COMPUTER LITERACY SURVEY

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Abstract. This paper analyses and compares the results of two surveys on computer literacy. The questionnaire survey was divided into three parts, namely: computer and user interface, information management, text-hypertext-multimedia. The second survey was aimed: to spot and analyze changes in students' computer literacy, compare computer literacy level of students studying at universities and those studying at higher education colleges, suggest possible improvement to IT as a subject taught at higher education institutions and to establish computer literacy skills development after students have participated at IT classes at the college.

Keywords: computer literacy, information technologies, survey of IT knowledge and skills.

Short title of the paper. Computer literacy.

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Introduction

This paper analyses and compares the results of 2 surveys on computer literacy. The first survey was run in Vilnius Pedagogical University during 2001-2002 (coordinated by E. Valavičius). The participants of this survey were university students (following the studies in humanities) and secondary school students. The questionnaire survey was divided into 3 parts, namely: computer and user interface, information management, text-hypertext-multimedia [1].

The second survey was aimed at the following goals: to spot and analyze changes in students' computer literacy, compare computer literacy level of students studying at universities and those studying at higher education colleges, suggest possible improvement to IT as a subject taught at higher education institutions and to establish computer literacy skills development after students have participated at IT classes at the college. This survey uses the same questionnaire as mentioned above.

Vilnius Business College students were acting as the participants of the second survey, however, the authors are targeting at extending this survey to a number of colleges and universities.

1. Results of the first survey

The participants of the first survey were divided into 4 groups depending on time since last of IT classes they had attended: i) first-year students (86 persons); ii) second-year and higher (94); iii) part-time students (37); iv) secondary school students (58). According to the survey results, the participants of each group were distributed into 4 subgroups - 2 groups with computer literacy above average and 2 groups- below average.

The questions were divided into three topics:

i) computer (hardware, user interfaces, basic concepts);
ii) information management;
iii) text (also hypertext and multimedia).

The questionnaire comprised no questions to evaluate motor skills due to the fact permanent knowledge (which level was aimed to establish) is better described by basic concepts and definitions. Here are some examples of questions that the questionnaire comprised:

i) label the main computer parts;
ii) find definitions of a folder, file, document, font, paragraph, hypertext, multimedia etc;
iii) find links among several enumerated terms.

The evident leaders for first two parts of questions were secondary school students while university students were leaders answering the third part of the questionnaire focusing on text, hypertext and multimedia. A closer look at the results shows that secondary school students were best in the basic concepts subtest (about 70% fall into 2 higher groups) and students of the first course were best in the information management subtest (about 80% of students are above the average).

Fig. 1 represents the results of the third subtest focusing on text, multimedia and hypertext.

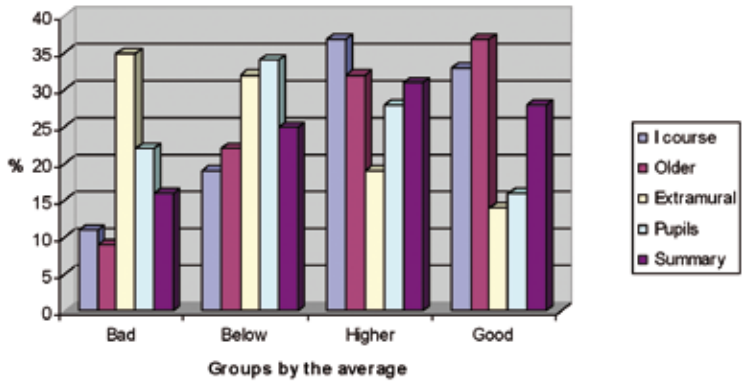

Fig. 1 Results of the subtest on text and hypertext.

Fig. 1 shows that text definitions are easiest to understand for the first year and older full-time students but not part-time students. Secondary school students did not succeed in this subtest: only about 40% of then scored higher than the average. However, the total average scores (31% as higher and 27% as good) in this subtest show that the knowledge level of text operations is better compared to the other two subtests: less than 40% in 2 higher groups in the computer subtest and near 50% in the information management subtest [2].

The conclusions of this survey can be following: operations with text, hypertext and multimedia are easy topics of computer literacy (the summary column- the last column in each of 4 groups - shows that nearly 60% of the students scored above average), however, this particular field of computer literacy is underestimated at secondary schools. The names of elements of the user interface and common definitions are easy to forget: only 40% of respondents knew them.

2. Results of the second survey

The secondary school curriculum of information technologies has undergone significant changes since 2005. Computer hardware and networks in schools have improved as well. Consequently, college and university teachers have to understand and accept these changes so that to find IT topics that are most relevant for their students.

The participants of the second survey (carried out in the autumn of 2007) were 173 first-year students studying at Vilnius Business College.

The maximum value of each question was 1 point. The average scores of subtests are shown in Fig. 2.

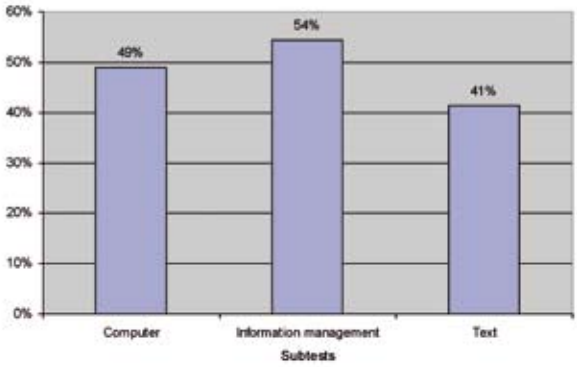

Fig. 2. Averages of subtests

We can see the best average score has been reached in the second subtest focusing on information management; the scores on the computer and user interface issues were less than 50% and the lowest average score is in the third subtest. However, these average scores do not reflect the real knowledge of the students because of the unequal distribution of very high and very low scores in individual tests.

Fig. 3 shows the distribution of the number of students whose scores are below and higher than the average of each subtest.

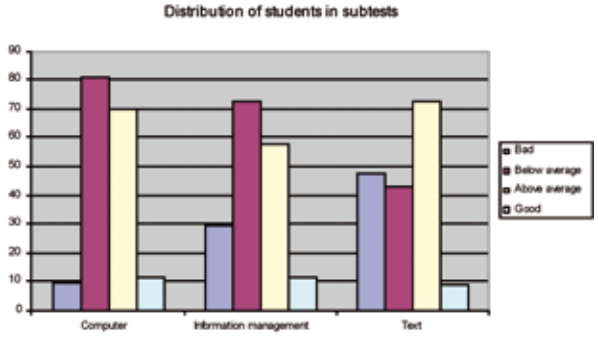

Fig. 3. Distribution of students' scores in subtests.

This diagram represents the level of knowledge of the field in each subtest. Students' scores are distributed into four groups: „Bad", „Below average", „Above average", „Good".

The biggest number of students fall into the „Below average" group in the first and second subtests while the biggest group is „Above average" in the third subtest. However, the third subtest has the lowest number of students that belongs to the group who has scored as „Good". This is the main reason why the average score of the third subtest was the lowest among all subtests (41%, as Fig.2 shows). Another reason for that can be that in this subtest the highest number of students fall into group who scored as „Bad".

When we look at the distribution, it is easy to notice that more than 60% of students scored below average in the second subtest. The scores of the other two subtests have almost equally distributed below and above the average. However, the average score is highest in the second subtest because of the total big number of highest scores.

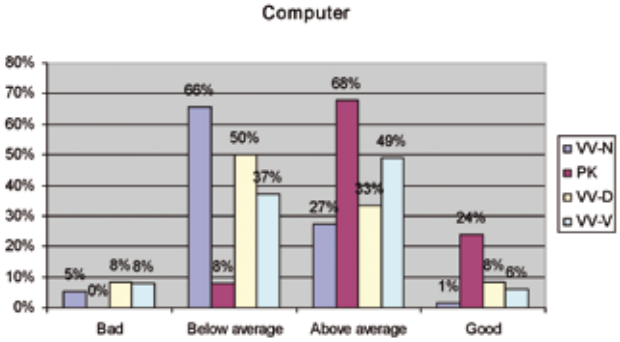

Fig. 4. The distribution of knowledge related to the computer according to study programs and study lines.

In Fig. 4, we see the level of knowledge in the first group of questions related to computer issues. It is easy to see that full-time students of the study programme of Computer Programming (PK-D) are evident leaders. None of them has scored under the category "Bad". Besides, they scored most in the categories "Above average" and "Good". Students of the study programme of Business Administration following evening studies (VV-V) scored about average: 37 % of them are "Below average" and 49 % - "Above average", whereas 8 % scored as "Bad" and 6 % as "Good". The scores of the full-time (day-time) students of Business Administration are similar to the evening students, with a slight shift to lower scores. If we ask why Computer Programming students have showed high results, the answer is obvious: they come across computer-related definitions, elements of user interface and other IT-related terms much more frequently compared to the students of other study programmes. The day-time Computer Programming students have showed lower scores. This can be explained by vast work experience and higher motivation of the evening class students who are mostly working specialists; some of them are older than daytime students. Nowadays, as most workplaces are often equipped with computers, it has positive influence in the knowledge of IT.

On the other hand, the results showed by the part-time students are significantly lower than those of day and evening classes. The majority of the part-time students who participated in the survey are much older than others, as they graduated from secondary school 5, 8, 10 or more years ago. They do not use IT at all or use it very rarely. Another factor is that many part-time students have family which means that they can spend less time for learning. However, more than 1/5 of them scored above average.

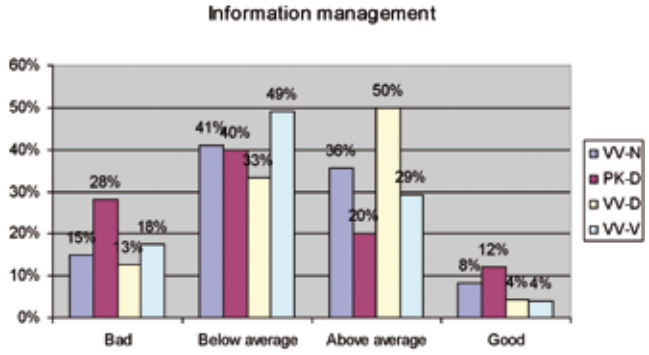

Fig. 5. The distribution of scores of knowledge related to the information management according to study programmes and study lines.

Computer Programming students (PK-D) are leaders in the group of questions related to information management. Nevertheless, they are leaders in the lowest scores as well (40% scored below average and 28 % scored as bad). These results are even worse than those of the part-time students. It seems that this group of students is low-motivated and they are chosen to study in order to obtain a diploma but not acquire knowledge. At the same time, more than a half of the students of Business Administration (daytime class) fall into the categories "Above average" and "Good". It means that totally the knowledge of the students of Business Administration is best.

If we compare these results with results of the other two groups of topics, we can notice that the questions related to information management are most difficult. This is the only topic where total scores are shifted to the left (low or below average) side. Our teaching experience shows that usually most of students know how to create a directory, copy, move or delete files, which are the main operations of file system of computer. However, the basic (theoretical) definitions are not so easy to understand and remember.

Looking at the scores of the topic related to Text, we can see that answers of the bigger part of the students fall under the categories of "Above average" and "Good". For example, 64% (56% + 8%) of the full-time Computer Programming students and 54% (50% + 4%) of the full-time Business Administration students (daytime class) are acquainted with this field better than the average. The evening Business Administration students are an exception – most of them scored as "Good". Nevertheless, at the same time most of them (35%) have showed low scores.

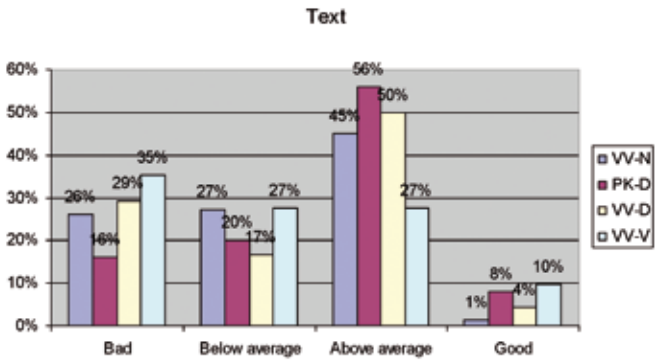

Fig. 6. The distribution of scores of knowledge related to the text processing (including hypertext and multimedia) according to study programmes and study lines.

The issue of text processing is important not only for IT specialists. This is a necessary part of knowledge for all educated people. Let us have a closer look at this field. The test on this topic consists of questions which are not only related to text as it is but also includes the definitions related to multimedia" and hypertext. While working with computer, we use the word text when we see various types of information (text, pictures, animations etc.) composed in one window. On the other hand, when there is an attempt to understand on a more thorough level, one has to know definitions and principles of using each type of information. In some cases, people merely do not want to think about it, sometimes they do not know the Lithuanian equivalents (e.g., many of us use the word multimedia in Lithuanian instead of its Lithuanian equivalent daugialypė aplinka). That is why we left only questions related to text directly ("Pure" text) and excluded multimedia and hypertext issues when revising the survey results.

Fig.7 shows the average score of the knowledge related to text. We see that almost all average scores reach the 50% level. It is very high level if we compare with other questions or groups of questions. The best scores were achieved by the full-time students of Business Administration (daytime studies) – about 55%. Computer Programming students appeared not to score best in this test. We have tried to explain this fact because of their specific interests – they are interested mostly in specific IT fields requiring profound knowledge and less in operations that regular users perform. As an unexpected exception in this question we can mention the high score achieved by part-time students of Business Administration, on the one hand, and the surprisingly low results showed by the evening Business Administration students.

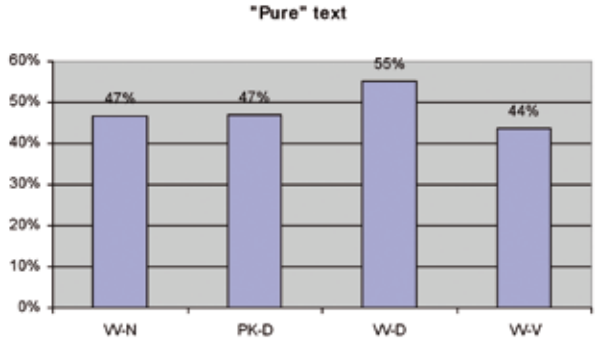

Fig. 7. The distribution of scores of knowledge related to the text according to study programmes and study lines.

However, the Computer Programming students scored best in the tests focusing more complicated definitions of IT terms. Table 1 show the parameters of total average knowledge related to multimedia and hypertext. As the maximum value of each question is 0.5, the average knowledge level is 0.25.

Table 1. Parameters of total average knowledge related to multimedia and hypertext

Study Programme	Multimedia	Hypertext
Business Administration (part-time)	0.14	0.15
Computer Programming (full-time, day-time studies)	0.22	0.26
Business Administration (full-time, day-time studies)	0.08	0.17
Business Administration (full-time, evening-time studies)	0.09	0.16

We see that the Computer Programming students have scored around average in the field of multimedia issues and above average in the field of hypertext. It means that 1 of 2 students understand these topics. The knowledge of students of other study programmes are about 1/3 and below. The issues of hypertext are better-known whereas the definition of multimedia is much (even 2 times) less known.

3. Preliminary comparison of the results of the two surveys

One of the purposes of the second survey was to compare the knowledge that students bring to a higher education institution after the secondary school. We have made an attempt to make a hypothesis that knowledge is improving every year. However, when we compare the preliminary results of the survey, we can state that there are no significant changes concerning the students' knowledge, which students had 5 years ago and which they bring from secondary schools now. Of course, we have to emphasize that our tests included only the main concepts and definitions and no motor skills.

In both surveys, the biggest part of students scored as „Below average", but there were bigger number of students that scored as „Bad" 5 years ago than now in the first subtest. We can state that now students are more accustomed to the computer and user interface.

The absolute leaders in the second subtest (information management) were secondary school students five years

ago. However, we got unexpected results in the second survey: the first-year students in Vilnius Business College know this topic much below average. We could find only one reason for such results: the group of pupils that took part in the first survey was not randomly, and, thus, properly chosen. They were participants of the courses organized for secondary school students by Vilnius Pedagogical University, which means that their knowledge level knowledge was higher.

We obtained better good results in the third subtest (related to text and hypertext) several years ago. On the other hand, we have to emphasize that the participants of the first survey took this questionnaire after the IT course training at university while now we have analyzed the results before teaching IT discipline at the college. Apart from that, there can be another reason too: the usage of computer now is more oriented towards the Internet and entertainment rather than to the process of creation.

Conclusion

These two surveys are separated by a long period of time and significant changes in IT teaching programs in secondary schools, nevertheless, the preliminary comparison shows similar results. The correlation is evident when comparing youngest participants of the first survey and the first year students. In both cases, the answers about concepts and definitions of text and hypertext scored 45% above average and in both cases the concepts of computer architecture and Windows interface are easier to understand than the basics of text and hypertext. However, we cannot present the full comparison because our survey participants have not accomplished the IT course at the college.

The preliminary analysis of the present survey allows us to presuppose that college IT teachers can spend less time teaching computer interface in favor of information management and other topics.

References

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