

STUDENTS' POINT OF VIEW OF THE BIOLOGY LECTURE TAUGHT WITH AN ICT ASSISTANCE: PRELIMINARY RESULTS

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Abstract

In our contribution, we focused on using of information and communication technologies in the biology lessons concretely on birds' class. We find out the students' points of view of this lesson. The five-point Likert scale questionnaire was used as a measurement tool. The questionnaire included 27 statements and there was a place for expressing of the own student's opinion there. The results were processed by using of factor analysis and ANOVA. The sample consisted of 70 secondary grammar schools students. General results should goes first – it means what was found in the research? Was ICT assistance considered to be important for students/ positively appreciated? In every dimension, the students from bigger town (according to the number of inhabitants) reached more positive score in questionnaire than the other students in sample. Gender differences were generally weak.

Key words: *information and communication technologies, biology, students.*

Introduction

Nowadays, e-learning is becoming very popular among pupils and teachers as well. It is used not only in informatics, as it was some years ago, when the ICT started to in schools, but on the all subjects. In our research was chosen the biology, because this subject have decreasing importance among students. The school should be properly equipped, of course. Some studies confirm, that ICT in schools and teaching supported with it, have positive influence on the learning process and improve the students' interest about biology (Soyibo, Hudson, 2000). There are some reasons to use ICT in the learning process, for example: ICT improves the quality of learning, reduces the cost of education, and improves the education, e.g. (Alexander 2001). E-learning offers many opportunities to provide teachers with more choice, learning experiences related to their personal needs, access to support, information, advice and guidance. One of the major but general benefits is that learning with technology can be motivational. Many people are short of the confidence, self-esteem and belief in their ability to learn. After the using of ICT, they have positive attitudes toward learning (Clarke 2007; Schnackenberg, Sullivan 2000; Yeh, Lehman 2001). E-learning provides means of communication within a learning environment that removes the geographical and temporal boundaries which can impede group learning activities (Dark, Perrett 2007). Some researches report, that in the class, where the ICT was used, students have expressed the interest about this school subject, for instance in the area of chemistry, students had better understanding of chemical representation with the aid of computer-based visualization tool (Wu, Krajcik, Soloway 2001). We focused on attitudes

of students on the class, where ICT were used, there are many works, which are investigated attitudes and their relationship with gender. Some authors asserted no difference between genders (Teo, 2006) on the other side Shashaani (1997) found out, that boys have more interest in the work with computers than girls. Boys have better ICT and computer skills, they use computers more in their leisure time, and their attitudes toward computers are more positive then the attitudes of girls. Some studies have quoted, that surprisingly, males have bigger fear of using computers (Reed, Erwin, Oughton, 1995). There is a lack of works, which are focusing on findings of differences among 2 or more cities resp. towns. If publications are existing, they are only focusing on the level of ICT using (Haywood et al., 2004). Author provides the questionnaire on the claiming.

Purposes of the study

The aims of our study were:

1. To design and verify in the practice possibilities the ICT using on the biology class.
2. To find out high school students points of view on the biology class, this was taught with the aid of ICT.

Methodology of Research

We taught the biology lesson with the aid of ICT. The model lesson was called “The anatomy of the birds’ body”. This lesson was taught in two high schools. One in the bigger city and second in smallest city, by the number of inhabitants. The number of inhabitants from bigger city is around 500000 and from smaller one is around 250000. These two cities are different in the equipped with the technology in the schools. After the end of lesson, we gave students a questionnaire, which concerned this lesson. The questionnaire consisted of 27 items, which were created by the Likert. The questionnaire was filled by the 70 students from two classes, one from each city. All students went to the third grade of the secondary grammar school. The sample consist from 41 girls and from 29 boys. We measured a reliability of all questionnaire and we used Cronbach’s alpha. We found out the high reliability ($\alpha = .83$, $n = 70$). We used factor analysis with Varimax rotation on the next statistical evaluation of results from the questionnaire. The factor analysis derived 5 dimensions, which were named by us. After the name dimension is showed the eigenvalue. This number means, that if it is higher, so there is smaller dependence among dimensions. Names of dimension are: 1. The using of knowledge from the lesson (5.86); 2. Advantages of the ICT used in the lesson (2.23); 3. Audiovisual aspects of the presentation (2.00); 4. A level of difficulty of the lesson (1.64); 5. General view on the presentation (1.57). None of the item was deleted. In the next step of our reserch, we used ANOVA (Analysis of Variance) on the mean scores from each dimension to find out the statistical significant differences between gender and cities.

Results of Research

In our contribution, we focused on the results evaluation of a questionnaire. Questionnaire consisted of 27 items, which were divided to 5 dimensions. In the table 1, is possible to find a basic statistical characteristics of dimensions.

Table 1. Basic statistical characteristics of the questionnaire.

	Number of items	Mean score	α	SD
The using of knowledge from the lesson	4	3.43	.58	2.89
Advantages of the ICT using on the lesson	4	3.80	.56	3.03
Audiovisual aspect of the presentation	5	4.02	.37	2.69
A level of difficulty of the lesson	4	3.98	.44	2.40
General view on the presentation	10	3.82	.76	5.35

α – Cronbach’s alpha; SD – standard deviation

By the using of ANOVA, we found out the statistical significant differences, which are showed in table 2.

Table 2 Statistical significant differences in results between gender and cities by the using of ANOVA.

	F _(gender)	F _(city)
The using of knowledge from the lesson	3.58	6.89*
Advantages of the ICT using on the lesson	.56	12.02***
Audiovisual aspect of the presentation	1.75	5.84*
A level of difficulty of the lesson	5.32*	5.74*
General view on the presentation	1.49	6.68*

F – the value of ANOVA. * - statistical significant difference $p < .05$; *** - statistical significant difference $p < .001$

In the first dimension we found out, that students from bigger city try better to use knowledge from lesson, where the ICT was used. Between gender, girls have positive attitude toward items of this dimension, but there was not statistical significant difference. Both independent variables (city, gender) had positive score – more than 3. In both cities girls have more positive attitude than boys. More than half of students wrote significance of all teaching material. Approximately 85 % of all students were satisfied with our teaching material, because it fulfilled expectations of them.

In the second dimension, the statistical significance was expressed for the students from bigger city. Between genders was little difference in account of girls. In the both cities girls reached more positive score than boys. In this dimension we found out interesting information. For instance about 70 % of all respondents consider for the advantage of ICT, not writing on the blackboard. More than $\frac{3}{4}$ consider using of ICT for the saving of paper. For 85 % was this lesson something new, only 12 % have experiences with this lesson.

Statistical significant difference was found out in the third dimension “Audiovisual aspects of the presentation” between cities in the account of bigger city. Between gender was not found out statistical significant difference, but we can say, that girls evaluated our presentation more positive than boys. More than 80 % of all asked students wrote that presentation was synoptic and the text part of presentation was comprehensible. Only for $\frac{1}{4}$ was in our presentation an excessive amount of pictures. More than $\frac{3}{4}$ considered colored harmony of background, text and pictures for good chosen.

In the fourth dimension, we found out the statistical significance difference between results at both investigated variables (gender, city). Students from smaller city assessed a learning material more difficulty on understanding than students from bigger one. Girls evaluated the learning material as easier on understanding as boys. More than $\frac{2}{3}$ of respondents was very attentive to our lecture. It was found out from the answers from questionnaire. Only 15 % wrote, that they had difficulties with understanding of some parts of presentation. Other had not difficulties. Only for 9 % was the learning material heavy on understanding, other did not agree with it. Only 2 % of all students had problems to understand to some information from our lecture.

In the last dimension “General view on the presentation”, we found out the statistical significant difference in results between cities. Students from the bigger city achieved in this dimension more positive score than students from smaller city. At the gender, girls had more positive score in the comparison with boys, but the difference in results was not statistical significant. About 90 % of all respondents evaluated the lesson with the using of ICT as interesting. For $\frac{2}{3}$ were some parts of lesson logical connected. Very interesting is claiming of 70 % students that they taught more in comparison with classic lesson. For more than 80 % was not the biology lesson with ICT using loss of time. About 30 % wrote, after the lesson was arising their interest about biology. At other, this lesson had not an influence on their interest about biology. Only for 3 % of high school students was the lesson with ICT using boring. For $\frac{1}{4}$ of students was learning material extensive. Nearly 85 % of students had not problem with the concentrate on our presentation. It means, they did not mind the noise of computer and data projector.

Discussion and Conclusion

We can summarize, from the questionnaire research about accessibility and expedience of ICT using in the biology lesson, students expressed satisfaction with it. Students wrote, that knowledge are important for their future life and also were satisfied with the learning material, with the presentation and the graphical layout. The similar result achieved Jereb and mitek (2006), their research was concerned on the finding out of e-learning advantages. Students from their research expressed satisfaction with lesson taught by the aid of ICT. Bagui (1998) have published in his works about very positive effect of ICT on the learning process. We found out some interesting information. For instance, only 12 % of students, who were respondents of our research, had experience with the using of ICT in the lessons. There is probability, that mostly of Slovak schools are not equipped by ICT. But there is possibility, if they have ICT equipment, so the biology lessons are not taught by the aid of ICT. For the mostly of students it is interesting part of teaching. Mostly of our students write this statement. Students did not bore on this kind of lesson. We can agree with authors Watts and Lloyd (2004), which presented digestive system of human body, and they published, that it was very interesting and funny class for students. We found out only in one dimension (A level of difficulty of the lesson) statistical significant difference between gender. Girls expressed that the learning material was not so difficulty as for boys. In other dimension were similar results between boys and girls. We can agree with authors Fančovičová and Prokop (2008), whose showed in their study little differences in the attitudes toward computers and computer activities between girls and boys.

Acknowledgements

I would like to express great thanks to Mr. Pavol Prokop, PhD. for reviewing the manuscript and for his comments which help to make it more comprehensible.

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