The Comparison of Different Age Groups on the Attitudes toward and the Use of ICT[*]

Milan KUBIATKO[a]
Masaryk University

Abstract

Different factors may be influencing the use of information and communication technology (ICT). One of the important factors is age. The society is divided into different groups according to age. A well-known age-based categorization, commonly used especially in the field of economics,, is based on whether people belong to the Millennial Generation which are born after 1980. The Millennial generation has some typical behaviors which are different from those of the older people regarding ICT. In this study Millennial Generation was compared to other older respondents while also taking into account factors like gender and residence. The sample was composed of 266 respondents from ages between 18 and 57. The questionnaire was administered on an e-form and contained 73 items regarding the use of Internet and ICT and attitudes toward these. The items regarding the attitudes were 5-point Likert type items and the items regarding the use of Internet and ICT had multiple-choice answers with 2 to 5 options to choose from. The first part of questionnaire included demographic variables like gender, age, the ownership of PC, etc. The analysis of the data focused on determining the differences in the use of Internet and ICT. The methods of inductive statistics like Analysis of Variance (ANOVA) were used. Reliability was tested by conducting a Cronbach's alpha coefficient analysis. The construct validity was determined by using an exploratory factor analysis.

Key Words

Information and Communication Technology, Millennial Generation, Questionnaire, Quantitative Analysis.

The concept Millennial Generation is commonly used in the field of economics. The penetration of this concept into education was relatively slower as it was in the economics. The concept of Millennial generation was first defined in the work of Tapscott (1997), who was later followed by other researchers, for example Prensky (2001). The definitions of these researchers were very similar. For them the Millennial Generation perceived ICT in a more positive way in comparison to the older respondents, who were called "digital immigrants". Later, the definition of Millennial Generation was made more pre-

cise. They "live while working", are oriented toward competence rather than hierarchies, and computers are part of their daily routine (Schmidt et al., 2011). Akande (2008) talked about the people belonging to the Millennial Generation as the people, who are internet savvy, phone-addicted, opportunistic and digitally conscious. Net Generation was defined as the population of young people, "Millenials", (Howe & Strauss, 2000, 2003), who have grown up or are growing up in constant contact with digital media (Tapscott, 1988). They are smart but impatient. They expect results immediately. Goldenberg (2005) de-

fined "Millennial Generation" as the people who prefer using Internet to shop over going for shopping, etc. They are comfortable; they connect to their PC and watch TV every day, access movies and turn on/off their house alarm systems. This generation created a digital lifestyle (Goldenberg). Djamasbi, Siegel, and Tullis (2010) characterized the Millennial Generation as very large and economically powerful, and Malykhina (2008) wrote that this generation looked to Web for answers. According to Arhin and Johnson-Mallard (2003) these young people lived in households where both parents worked, and single parents were employed. They have grown up with computers; they are digitally or technologically literate. They tend to be inventive and are self-sufficient problem-solvers. They often desire support and feedback, but detest authoritative control, expect immediate answers and feedback. According to Bennett, Maton, and Kervin (2008) young people have been immersed in technology all their lives, a condition, that imbued them with sophisticated technical skills and learning preferences for which traditional education was unprepared.

Literature Review

The majority of research studies focused on the perception of ICT by Millennial Generation or the comparison of Millennial Generation with older respondents. It is possible to come across different kinds of investigations. For example Hills, Smith, and Warren-Forward (2012) analyzed anonymous responses of educators about Millennial Generation. Descriptive statistics, attribute coding and content analysis were used. But, as it was mentioned above, other kind of studies are predominant. Most educators described Millennial Generation as students who are confident with technology, confident in their skill level and easily bored. They have problems with casual communication; have poor professional behaviour and can´t accept it when they receive negative feedback. Liu (2010) did a study using in-depth interviews to compare the attitudes about Internet between Chinese and Norwegian high-school students. Valtonen, Dillon, Hacklin, and Väisänen (2010) conducted a questionnaire survey with 1070 Finnish students of Millennial Generation, which focused on social networking. Another survey (Selwyn, 2009) tested the accuracy of the description of digital native in reflecting young people´s actual uses of digital technology and digital information. Djamasbi et al. (2010) focused on what attracts the attention of Millennial Generation. They preferred pages that

include a main large image, image of celebrities, little text and a search feature. Beyers (2009) proposed a five dimensional model for educating the Millennial Generation which consists of survival strategies, knowledge and comprehension, spatial orientation, time and global vision. There are many research reports that focus on different strategies for an effective teaching of Millennial Generation (Arhin & Johnson-Mallard, 2003; Bennett et al., 2008; Beyers). Their learning styles are more active and visual rather than verbal (Arhin & Johnson-Mallard). They learn differently as compared to past generations of students. They are considered to be active experimental learners, proficient in multitasking, and dependent on communication technologies for accessing information and for interacting with others (Oblinger & Oblinger, 2005; Prensky, 2001). Jones and Hosein (2010) used factor analysis. Their research found that students can be categorized into clusters based on whether they were web interactive, technical-oriented, social interactive, game-oriented or work-oriented. Young students of Arhin and Johnson-Mallard were highly socially interactive whilst distance-learning students were less socially interactive. The age, gender, mode of study and the national origin of students all play a role in explaining the pattern of students´ engagement with new technologies. Kennedy, Judd, Dalgarno, and Waycott (2010) identified in sample of 2096 Australian university students four types of technology users: power users, ordinary users, irregular users, basic users. Chi-square analyses revealed significant associations between different types of technology users and the university that students attended, their gender and age and whether the student was local or international. No associations were found in analyses related to the discipline of study, socio-economic status or rurality of residence. Research findings have identified as an important factor the developing capacity of short-term memory (Cowan, Nugent, Elliott, Ponomarev, & Saults, 1999). As this capacity increases with age, so too do children's abilities to scan information more quickly, apply strategies to transform it more rapidly, hold more information within memory and move between tasks more easily. Twenge (2009) summarized that people belonging to the Millennial Generation are able to benefit from the kinds of information, which are in the electronic form, from using ICRs very often for study or work. Millennial Generation trust the kinds of information on the Internet, and are able to perform other activities beside their work. Millennial Generation likes the text divided into short parts transcended by pictures.

Purpose of Study

In the context of Slovakia and Czech Republic this issue of Millenial Generation was not investigated with respect to the educational environment. Also this issue is relatively less investigated in comparison to how much it was investigated in the field of economics. The research tool presented in the next section was created in line with other studies as much as possible while trying to change aspects which may differ across contexts regarding the Millennial Generation's situation with respect to the older respondents.

The main aim of this investigation was to compare the Millennial Generation with older respondents (Generation X) on the use of Internet and ICT and their attitudes toward these.

The following two aims are focused only on the Millennial Generation. First aim is to compare boys with girls on the use of Internet and ICT and their attitudes toward these. The second aim is to find out any differences between the respondents from villages and the respondents from towns on the use of and the attitudes toward Internet and ICT.

In line with these aims the following research questions were formulated:

1. Is there any difference in the use of Internet and ICT and the attitudes toward these between Generation Y and X?

2. Does the gender have an effect on the use of and the attitudes toward ICT and Internet in Millennial Generation?

3. Is there any difference in the use of and the attitudes toward ICT and Internet with respect to the different places of residence where the Millennial Generation respondents live?

Method

Respondents

The sample (n = 266) composed of respondents from Slovakia and Czech Republic. The respondents were from different backgrounds within each country. Some of them were university students. Others were elementary, high schools and university teachers. There was an interest to find out the difference between the Millenial Generation and Generation X, so we primarily divided our sample into these two groups. The number of respondents in the Millennial Generation group was N = 200 and in the Generation X group 66 members. The respondents included in the Millennial Generation

group were born in 1981 and later and the respondents included in the generation X group were born before 1981. The average age of respondents was 26.36 years (SD = 10.39). The youngest respondent was 17 years old and the oldest respondent was 57 years old. In the Millennial generation group the number of boys was 52 and the number of girls 148. The number of respondents from towns in the Millennial Generation group was 119 and the rest (n = 81) were respondents from villages.

The Instrument

A self-constructed questionnaire was used as a research tool. It consisted of three main parts. The first part consisted of demographic variables (gender, age, residence). The second part focused on the use of ICT and Internet. This part contained 9 items with different possibilities of answer. The majority of items (6) were dichotomous (yes – no/ true – false). For two items it was possible to choose several answers and one item was rated on a 4-point scale. The last one consisted of eight sub-items. In this paper only the last item with sub-items was evaluated, because the results of other items were already published. The last part of the questionnaire consisted of 64 5-point Likert type items (totally disagree – slightly disagree – nor agree/ nor disagree – slightly agree – totally agree). They focused on the different kinds of ICT. For example, these were the use of ICT at work, opinion on social networks, opinion on downloading music, and movies etc. Items in this part were negatively and also positively couched in. The positive items were coded in the following way: totally disagree – 1.........totally agree – 5. The negative items were coded in the reverse order. The number of positive items was 46 and the number of negative items was 18. The overall score showed the attitudes toward ICT and Internet. If score was within the interval of <2.75; 3.25> the attitude was neutral, if the score was lower than 2.75 the attitude was negative and if the score was higher than 3.25 the attitude was positive. The validity of the questionnaire was ensured by two experts in the field of ICT. According to their comments the items were modified to constitute the final version, which was used in the main investigation/ survey. The validity of the last part of the questionnaire was ensured by an exploratory factor analysis (see subchapter Data analysis).

Administration of the Instrument

The questionnaire was distributed in two different

ways. First, it was given on lectures by one of the authors. Second, it was administered through an electronic form. The link was e-mailed to the respondents. All respondents were assured about the anonymity of their questionnaire answers and were told that the data will be used only for research purposes. The respondents filled the questionnaire in no more than 20 minutes. All returned questionnaires were entered to the computer and included in the next analysis.

Data Analysis

The data from the item regarding the use of ICT and Internet and the data from the scaled item from the second part (never – 1; one per month – 2; one per week – 3; almost every day – 4) were recorded on the number form. The reliability of the third part of questionnaire was calculated. The value of Cronbach's alpha ($\alpha = 0.83$) indicated high a reliability of the attitude part of the questionnaire. The values of alpha for factors were from 0.51 to 0.66, that were satisfactory for the reliability of the factors (Kerlinger & Lee, 2000).

An exploratory factor analysis with Varimax rotation was used for the determination of validity. The suitability of using a factor analysis was ensured by the outcome of a KMO test producing a value of 0.68 and a Bartlett test of sphericity ($\chi^2 = 4774.81$; $p < 0.001$). These values indicated the suitability of using a factor analysis. The factor analysis divided attitude items into seven factors: 1. Work and ICT (15 items); 2. Internet as a source of information (6 items); 3. Social networks (14 items); 4. The security of Internet (13 items); 5. The difficulty of the internet using (5 items); 6. The importance of the

Internet (5 items); 7. Other media and Internet (6 items). The marginal value of factor score was 0.30. The results of factor analysis are presented in table 1.

For the evaluation of data the methods of inferential statistics were used. The first method was a t-test for the independent samples, where the groups of respondents according to age (Millennial Generation and Generation X) were the independent variable and their scores on the attitudes was the dependent variable. The next analysis was an analysis of covariance, which was applied to the analysis of gender and residence in the Millennial Generation. The age was as a covariate. The use of ICT was evaluated only by percentages and by the two groups (Y and X Generation were compared). For determining relations between factors the Pearson product moment was used. As it is seen we used methods of parametric statistics. The use of these methods was established by a Kolmogorov-Smirnov test which produced a value of d = 0.05; $p > 0.20$.

Results

The overall score of the attitude section was 3.02 (SD = 0.32), which indicated a neutral attitude. In Figure 1 the distribution of scores by factors is shown. The lowest score was found on the dimension of "Social network" and the highest score was found on the dimension of "The security of Internet".

The Millennial Generation respondents achieved a higher score (x = 3.04; SD = 0.33) in comparison to the Generation X respondents (x = 2.93; SD = 0.28). This difference was significant (t = 2.51; $p < 0.05$). There was also a significant difference between generations by the factors. The distribution of scores for factors between the Millennial
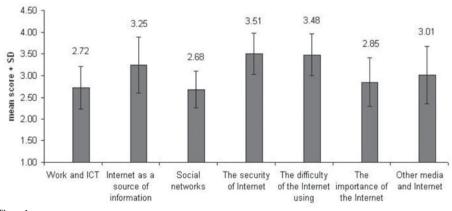

Figure 1.

The Mean Score for Factors

Table 1.

The Result of Exploratory Factor Analysis

	α	I	II	III	IV	V	VI	VII
I. Work and ICT	0.66							
12. I have no problems using internet in my phone.		**0.37**	0.01	-0.07	-0.08	0.19	0.06	-0.04
33. It's normal, during working hours, to be logged into the Facebook account.		**0.72**	-0.01	0.17	-0.01	0.09	0.06	0.02
34. Skype or ICQ is normal for me to be turned on, during working hours / education at school.		**0.82**	-0.05	0.01	0.08	0.00	-0.01	0.11
35. I consider admittedly to "Speak or chat" on ICQ during my working time or lecture for solving privat or working problems.		**0.71**	0.12	0.06	0.09	0.06	0.00	0.02
36. I consider the meetings by videoconferences more effective (time saving) than face-to-face meeting.		**0.73**	0.05	0.07	0.09	-0.03	-0.11	0.16
37. It is not advisable to use working e-mail for privat intention.		**0.75**	-0.04	0.05	0.02	0.01	0.02	0.02
38. A short break during working time, which I spend playing computer games, I find suitable for relax.		**0.34**	0.00	-0.03	-0.01	0.01	0.10	-0.06
39. I consider normal to work out of workplace (I take my work home).		**0.78**	0.04	-0.01	-0.02	0.04	0.08	0.05
42. I consider normal to locate personal photos on websites.		**0.36**	0.09	0.12	-0.05	0.09	0.04	0.06
48. I express my mood through emoticons (smiles).		**0.34**	0.05	0.03	0.14	0.02	0.11	0.04
49. It is normal not to use diacritical signs in SMS or e-mail.		**0.53**	0.06	-0.04	0.05	-0.06	0.09	-0.04
52. I express sympathy to addressee through emoticons.		**0.38**	0.14	0.15	0.06	0.01	-0.01	-0.01
53. Emoticons should not be used in mail messages.		**0.38**	0.05	0.11	-0.06	-0.40	0.03	-0.08
55. I consider normal when the computer is on constantly.		**0.62**	0.01	-0.07	0.01	0.19	-0.09	0.03
62. Some Web sites should be censored.		**0.37**	-0.02	0.10	0.22	0.06	0.13	-0.26
II. Internet as a source of information	0.54							
13. I prefer to use e-mails than classic post mails.		0.04	**0.74**	0.10	0.11	-0.08	0.13	-0.01
14. I send letters or postcards only in extraordinary cases.		-0.01	**0.82**	-0.05	0.14	0.09	0.02	-0.01
15. Sending letters by post gradually (over the next five years) completely extinguishes.		0.12	**0.37**	0.17	0.09	-0.07	-0.05	0.06
31. I consider encyclopedias on internet (for example Wikipedia) as trustworthy.		-0.05	**0.35**	0.20	0.12	-0.01	-0.08	0.09
56. There is some information on internet that can't be found.		0.04	**0.75**	-0.08	0.09	0.04	0.01	0.12
60. All information I need I can find on internet.		0.15	**0.75**	0.03	0.07	0.00	0.17	0.10
III. Social networks	0.56							
16. I like to chat.		0.23	0.15	**0.34**	0.13	-0.08	0.14	0.25
17. I prefer talking face to face to chat.		0.05	-0.02	**0.73**	-0.03	0.09	-0.12	-0.04
18. I don´t know about advantages of chat than the interview face to face has.		0.04	0.04	**0.89**	-0.05	-0.22	-0.01	0.26
19. I consider Facebook as portal, I can get to know information important for my life.		0.04	-0.09	**0.60**	0.15	0.14	-0.05	0.05
20. Through Facebook I learn a lot about my friends.		0.08	0.18	**0.63**	0.05	0.05	0.16	0.05
21. Facebook helps me to get to know a lot about unknown people.		0.00	0.01	**0.69**	0.10	0.04	0.12	-0.04
22. Through Facebook I arrange acquaintances with people, with whom, in a real world, I would have never try to.		0.11	0.03	**0.71**	0.07	-0.10	0.10	0.05
23. Social networks (e.g. Facebook) limit privacy.		0.05	0.03	**0.77**	0.00	0.04	0.02	-0.05
24. Social networks such as Facebook are for entertainment purposes only.		-0.06	0.02	**0.47**	-0.03	0.00	-0.09	0.02
25. I consider the spending time on social networks such as loss of time.		0.14	0.00	**0.66**	0.13	-0.08	0.07	0.19
46. I prefer to use electronic communications (mail, chat ...).		0.20	-0.03	**0.35**	-0.06	-0.08	-0.08	-0.17
47. I have to have personal contact with someone to add him on Facebook.		0.25	0.00	**0.31**	-0.03	-0.09	-0.11	0.09
50. I carefully choose who I add as a friend on Facebook.		0.10	-0.10	**0.34**	-0.06	-0.13	0.01	0.09
61. Internet allows people in distant collaboration.		0.02	0.19	**0.38**	0.16	0.04	0.32	0.09
IV. The security of Internet	0.65							
26. It is reliable to purchase goods through internet.		0.27	0.09	0.01	**0.33**	0.01	0.11	-0.08
27. Electronic banking is danger because of inadequate securing of account.		0.08	-0.03	-0.06	**0.80**	-0.05	-0.02	0.03
28. I consider downloading the movies films from internet as crime.		0.19	0.03	0.02	**0.45**	0.37	-0.03	0.25
29. I cannot imagine my life without internet.		0.07	0.01	0.16	**0.82**	0.01	0.11	0.03
30. PC is necessary in today's life for people.		-0.03	0.11	0.05	**0.67**	-0.08	0.11	-0.07
41. I could not imagine life without Internet.		0.15	0.10	0.09	**0.75**	-0.02	0.02	0.22
43. The use of a computer is very limited, if it's not connected to internet.		-0.05	0.01	0.08	**0.74**	0.06	0.00	0.01
44. I find it normal to use internet every day.		0.08	0.14	-0.03	**0.61**	0.08	0.07	0.13
51. I consider normal to use software that is illegal (i.e. cracked...)		0.24	0.04	0.10	**0.35**	0.21	0.05	0.08
63. Internet saves time.		0.12	0.03	0.12	**0.40**	-0.05	0.12	0.13
65. Internet helps in plagiarism/ to violate the authors´ rights in large amount.		-0.03	-0.13	-0.17	**0.39**	-0.08	-0.12	-0.02
66. Internet access has to be free of charge everywhere.		0.07	0.03	-0.02	**0.35**	0.05	0.07	0.05
67. It is good when I can accommodate some things over Internet and don't need to go to the bank, the post office or shop in person.		0.02	0.08	-0.09	**0.43**	0.09	0.25	-0.03
V. The difficulty of the Internet using	0.52							
40. I'd rather use my own software as a pre-determined one (suggested by an employer).		0.24	-0.01	0.00	-0.06	**0.66**	0.05	0.14
57. Internet is easy to use for a 6 year old child.		0.08	0.02	-0.01	0.05	**0.50**	0.06	0.02
58. No computer is safe from hackers.		-0.11	0.17	0.11	0.06	**0.31**	0.02	0.03
68. Only programmers or computer experts can work with Internet on a very good level.		0.11	-0.04	0.02	-0.01	**0.47**	-0.16	0.22
69. My grandparents would work with internet without problems.		0.03	0.09	-0.18	-0.01	**0.44**	0.06	0.11
VI. The importance of the Internet	0.51							
45. It is normal to own and use more than two e-mail addresses.		0.25	-0.06	-0.14	0.04	-0.01	**0.43**	0.10
59. It is not necessary to print the books and textbooks, it is sufficient to do it in e-form/online.		0.26	-0.08	-0.12	0.03	0.02	**0.41**	0.03
64. All websites should use only one universal language (preferably English).		-0.04	0.05	0.10	0.01	-0.03	**0.73**	0.00
70. Own website on internet can bring benefits in terms of establishing important contacts.		0.05	0.07	0.15	0.14	-0.05	**0.73**	0.00
71. Thanks to own website on Internet one can find a good job.		0.04	0.07	0.16	0.10	0.06	**0.77**	0.14
VII. Other media and Internet	0.54							
10. I watch chosen TV programs only on internet (for example news...).		0.68	-0.03	-0.01	0.08	0.10	0.10	**0.68**
11. I prefer to read newspapers in print more than online.		0.58	-0.03	0.05	0.14	0.24	-0.03	**0.58**
32. I am able to work on PC, or notebook and watch TV at the same time.		0.19	-0.03	0.15	0.12	0.06	0.04	**0.42**
54. I prefer watching TV to using internet.		0.15	0.15	0.01	0.27	-0.04	0.07	**0.43**
72. I prefer watching several TV programs on internet than on TV.		0.21	0.01	0.08	0.06	0.08	0.04	**0.74**
73. If I don´t catch broadcasting life, I watch it on internet.		0.19	-0.08	-0.06	0.18	-0.09	0.03	**0.47**
Eigenvalues		*6.95*	*3.52*	*2.51*	*2.47*	*2.18*	*2.06*	*1.85*
% of variance		*10.86*	*5.50*	*3.93*	*3.86*	*3.40*	*3.22*	*2.88*

and Generation X group is shown in the Figure 2. A statistically significant difference was found only in the first, third and the seventh factor. In almost all factors a higher score was achieved by the Millennial Generation but in some factors a higher score was achieved by the Generation X. For example the latter was the case with the second factor. Only in two factors (The security of Internet and The difficulty of the Internet using) it was possible to observe positive attitudes in both groups of respondents. This means that respondents trusted the internet sufficiently and had no problems with using it. They considered the majority of things related to the use of e internet to be commonplace and they did not have problems with their use. The negative attitudes were not observed on the dimension of "Social network".

The use of ICT and internet was measured by a series of nine questions. The first question focused on the use of Internet. The answers are shown in the figure 3. The Millennial Generation used internet more often for chat, downloading music and games and also for playing games. The Generation X used it very little for downloading music and movies or for playing games.

The second part of results focuses on the analysis of the influence of gender and residence on the use of and the attitudes toward ICT among the Millennial Generation. The effect of gender was not significant in the evaluation of attitudes (F = 2.10; p = 0.15). The age did not have a significant effect (F = 1.58; p = 0.21). Boys achieved higher scores in comparison to girls (Figure 5). The residence did have a statistically significant influence on the attitudes toward
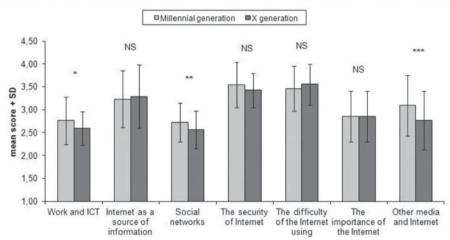

Figure 2.

*The Difference in Score in Factors with Respect to Generation NS – non-significant difference; * p < 0.05, **p < 0.01, *** p < 0.001*
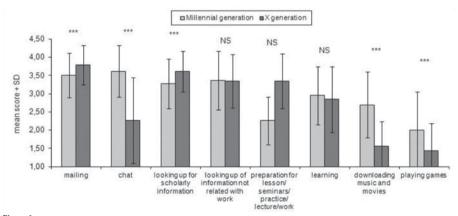

Figure 3.

*The Mean Score of Respondents for the Item "I use Internet for these activities" NS – non-significant difference; *** - p < 0.001*

ICT (F = 4.60; $p < 0.05$) without a significant influence of age (F = 0.68; $p = 0.41$). The respondents from town achieved higher scores in comparison to the respondents from villages (Figure 5).

The analysis of dimensions with respect to gender showed an effect of gender only in two dimensions: "Work, ICT" and the difficulty of using Internet. In both cases boys achived higher scores in comparison to girls. The effect of age was observed only on the dimension of "The security of Internet". The distribution of scores and the outcomes of ANCOVA are in table 2.

In the analysis of the influence of residence, a statistically significant difference was observed only on the first dimension "Work and ICT", where respondents from towns achieved higher scores. This means that the respondents from towns assign a higher importance to ICT for work purposes in comparison to the respondents from villages. The effect of age was observed on the dimension of "The security of Internet". The distribution of scores and the outcomes of ANCOVA are in table 3.

The analysis of the use of ICT and Internet with respect to gender revealed interesting results. The ICT and Internet was much more used by boys for searching scholarly information. They also used Internet and ICT much more for downloading music and movies and playing games. An effect of age was observed nearly in all activities except for "preparation for lesson/seminars/practice/lecture/work", "learning" and "downloading music and movies". The distribution of scores and the results of ANCOVA are in table 4.

In the analysis of residence, it was found that the respondents from towns achieved statistically higher scores in comparison to the respondents from villages on two dimensions: "Downloading music and movies" and "playing games". The effect of age was observed on the same dimensions as in the previous analyses above. The distribution of scores and the results of ANCOVA are in table 5.

Discussion and Conclusion

In our research we were interested in the comparison of using Internet and ICT and the attitudes to-

Table 2.
The Mean Score of Boys and Girls and Outcomes of ANCOVA regarding Attitudes toward ICT and Internet

dimensions	female (mean score)	male (mean score)	female (SD)	male (SD)	F gender	F age
Work and ICT	2.71	2.90	0.04	0.07	5.20*	0.50
Internet as a source of information	3.26	3.16	0.05	0.09	0.93	0.00
Social networks	2.72	2.70	0.04	0.06	0.09	0.04
The security of Internet	3.51	3.61	0.04	0.07	1.62	5.96*
The difficulty of the Internet using	3.41	3.57	0.04	0.07	4.09*	0.00
The importance of the Internet	2.84	2.87	0.05	0.08	0.08	0.34
Other media and Internet	3.06	3.18	0.05	0.09	1.37	2.22

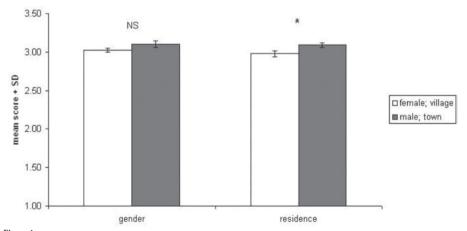SD – standard deviation; F – analysis of covariance; * - $p < 0.05$

Figure 4.
*The Mean Score of Respondents with respect to Gender and Residence NS – non-significant difference; * - p < 0.05*

ward these among the members of the Millennial Generation and the Generation X groups. An effect of gender and residence on the attitudes toward and the use of ICT and Internet in the Millennial Generation were observed. It is possible to divide our results into three main sections.

The first section relates to the development of an instrument to measure the use of ICT and Internet and the attitudes toward these (Bingimlas, 2009; Šorgo & Kocijančič, 2012). Mainly, the attitude part was developed by a detail analysis. The exploratory factor analysis was used to determine the validity of the instrument and to group the items into factors. Seven factors were identified. These are pre-

sented in the Methodology part of this paper. This instrument is free to use and it could be used in the context of other countries to compare the results obtained there with ours.

The second section of results is about the attitudes of respondents. The overall attitudes toward ICT and the Internet were neutral. A detailed analysis of data revealed a positive evaluation of two categories: "The security of Internet" and "The difficulty of using Internet". This means that for the respondents there was no problem in using Internet. They believed that Internet was easy to use for everyone, both for children and also for adults. Another point was that the respondents trusted the security of Internet. They

Table 3.
The Mean Score of Respondents from Villages and Towns and the Values of ANCOVA regarding the Attitudes toward ICT and Internet

dimensions	village (mean score)	town (mean score)	village (SD)	town (SD)	F residence	F age
Work and ICT	2.61	2.85	0.06	0.05	10.18**	0.01
Internet as a source of information	3.23	3.24	0.07	0.06	0.02	0.00
Social networks	2.66	2.75	0.05	0.04	2.02	0.01
The security of Internet	3.48	3.58	0.05	0.05	1.14	4.77*
The difficulty of the Internet using	3.50	3.43	0.05	0.05	1.13	0.06
The importance of the Internet	2.85	2.84	0.06	0.05	0.00	0.33
Other media and Internet	2.97	3.17	0.07	0.06	3.70	1.20

SD – standard deviation; F – analysis of covariance; * - $p < 0.05$, ** - $p < 0.01$

Table 4.
The Mean Score of Boys and Girls and Results of ANCOVA regarding The use of ICT and Internet

dimensions	female (mean score)	male (mean score)	female (SD)	male (SD)	F gender	F age
mailing	3.54	3.42	0.05	0.08	1.50	12.37***
chat	3.63	3.58	0.06	0.10	0.22	15.52***
looking up for scholarly information	3.22	3.44	0.05	0.09	4.28*	11.23***
looking up for information not related with work	3.32	3.48	0.06	0.11	1.68	7.18**
Preparation for lesson/seminars/practice/lecture/work	3.28	3.17	0.05	0.09	1.10	3.50
learning	2.93	2.98	0.07	0.11	0.14	0.22
downloading music and movies	2.50	3.25	0.07	0.12	30.32***	0.18
playing games	1.77	2.63	0.08	0.13	30.47***	4.92*

SD – standard deviation; F – analysis of covariance; * - $p < 0.05$, ** - $p < 0.01$, *** - $p < 0.001$

Table 5.
The Mean Score of Respondents from Towns and Villages and the Outcomes of ANCOVA regarding the Use of ICT and Internet

dimensions	town (mean score)	village (mean score)	town (SD)	village (SD)	F residence	F age
mailing	3.53	3.48	0.05	0.07	0.01	12.00***
chat	3.63	3.59	0.06	0.08	1.36	16.82***
looking up for scholarly information	3.30	3.25	0.06	0.07	0.00	10.64**
looking up for information not related with work	3.39	3.32	0.07	0.09	0.00	6.78**
Preparation for lesson/seminars/practice/ lecture/work	3.33	3.15	0.06	0.07	2.50	2.36
learning	2.99	2.88	0.07	0.09	1.24	0.46
downloading music and movies	2.82	2.51	0.08	0.10	6.75*	0.82
playing games	2.14	1.78	0.09	0.11	8.69**	7.00**

SD – standard deviation; F – analysis of covariance; * - $p < 0.05$, ** - $p < 0.01$, *** - $p < 0.001$

did not have any problems with buying/doing shopping through Internet. Also they used other services on the internet such as Internet banking and others. We also observed that the Millenial Generation had more positive attitudes toward social network media. They preferred to contact people through such media. Our finding is in accordance with those of the other investigators. For example Schmidt et al. (2011) showed that the computers are an inseparable part of the lives of young people. They spend time on the social network media, and use chat programs. They prefer this type of communication through a social network medium over a face-to-face communication. And there are other interesting results. The Y Generation had more positive attitudes toward the dimension of "Work and ICT" in comparison to the X Generation. Based on this, it is possible to say that the people belonging to the Y Generation did not have problems with changing television programs, reading newspapers besides surfing on the internet. The similar results can be found in the works of Selwyn (2009). The Y generation also reported more positive attitudes on the dimension of "Work and ICT". This means that these people did not have any problems with working in the home environment, where they had their own computer. They also did not have any problems with watching TV, being online on some social network media, chatting with friends and working at the same time. An effect of gender and residence was found on the attitudes toward and use of ICT and Internet among the respondents belonging to the Millennial Generation. Such an effect of gender on the attitude scores was not found, suggesting that the differences between generations about the attitudes toward ICT and Internet are disappearing. This is a very interesting finding, because recent studies are showing differences between boys and girls on the attitudes toward ICT and Internet: The boys perceive ICT most positively in comparison to girls (Anderson, Lankshear, Timms, & Courtney, 2007; Meelissen & Drent, 2008). A statistically significant difference was found on the dimensions of "Work and ICT" and "The difficulty of the use of Internet". The boys on both dimensions achieved higher scores. This means that boys used the ICT for work and thought that the ICT may be more helpful for their carrier. And the boys were more likely to consider the use of ICT as easy as compared with the girls. Maybe, the technical difficulties have an effect on the girls' use of ICT. A statistically significant difference was observed according to the residence of respondents. The respondents from towns achieved statistically higher scores than respondents from villages. This could be caused by the environment of living. Respondents from towns have an access to ICT more often in comparison to the respondents from villages. The town respondents need the ICT and Internet for their work: They encounter and use ICT more often in their everyday life.. These facts can influence the perception of ICT and the Internet. Such results are very hard to compare with those from other studies because studies investigating the effect of residence were hard to come by in the literature.

The last section of the results of our investigation is the different uses of ICT and Internet in the lives of the Millennial Generation and the Generation X. The X Generation used Internet more for mailing. However, the Millennial Generation used it more for chat. This is in line with previous findings regarding attitude scores. For younger people belonging to the Millennial Generation, e-mail does not feel very interactive. That´s why they rather use chat. Also they have more positive attitudes toward downloading music and movies from the Internet. As a result we can say that the Y Generation uses the Internet and ICT more to not conform in comparison with the X Generation. This finding is in accordance with the conclusions of Bennett et al. (2008), who wrote about the characteristics of Millennial Generation. As authors stated this generation of young people used ICT and Internet differently as compared with older respondents. The Millennial Generation was observed to be active experiential learners who were proficient in multitasking, and dependent on communication technologies for accessing information and for interacting with others. In a more detailed analysis of the Millennial Generation it was found that the boys used ICT and Internet more for searching for scholarly information. This fact is in line with our previous results, where the boys used ICT more for work. They did not have many difficulties with using ICT. The girls probably used more traditional forms of searching for information (libraries etc.). Also boys used ICT and Internet more for downloading music and movies and also for playing games. These activities are typical for boys. The girls prefer watching movies in cinema rather than watching on a computer screen. Also the respondents from towns were more often downloading music and movies or playing games in comparison to the respondents from villages. The reasons could be similar to those discussed in the explanations of attitude scores. The respondents from towns devoted more time to the works on ICT and Internet and the leisure activity that were watching a movie, downloading from the Internet or playing an online game.

To sum up our investigation confirmed that in the contexts of Czech and Slovak Republic the Millennial and the X Generation are different from each other when it comes to their use of and the attitudes toward ICT and Internet. We should be aware that the Millennial Generation is the consumers of the future. They are also the ones with whom we will build and manage our customer relationships. They hold the keys to our organizations' future in all areas of life.

References

Akande, B. O. (2008). The I.P.O.D. generation. Diverse. *Issues in Higher Education*, *25* (15), 20-23.

Anderson, N., Lankshear, C., Timms, C., & Courtney, L. (2007). Because it's boring, irrelevant and I don't like computers: Why High school girls avoid professionally-oriented ICT subjects. *Computers and Education*, *50* (4), 1304-1318.

Arhin, A. O., & Johnson-Mallard, V. (2003). Encouraging alternative forms of self expression in the generation Y student: A strategy for effective learning in the classroom. *Association of Black Nursing Faculty Journal*, *14* (6), 121-122.

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.

Beyers, R. N. (2009). A five dimensional model for educating the net generation. *Educational Technology & Society*, *12* (4), 218-227.

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 and Technology Education, 5* (3), 235-245.

Cowan, N., Nugent, L. D., Elliott, E. M., Ponomarev, I., & Saults, J. S. (1999). The role of attention in the development of short-term memory: Age differences in the verbal span of apprehension. *Child Development*, *70* (5), 1082-1097.

Djamasbi, S., Siegel, M., & Tullis, T. (2010). Generation Y, web design, and eye tracking. *International Journal of Human-Computer Studies*, *68* (5), 307-323.

Goldenberg, B. (2005). The consumer of the future. *Customer Relationship Manager*, *25* (4), 22-22.

Hills, C. R., Smith, D. R., & Warren-Forward, H. (2012). The impact of 'Generation Y' occupational therapy students on practice education. *Australian Occupational Therapy Journal*, *59* (2), 156-163.

Howe, N., & Straus, W. (2000). *Millenials rising: The next great generation*. New York: Random House.

Howe, N., & Strauss, W. (2003). *Millennials go to college*. Washington, DC: American Association of Collegiate Registrars and Admissions Officers.

Jones, C., & Hosein, A., (2010). Profiling university students' use of technology: Where is the net generation divide? *The International Journal of Technology, Knowledge and Society*, *6* (3), 43-58.

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* (5), 332-343.

Kerlinger, F. N., & Lee, H. B. (2000). *Foundations of behavioral research* (4th ed.). Forth Worth, TX: Hartcourt College Publishers.

Liu, F. (2010). The Internet in the everyday life-world: A comparison between high-school students in China and Norway. *Comparative Education*, *46* (4), 527-550.

Malykhina, E. (2008). Generation Y looks to Web for answers. *Electronic Engineering Times*, *1508*, 6.

Meelissen, M. R. M., & Drent, M. (2008). Gender differences in computer attitudes: Does the school matter? *Computers in Human Behavior*, *24* (3), 969-985.

Oblinger, D., & Oblinger, J. (2005). Is it age or IT: first steps towards understanding the net generation. In D. Oblinger & J. Oblinger (Eds.), *Educating the Net generation*. Washington, DC: Educause.

Prensky, M. (2001). Digital natives, digital immigrants, part II. Do they really think differently? *On the Horizon*, 9(6), 1–6.

Schmidt, C. E., Möller, J., Schmidt, K., Gerbershagen, M. U., Wappler, F., Limmroth, V. et al. (2011). Generation Y. Anaesthesist, *60* (6), 517-524.

Selwyn, N. (2009). The digital native - myth and reality. *Aslib Proceedings*, *61* (4), 364-379.

Šorgo, A., & Kocijančič, S. (2012). Reading graphs obtained in computerized biological experiments. *Eurasia Journal of Mathematics, Science and Technology Education, 8* (2), 129-137.

Tapscott, D. (1988). *Growing up digital: The rise of the Net Generation*. New York: McGraw-Hill.

Tapscott, D. (1997). *Growing up digital: The rise of the Net Generation*. Toronto: McGraw-Hill.

Twenge. J. M. (2009). Generational changes and their impact in the classroom: Teaching generation me. *Medical Education*, *43* (5), 398-405.

Valtonen, T., Dillon, P., Hacklin, S., & Väisänen, P. (2010). Net generation at social software: Challenging assumptions, clarifying relationships and raising implications for learning. *International Journal of Educational Research*, *49* (6), 210-219.