

LITHUANIAN STUDENTS` EXPERIENCES WITH TECHNOLOGY: SOME IMPORTANT ISSUES

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Abstract

The role of ICT in education in whole and particularly in science education is very important topic. It is worth emphasizing that in recent years, a general degree of integrating ICT in the process of teaching has increased in Lithuania as well as in other countries. It is accepted that ICT makes the process of teaching/learning more effective and beneficial whereas the education system starts functioning faster. The development of ICT and the process of globalization determine alteration in the education system as well as in the whole society. The implementation of new technologies in the educational process raises new possibilities for both teacher and learner, enhances education quality and makes the educational process more versatile. The research 'Student and Computer-Based Technologies' was conducted in January – March, 2010. Research sample consisted of 663 respondents who were 1st year university students (freshmen). To analyze research data, the measures of descriptive statistics (absolute and relative frequencies, popularity/usefulness/necessity indexes) have been applied. It has been stated, that respondents have practically unlimited opportunities to use mobile phone, computer, internet and e-data mini storage device - USB stick. Relatively new and rather expensive digital technologies are barely used. The most useful information communication technology for the first year students while studying is compute.

Key words: *information communication technologies, first year students, experience.*

Introduction

Rapid growth of information communication technologies and their penetration into education process is inevitable. New innovative technologies are constantly being created. We can mention one of the newest technologies – Augmented Reality teaching/learning platform – having been created while implementing international science innovation project „ARiSE“ (Augmented Reality in School Environments). 21st century requires from the teacher deeper understanding of the pupil's general ability and culture competence education. It is necessary to seek that the pupil could be able operatively react to rapid society changes, to be flexible, active, trying to improve and form an attitude that he will have to learn for the rest of his life. On the other hand, the amount of information is continuously growing. The need rises to use the newest ICT effectively. Using ICT gives many possibilities to make education process more picturesque, more interesting and more diverse. The same attitudes are valid in the university study process as well. It would seem that pupils nowadays are able to use information communication technologies rather well. However, we can notice that quite often a lot of difficulties arise both to students and teachers trying to effectively use ICT in the study process.

Using ICT is very important for scientists and teachers because currently without using them or using insufficiently will not guarantee suitable standard of the studies. It is also obvious, that practically all ICT can be useful in the studies. The question is how to find optimal balance between the newest and classical technologies.

Researches carried out in various countries show that students' preparation level of using ICT is different. The research conducted in Australia shows that many first year students are highly tech-savvy (Kennedy, Judd, Churchward, Gray, Kerri-Lee Krause, 2008). However, the researchers state that when one moves beyond entrenched technologies and tools, the patterns of Access and use of a range of other technologies show considerable variation. The research carried out in Denmark, in which first year medical students participated, showed that significantly more males than females had access to a computer at home, and males had a more positive attitude towards the use of computers in their medical studies (D, rup, 2004). Similar results were received in Great Britain. The researchers stated that students are receptive to new types of ICT in principle, although their level of familiarity and comfort with each application of technology varies (JISC research report, 2008). The researches are being carried out seeking to analyze the usage and effectiveness of very specific ICT in the study process. For example, it has been stated, that integration of educational technology such as wireless keypads are considered important elements in undergraduate health care students learning approaches. Williams, B., & Boyle, M. (2008) stated that students enjoy learning when using wireless keypads and that they offer an alternative and innovative pedagogical tool in providing better appreciation and understanding of other health care disciplines. Knowing the students' abilities in using ICT is important. As to researchers, by knowing the level of technological experience that students have when they arrive, university can utilize the most appropriate strategies, methods, and resources to help students (Arora, 2005; Frankowicz, 2008; Turčani, Kapusta, 2008; Lamanauskas, 2009). It is obvious that students need strong technology skills to succeed in the world of work. The main questions are still open:

- How does technology enhance student achievement?
- How to assess student progress in using ICT? or how to find the most appropriate ways of assessing existing skills?
- How to effectively incorporate modern ICT into study process?

Hence, the object of research is the first year students' experiences with technology. The aim of the research is to analyze the first year students' experiences in using modern ICT.

Methodology of Research

General Characteristics of Research

The research Student and Computer-Based Technologies was conducted in January – March, 2010. Before that a pilot research entitled Student and Computer-Based Technologies was conducted in October – November, 2009 (Lamanauskas, Šlekienė, Ragulienė, 2009). The main results were presented at international scientific conference in Slovakia (Lamanauskas, Šlekienė, Ragulienė, 2010).

The Applied Instrument

To collect the required data, an anonymous questionnaire including four main blocks was prepared. Questionnaire arranged by Australian researchers was used as a research instrument (Kennedy, Judd, Churchward, Gray, Kerri-Lee Krause, 2008). Questionnaire comprises four main blocks: demographic information (5 items), access to hardware and the Internet (13 items), use of abilities and skills with technology based tools (Computer: 11 items; Web: 18

items; Mobile phones: 8 items) and preferences for the use of technology based tools in University studies (19 items). Mentioned instrument was partially modified taking into account the study specifics of Lithuanian universities.

Research Sample

663 university studies' first year students participated in the research. From them – 469 Siauliai University, 82 – Vilnius pedagogical institute, 112 – Kaunas medical university students. According to sex 421 female (63.5%) took part in the research and 242 (36.5%) male. From them 295 (44.5%) respondents, city school graduates, 368 (55.5%) regional school graduates.

Table 1. Respondents' Characteristics (N/%).

According to sex	Female	Male	Total
	421/63,5	242/36,5	663/100
According to school graduation place	City school	Regional school	Total
	295/44,5	368/55,5	663/100
According to university	Siauliai university	Vilnius pedagogical university	Kaunas medical university
	469/70,7	82/12,4	112/16,9

Sampling was structured applying the stochastic method of group selection i.e., a consecutive 'bunch' system. Research sample is considered to be sufficiently reliable because of several reasons: sample contains students from three Lithuanian universities; all first year students graduated from secondary comprehensive schools in different places of Lithuania, therefore it is likely that they have varied experience in the field of using ICT.

Statistical data analysis

To analyze research data, the measures of descriptive statistics (absolute and relative frequencies, popularity/usefulness/necessity indexes) have been applied. Independent Samples Test – t-test for Equality of Means has been applied for comparing possible differences between features. The SPSS statistics batch is used as an instrument for data processing.

Results of Research

Respondents were asked what possibilities they have of using mobile phone, computer, camera, USB sticks, other technologies and the Internet (Table 2).

Table 2. Students about possibilities of using computer technologies (N/%, PI – Possibility index, $0 \leq PI \leq 1$).

Your possibilities of using information computer technologies and internet	Unlimited	Limited	Have no access	PI
Mobile phone	584/88.1	56/8.4	23/3.5	0.92
Desktop computer	458/69.1	157/23.7	48/7.2	0.81
'Laptop' computer	410/61.8	101/15.2	152/22.9	0.69
'Palmtop' computer	38/5.7	62/9.4	563/84.9	0.10

Digital camera		414/62.4	144/21.7	105/15.8	0.73
Digital video camera		182/27.5	152/22.9	329/49.6	0.39
Memory stick		571/86.1	52/7.8	40/6.0	0.90
MP3 player		434/65.5	94/14.2	135/20.4	0.73
iPod touch		64/9.7	74/11.2	525/79.2	0.15
GPS navigator		74/11.2	128/19.3	461/69.5	0.21
Portable library (eBook Reader)		22/3.3	72/10.9	569/85.8	0.09
Games console		87/13.1	106/16.0	470/70.9	0.21
Internet	Broadband	376/56/7	63/9.5	224/33.8	0.61
	Dialup	234/35.3	120/18.1	309/46.6	0.44
	Wireless	260/39.2	94/14.2	309/46.6	0.46

94.6% of respondents have unlimited possibilities of using computer. In the questionnaire, three kinds of computers are distinguished: desktop computer, laptop computer and palmtop computer. The biggest possibility is of using desktop computer (possibility index PI = 0.81, standard deviation SD = 0.31), palmtop computer is used the least (PI = 0.10, SD = 0.26). This is one of the newest computer technologies, which is not very widely spread among our youth yet.

A statistically significant difference has been noticed between students having graduated from city and regional schools. Regional school students have bigger possibilities of using laptop computer (PI = 0.76), than city students (PI = 0.61). The null hypothesis about equal averages is rejected considering the level of significance which is $p < 0.001$; $df = 661$; $t = -4.64$. We may assume that when acquiring a new computer, regional school students give preference to laptop computer.

Students, having unlimited possibilities of using computer, also widely use the most popular e- data mini storage device- USB stick (PI = 0.90, SD = 0.26). It seems to be an inseparable means of linking individual computers.

88.1% of respondents have unlimited possibilities of using a mobile phone. Possibility index of using a mobile phone is PI = 0.92, SD = 0.22 and only 3.5% do not have access to mobile phone. Digital camera is rather widely used as well (PI = 0.73, SD = 0.38). Digital video camera is already not so popular among students (PI = 0.39, SD = 0.42). Less than one third of respondents have unlimited possibilities of using digital video camera (182/27.5 %) and almost half of them have no access (329/49.6 %). GPS navigator (PI = 0.21, SD = 0.34) and games console (PI = 0.21, SD = 0.36) have little popularity. iPod touch is little used (PI = 0.15, SD = 0.32) and eBook Reader is used very little (GI = 0.09, SD = 0.23). These are relatively new, rather expensive digital technologies that are not directly related with the studies. We could ascribe them to luxury or goods of specific interest. Statistics showed that respondents having e.g., iPod touch usually also have a GPS navigator (correlation coefficient $r = 0.402$), e-Book Reader ($r = 0.447$), digital video camera ($r = 0.415$), palm computer ($r = 0.484$). This is probably predetermined by family financial possibilities.

A statistically significant deviation was obtained which shows that students from the city (PI = 0.78) use MP3 players more than regional centre students do (PI = 0.68; $p < 0.001$; $df = 661$; $t = -3.01$). Analysis in terms of sex showed that males (PI = 0.28) more than females (PI = 0.17) use games console ($p < 0.001$; $df = 661$; $t = -3.63$) and GPS navigator: males - PI = 0.26, females - PI = 0.18 ($p < 0.005$; $df = 661$; $t = -2.76$).

92.3% of respondents have unlimited access to the internet. The biggest possibilities are of using broadband (cable) internet connection (PI = 0.61, SD = 0.46), and the least – dial-up connection (PI = 0.44, SD = 0.45), though dial-up connection is significantly more popular in

regions than in cities. Statistically significant difference was established on possibilities of using dial-up (modem) internet between students having graduated from city and regional centre schools: regional - $PI = 0.51$, city - $PI = 0.35$ ($p < 0.005$; $df = 661$; $t = -2.76$).

Questionnaire was made to find out how often and for what aims students are using computer (Table 3).

Table 3. Students about aims of using computer (N/%, UI – using index, $0 \leq UI \leq 1$).

How often do you use computer for these aims	Every day	Once a week	Once a month	Less than once a month	Do not use it	UI
Use a computer for writing documents (e.g. using <i>Word</i>)	143/21.6	294/44.3	128/19.3	91/13.7	7/1.1	0.68
Use a computer for data processing (tables, graphics and so on.)	50/7.5	281/42.4	188/28.4	122/18.4	22/3.3	0.58
Use a computer for working with digital pictures/photos	130/19.6	232/35.0	157/23.7	108/16.3	36/5.4	0.62
Use a computer for creating web pages (e.g. using <i>Dreamweaver</i> , <i>Frontpage</i>)	21/3.2	25/5.3	27/4.1	59/8.9	521/78.6	0.11
Use a computer for creating multimedia presentations	28/4.2	149/22.5	292/44.0	173/26.1	21/3.2	0.50
Use a computer for creating editing audio and video (e.g. <i>iMovie</i>)	33/5.0	103/15.5	127/19.2	156/23.5	244/36.8	0.32
Use a computer for general study, without accessing the web	200/30.2	177/26.7	130/19.6	84/12.7	72/10.9	0.63
Use a computer to play digital music files (e.g. <i>iTunes</i>) without accessing the Internet	491/74.1	67/10.1	43/6.5	33/5.0	29/4.4	0.86
Use a computer to play games, without accessing the Internet / web	133/20.1	136/20.5	78/11.8	94/14.2	222/33.5	0.45
Use a games console to play games	56/8.4	59/8.9	55/8.3	46/6.9	447/67.4	0.21
Use a handheld computer (e.g. a PDA) as a personal organiser	50/7.5	64/9.7	52/7.8	57/8.6	440/66.4	0.21

Students state that most frequently, almost daily they use computer for Listening to music without accessing the Internet ($UI = 0.86$, $SD = 0.27$), nearly once a week – for Preparing/writing documents ($UI = 0.68$, $SD = 0.25$), for General study, without accessing the web ($UI = 0.63$, $SD = 0.33$), for Working with digital pictures/photos ($UI = 0.62$, $SD = 0.28$). We can see that computer became a daily necessity for students. It is intensively used to both studies and leisure time.

Very rarely computer is used for creation of web pages ($UI = 0.11$, $SD = 0.25$). Only 3.2% of students create web pages every day and 78.6% - do not create at all.

Statistically significant difference was not obtained between students having graduated from city and regional schools on possibilities of using computer. However, a statistically significant deviation was established in terms of sex. Male students more frequently use computer for Playing games using a games console: male - $UI = 0.29$, female - $UI = 0.16$ ($p < 0.001$; $df = 661$; $t = -4.74$); for Playing games, without accessing the Internet: male - $UI = 0.58$, female

- UI = 0.37 ($p < 0.001$; $df = 661$; $t = - 6.69$); for Creating and editing audio and video material: male - UI = 0.41, female - UI = 0.27 ($p < 0.001$; $df = 661$; $t = - 5.59$); for Creating web pages: male - UI = 0.19, female - UI = 0.07 ($p < 0.001$; $df = 661$; $t = - 6.02$). We can assert that boys are using more complicated computer functions than girls. Besides, considerable correlation link was obtained between respondents having a digital video camera and using computer for creating and editing audio and video material ($r = 0.411$). Thus, students, filming important events for themselves, usually are able to use special computer programmes, i.e., they create and edit films themselves.

Table 4 shows for what aims students are using a mobile phone.

Table 4. Students about aims of using a mobile phone (N/%, UI – using index, $0 \leq UI \leq 1$).

How often do you use a mobile phone for these aims	Every day	Once a week	Once a month	Less than once a month	Do not use it	UI
Use a mobile phone to call people	531/80.1	86/13.0	16/2.4	27/4.1	3/0.5	0.92
Use a mobile phone to text/ SMS people	618/93.2	30/4.5	8/1.2	4/0.6	3/0.5	0.97
Use a mobile phone to take digital photos or movies	69/10.4	221/33.3	162/24.4	118/17.8	93/14.0	0.52
Use a mobile phone to send pictures or movies to other people	52/7.8	131/19.8	119/17.9	115/17.3	246/37.1	0.36
Use a mobile phone as a personal organiser (e.g. diary, address book)	77/11.6	115/17.4	83/12.5	78/11.8	310/46.8	0.34
Use a mobile phone to listen music, radio	213/32.1	143/21.6	84/12.7	90/13.6	133/20.1	0.58
Use a mobile phone to access information/ services on the web	99/14.9	94/14.2	65/9.8	108/16.3	297/44.8	0.35
Use a mobile phone to send or receive email	69/10.4	35/5.3	37/5.6	50/7.5	472/71.2	0.19

Students use basic functions of a mobile phone almost every day: sending SMS or MMS messages (UI = 0.97, SD = 0.11) and calling people (UI = 0.92, SD = 0.19). Besides, more than once a month the phone is used to listen to music, radio (UI = 0.58, SD = 0.38), to take photos or movies (UI = 0.52, SD = 0.30), and the least it is used to send or receive email (UI = 0.19, SD = 0.34). Statistically significant deviation on possibilities of using a mobile phone was noticed only in terms of sex. Male students more often than female students are using special mobile phone functions: to Take photos or movies - UI = 0.58, UI = 0.49 ($p < 0.001$; $df = 661$; $t = - 3.88$); to Surf the net: male - UI = 0.44, UI = 0.29 ($p < 0.001$; $df = 661$; $t = - 5.06$); to Receive and send email: male - UI = 0.25, UI = 0.15 ($p < 0.001$; $df = 661$; $t = - 3.68$); to Listen to music, radio: male - UI = 0.63, UI = 0.55 ($p < 0.01$; $df = 661$; $t = - 2.61$).

Respondents were asked for what aims and how often they use the Internet (Table5).

Table 5. Students about the aims of using the Internet (N/%, UI – using index, $0 \leq UI \leq 1$).

How often do you use the Internet for these aims	Every day	Once a week	Once a month	Less than once a month	Do not use	UI
Use the web to access a school or university portal	173/26.1	294/44.3	95/14.3	89/13.4	12/1.8	0.70
Use the web to look up reference information for study purposes (e.g. online dictionaries)	353/53.2	194/29.3	49/7.4	54/8.1	13/2.0	0.81
Use the web to browse for general information (e.g. news, holidaying, event timetables)	515/77.7	101/15.2	18/2.7	26/3.9	3/0.5	0.91
Use the Internet/web or a LAN to play networked games	171/25.8	134/20.2	87/13.1	98/14.8	173/26.1	0.51
Use the web to listen to sound recordings (e.g. via streaming audio or <i>iTunes</i>)	445/67.1	106/16.0	42/6.3	42/6.3	28/4.2	0.84
Use the web for other pastimes (i.e. for leisure activities, movies)	226/34.1	194/29.3	107/16.1	92/13.9	44/6.6	0.68
Use the web to buy or sell things (e.g. <i>eBay</i> , <i>Amazon</i> , air tickets.)	40/6.0	70/10.6	97/14.6	123/18.6	333/50.2	0.26
Use the web for other services (e.g. banking, paying bills)	43/6.5	151/22.8	181/27.3	92/13.9	196/29.6	0.41
Use the web to send or receive email (e.g. <i>Hotmail</i> , <i>Yahoo</i> , <i>Outlook</i>)	457/68.9	116/17.5	23/3.5	51/7.7	16/2.4	0.86
Use the web for instant messaging/ chat (e.g. <i>MSN</i> , <i>Yahoo</i> , <i>ICQ</i>)	555/83.7	58/8.7	10/1.5	26/3.9	14/2.1	0.92
Use the web to build and maintain a website	16/2.4	32/4.8	36/5.4	56/8.4	523/78.9	0.11
Use the web to download MP3 files (e.g. music, videos, podcasts)	317/47.8	183/27.6	64/9.7	77/11.6	22/3.3	0.76
Use the web to download software	136/20.5	176/26.5	176/26.5	103/15.5	72/10.9	0.58
Use the web to share photographs or other digital material (e.g. using <i>Blinklist</i> , <i>Flickr</i>)	145/21.9	183/27.6	170/25.6	98/14.8	67/10.1	0.59
Use the web to make phone calls (e.g. VoIP using <i>Skype</i>)	145/21.9	110/16.6	88/13.3	86/13.0	234/35.3	0.44
Use the web for web conferencing (e.g. using a webcam)	69/10.4	100/15.1	91/13.7	117/17.6	286/43.1	0.33
Use the web to read RSS feeds (e.g. news feeds)	76/11.5	102/15.4	60/9.0	82/12.4	343/51.7	0.31
Use social networking software on the web (e.g. <i>MySpace</i> , <i>Trendster</i>)	183/27.6	111/16.7	104/15.7	105/15.8	160/24.1	0.52

Most frequently students use the Internet for communication (UI = 0.92, SD = 0.21), to browse for general information (UI = 0.91, SD = 0.19), for e-mail services (UI = 0.86, SD = 0.26), to listen to music (UI = 0.84, SD = 0.28), for studies (UI = 0.81, SD = 0.26). The most seldom computer is used for creation of websites (UI = 0.11, SD = 0.24), for buying/selling (UI = 0.26, SD = 0.32). 27.6% of respondents every day take part in social websites (UI = 0.52, SD = 0.39), and 24.1% do not use these websites at all. A similar situation is with the games on the internet (UI = 0.51, SD = 0.39): 25, 8% use the internet for games every day and 26.1% do not

play on the internet at all.

A statistically significant difference was obtained between students having graduated from city and regional schools considering participation in social websites: city - UI = 0.575, regional - UI = 0.48 ($p < 0.005$; $df = 661$; $t = 2.79$). Statistical analysis showed that social websites are more popular in cities than in regions. Quite a few significant differences were noticed in the analysis concerning sex. Boys use the internet significantly more frequently than girls for these purposes: to Send various files (music, video, e-cards): males - UI = 0.82, females - UI = 0.73 ($p < 0.001$; $df = 661$; $t = -3.95$), to Download necessary software: males - UI = 0.74, females - UI = 0.48 ($p < 0.001$; $df = 661$; $t = -10.72$), to Watch films: males - UI = 0.77, females - UI = 0.62 ($p < 0.001$; $df = 661$; $t = -5.87$), to Play games: males - UI = 0.66, females - UI = 0.43 ($p < 0.001$; $df = 661$; $t = -7.51$), to Participate in conference calls/video conferencing: males - UI = 0.40, females - UI = 0.29 ($p < 0.001$; $df = 661$; $t = -3.89$), to Buy/sell: males - UI = 0.38, females - UI = 0.19 ($p < 0.001$; $df = 661$; $t = -7.41$), to Create websites: males - UI = 0.18, females - UI = 0.06 ($p < 0.001$; $df = 661$; $t = -6.25$). We can see that both boys and girls use the internet mostly for communication, for search of information and for e-mail services. However, boys use the internet much more variably than girls do.

The aim was to find out if information communication technologies are necessary studying at university (Table 6).

Table 6. Students about the necessity of communication technologies for studies (N/%, NI – necessity index, $0 \leq NI \leq 1$).

Do you need these information communication technologies while studying	Yes	Neither yes nor no	No	NI
A computer for general study	631/95.1	27/4.1	5/0.8	0.97
A computer to create documents (e.g. using <i>Word</i> , <i>Excel</i> , PDFs)	597/90.0	58/8.7	8/1.3	0.94
A computer to create web pages (e.g. using <i>Dreamweaver</i> , <i>Frontpage</i>)	100/15.1	152/22.9	411/62.0	0.27
A computer to create multimedia presentations (e.g. <i>PowerPoint</i> , <i>Director</i>)	537/81.0	107/16.1	19/2.9	0.89
A handheld computer (e.g. a PDA) as a personal organiser (e.g. diary, address book)	51/7.7	123/18.6	489/73.7	0.17
The web to access a learning portal (e.g. a 'Course' or 'Learning Management System')	481/72.5	126/19.1	56/8.4	0.82
The web to look up or search for information (e.g. online dictionaries, <i>Google</i>)	612/92.3	36/5.4	612/92.3	0.95
The web for other services (e.g. enrolment, sign up for tutes, paying fees)	315/47.5	175/26.4	173/26.1	0.61
The web for instant messaging/ chat (e.g. <i>MSN</i> , <i>Yahoo</i> , <i>ICQ</i>)	545/82.2	78/11.8	40/6.0	0.88
The web to build and maintain a website	78/11.8	128/19.3	457/68.9	0.21
Social networking software on the web (e.g. <i>MySpace</i> , <i>Trendster</i>)	252/38.0	239/36.0	172/26.0	0.56
The web to download MP3 files (e.g. podcasts, <i>iTunes</i>)	567/85.5	66/10.0	30/4.5	0.91
The web to download software	474/71.5	129/19.5	60/9.0	0.81
The web for web conferencing (e.g. using a webcam)	181/27.3	239/36.0	243/36.7	0.45
The web to read RSS feeds (e.g. news feeds)	161/24.3	186/28.0	316/47.7	0.38
A mobile phone to send or receive text messages/ SMSs	517/78.0	72/10.9	74/11.2	0.83
A mobile phone to send or receive email	173/26.1	138/20.8	352/53.1	0.37
A mobile phone as a personal organiser	141/21.2	188/28.4	334/50.4	0.35
A mobile phone to access web based information or services	149/22.5	181/27.3	333/50.2	0.36

The most needful information communication technology for the first year students is computer. Most of all it is necessary for general studies (NI = 0.97, SD = 0.13), to create documents (RI = 0.94, SD = 0.18), to make presentations (NI = 0.89, SD = 0.24). While studying the internet is the most needful for information search (NI = 0.95, SD = 0.18), to download various files (NI = 0.91, SD = 0.25), to talk/communicate (NI = 0.88, SD = 0.26), to download necessary software (NI = 0.81, SD = 0.32). According to respondents, palmtop computer is little necessary for studies to organise personal schedule (NI = 0.17, SD = 0.31) and mobile phone for organising personal schedule (NI = 0.35, SD = 0.40). Few respondents require computer to create websites (NI = 0.27, SD = 0.37), and the internet to create websites (RI = 0.21, SD = 0.35). Such results were expected because the great majority of respondents are studying social sciences.

Statistically significant difference was not noticed concerning the necessity of communication technologies for studies between students having graduated from city and regional schools. Analysis considering sex showed that information communication technologies in some aspects are more necessary for boys: Internet for downloading necessary software; male - NI = 0.87, female - NI = 0.78 ($p < 0.001$; $df = 661$; $t = -3.39$), Mobile phone for searching the net: male - NI = 0.45, female - NI = 0.31 ($p < 0.001$; $df = 661$; $t = -4.37$), Computer for creation of websites: male - NI = 0.38, female - NI = 0.20 ($p < 0.001$; $df = 661$; $t = -5.96$), Internet for creation of websites: male - NI = 0.31, female - NI = 0.16 ($p < 0.001$; $df = 661$; $t = -5.76$).

Discussion

The process of training the teachers of sciences in Lithuania is aimed at developing teacher's abilities to work in a new teaching/learning environment applying the newest didactical principles. The methodology of preparing teachers is based on constructive teaching that refers to the principles of humanistic education. All constructive methods are combined adopting an attitude towards knowledge acquisition as an active process of knowledge construction the student in which performs the most important role.

Achievements in the field of information technologies have been noticed and used for a rather long period of time, nevertheless, the present and constantly increasing level of computerizing universities and schools enables to realize it in a more attractive and qualitative way.

However, a number of teachers applying ICT for education purposes encounter didactic problems as they:

- do not have appropriate qualification to work with computer and complex software;
- feel a lack of time to get confidence in ICT and find out complex the programs applied in the classroom and practical activities when working with students;
- suffer from a shortage of willingness, initiative and enthusiasm.

A crucial point is that employing ICT must be highly efficient in the process of training would-be teachers of sciences. The students graduated from comprehensive or upper secondary (gymnasium) schools have a broad knowledge of mastering ICT the major part of which are PCs, palmtop computers, mobile phones, different kinds of audio, video and digital players etc. In this case, we encounter a problem of how to properly develop the acquired abilities in the further process of studying. The researchers agree that the used 'living technologies' are treated as 'learning technologies' (Kennedy, Judd, Churchward, Gray, Kerri-Lee Krause, 2008). The students most frequently use ICT as social or entertainment technology in their free time. The integration of the acquired abilities in the process of studies (using the obtained knowledge for the purposes of learning) is neither an easy nor automatic process (Kirkwood, Price, 2005; Katz, 2005; Bierwagen, 2010) but a very important one as increases students' abilities to study (Beyerbach, Walsh, Vannatta, 2001; Campbell, Kent, 2010).

A large number of recently conducted researches in the field have concentrated on separate instruments like laptop computers, mobile phones, interactive whiteboard etc. as well as on ICT as tools for investigating the wholeness. Full attention has been devoted to examining the efficiency of different ICT in the process of studies (Deng, Doll, Truong, 2004; Selwyn, 2006; Tunku Badariah Tunku Ahmad, Kamal Basha Madarsha, Ahmad Marzuki Zainuddin, Nik Ahmad Hisham Ismail and Mohamad Sahari Nordin, 2010). Our research has also revealed that the effective use of ICT depends not only on the already acquired abilities but also on appropriate teacher training and the available infrastructure of studies. It is clear that the latest ICT such as handled computer are relatively expensive and still rarely employed. In this context, the teachers of universities play a fundamental role. The representatives of an older generation are insufficiently familiar with using ICT, and therefore avoid applying them in the educational process. Thus, the executives of universities and staff responsible for the quality of the studying process should pay attention to the encountered situation and find proper ways to develop the skills of science teachers in the field of ICT. B. Hoffman (2001) notices that successful implementation of ICTs need to address five interlocking frameworks for change: the infrastructure, attitude, staff development, support (technical and administrative) and also sustainability and transferability. The question of the sex remains a burning issue. Certain differences between male and female students especially between those studying social sciences and humanities in the area of using ICT can be noticed. The researchers only confirm the fact that such differences are really enormous (Markauskaite, 2006; Valasidou, Bousiou-Makridou, 2008; Mahmood, 2009). Further research has to be done to find out what importance these differences have attaining equality. Another important point is to work out reliable methodologies in order to decrease the above introduced differences at university level.

Conclusion

Having generalized the results of the research *Student and information communication technologies*, we can assert that:

- Respondents have practically unlimited possibilities to use a mobile phone, computer, internet and e- data mini storage device - USB stick.
- Relatively new and very expensive digital technologies, such as iPod touch, eBook Reader, palmtop computer, GPS navigator and other are still little used.
- Respondents, having, for example, iPod touch, most frequently have GPS navigator, eBook Reader, digital video camera, palmtop computer. This might be predetermined by family financial possibilities.
- Computer became everyday necessity for students. It is intensively used both for studies and for leisure time. Boys use more complicated computer functions than girls.
- Almost every day students are using basic mobile phone functions (SMS texting and calling people). Special mobile phone functions (listen to music, radio, take photos or record videos, receive and send e-mail) boys use more often than girls do.
- Respondents usually use the internet for communication, information search and for e-mail services. Boys use the internet much more variably than girls do.
- The most needful information communication technology while studying for the first year students is computer. It is the most needful for general study needs, to create documents, to make presentations and so on.

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