EVALUATION OF QUALITY AND EDUCATIONAL METHODS FROM THE POINT OF VIEW OF IMPLEMENTATION AND EXPLOITATION OF INTERACTIVE ANIMATIONS IN E-LEARNING COURSE

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Abstract: Usage of interactive animations, eventually particular media elements, in educational process has been in the centre of the interest of the community of professionals for a long time. The importance of their exploitation increased notably after the implementation of ICT into the education when their potential was revealed. From the psychological and pedagogical point of view, the implementation of interactive animations into e-learning courses should enable and ensure the development of cognitive and intellectual abilities of the students. The aim of our research was to find out how the students who use e-learning course Computer Architecture evaluated our educational methods incorporating innovated study materials into which interactive animations were implemented. Moreover, we wanted them to identify the problems of innovated materials as well as the problems of the evaluation process of education. The experiment was realised in summer terms of 2009/2010 and 2010/2011 academic year.

Keywords: interactive animations, educations, e-learning, evaluation.

I. INTRODUCTION

In the area of research of animation to students [8] has an important contribution of the Mayer R, who has showed at the lot of experimental studies [6], that the learning with the use of animations has may be more successful, if they are to extended, e.g. about the spoken word or in written text [12].

The advantages of the classic dynamic animations are its time dimension, ability to clarify changes or during the survey process, possibly by activating the perceptual functions of the possibility of new concepts, relationships and principles [11]. Their disadvantage is, that the changes are too fast and the student is unable to identify, which information author wants to mediate. The importance of dynamic animations so loses its sense, since the user cannot in good time to process the information provided, but must follow a number of different elements simultaneously (shape, colour, movement, direction...).

These disadvantages can remove is creating and to the education process implementing interactive animations. Interactive animations are ideal to improving cognitive, decision and interpersonal skills of the learner in the educational and training process. This is in the centre of the professional public for a long time [3], [10].

II. INTERACTIVITY IN E-LEARNING COURSES

Although, the interactive animations in the educational and training process to use relatively long, at the present they introduce, alongside the draft and creating adaptive hypermedia systems [1],

new space in the area of research the impact on pupil or student [4]. As a one of aspect, which directly determinate educational and training process getting knowledge and skills (simulators, remote experiment...) not only in terms of quality and efficiency, and the way of teaching, but also the effectiveness and the time needed to successfully ending of study [9].

Their benefits have increased in particular, using virtual education systems, which they are based on certain pedagogical models (Kolb's education period). In every of these models have included concrete didactic targets. Mainly, they are focused to the development experience, which would be studying as a standard in the real world has not reached. There is the specific result in learning with using these models [7].

Interactivity, which may dispose animations implementing in the virtual educations system, is not a characteristic the system itself [5], but is a result of the interaction with didactics target (Figure 1).
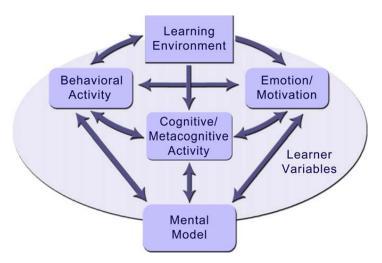

Figure 1. Interactivity in multimedia learning – An integrated model [2]

2.1. Target of research

The aim of research aimed at the evaluation of the quality of the way of teaching was to determine, as students who use the e-learning course in Computer Architecture, evaluate our way of teaching with the use of innovative study materials and identify problem items in the assessment method of teaching and study material of an upgraded.

By the research we focused at the quality method of learning using interactive animations implemented in LMS Moodle, therefore at the present prevailing trend of their implementation in different parts of the learning process supported by virtual learning environments. Experiment was realized gradually always at the summer term academic year 2009/2010 (control group) and 2010/2011 (experimental group). At the end of this experiment we have requested the students to complete a questionnaire (Table1). There they may write your own comments, what they missing and what was too many.

E-learning course Computer Architecture consist a total of 11 lessons. At the academic year 2009/2010, when the interactive animations have not been implemented into the e-learning course, control group consisted of the students. There should be a complete materials containing media elements, however, the degree of interactivity was in this direction is negligible. At the end of the completed course we are the students allowed to comment as to the quality and the method of teaching through e-learning course. Students may express their opinion during the questionnaire containing 11 items focusing on the structure and content of e-learning course, as well as the possibility of using interactive animations, if implemented. At the academic year 2010/2011 we have inserted at the e-learning course Computer Architecture interactive animations (in 8 of 11 study lesson). During the study students have 16 different interactive animations explaining the principles of computers works. In this academic year were students' experimental group. At the base of implementations interactive animations we used again questionnaire for the compare of the quality and the way of learning.

Table 1. Questionnaire of experimental group

Number of item	Item
1.	The structure of the e- learning course is transparent.
2.	E-learning course is sufficiently illustrative.
3.	E-learning course is sufficiently interactive.
4.	Graphical representation of the hardware of the computer is sufficient.
5.	E-learning course provides a sufficient quantity of interactive animations.
6.	The lecture was more interesting in using this e-learning course precisely because of though contains interactive animations.
7.	E-learning course, which includes interactive animations me facilitate to understand learning.
8.	This e-learning course connecting with implementation interactive animations, or similar course, they should be ordinary part of the teaching.
9.	On understanding of concepts to learn only this e-learning course would be sufficient to me (I did not need interpretation of the teacher).
10.	Suits me this way of teaching.
11.	I would like to further educate with this method.

2.2. The process for the realisation of the research

The individual items of the questionnaire, which characterize the way of teaching and interactive animation implemented into e-learning course Architecture computers, students should evaluate the range of e-learning from 1 to 9. Item 1 mean completely disagree, item 9 completely agree and item 5 neither disagree nor agree. Overall, the evaluation together involve learners aged from 18 to 50 years of 146, in the both of the academic years (2009/2010 and 2010/2011) were 73 students. Original number handing of questionnaires in the academic year 2010/2011 was 78. However, the 5 of them was completed despite the fact that the students were not interactive animation coursework.

We followed the steps in the implementation of the research:
1. making available updated study materials for students,
2. evaluation of the method of teaching in the summer semester of the academic year 2009/2010, without innovating study materials to students,
3. evaluation method of teaching and learning materials in the summer semester of the academic year updated 2010/2011 students,
4. identification of problem items – evaluation of innovative study materials, procedure and method of teaching.

From the questionnaire we would like to find out whether the significant differences in the evaluations of implemented interactive animations and the way of teaching between the control and experimental group in different academic years. Input data for the statistical evaluation of the assessment of the quality of the teaching method and electronic teaching material, to which they were implemented interactive animation:
1. sex,
2. academic year,
3. way of the study,
4. which secondary school ending,
5. age
6. relationship to computer science,
7. items 1-11 of the questionnaire for assessment of the quality of the teaching method of presenting issues and electronic teaching material,

All input data in addition to items 1 to 11 is between-group factor (factor, by which we are comparing different groups of objects with statistic method ANOVA). According to the average value

of the range of the largest differences were between the ninth item, and other items. Whether this difference statistically significant, or whether there are some other significant differences, we are also testing a statistically the null hypothesis.

H0: Score the answers of respondents does not depend on the items/questions.

To test the hypothesis by analysis of variance for repeated measurements referred to with more than two levels we have used for the verification of the provided using Mauchly's sphericity test.

Table 2. Mauchly's sphericity test

	W	Chi-square	sv	p
ITEM	0,056120	381,5398	54	0,0000

If condition for sphericity of covariance matrix is not fulfilled, there occurs increasing the size of errors I. kind. Therefore in these causes governing the degrees of freedom for the F-test is used by the corrections (Greenhouse-Geisser, Huynh-Feldt correction), thereby achieving the declared level of significance. At the following table (Table 3), at the first column are the untreated results of the analysis of variance, in the next table, in other results are adjusted its.

Table 3. Analysis of variance with more than two levels

ITEM	RAW	Greenhs.	Huynh
	Results	Geisser	Feldt
Epsilon		0,5877	0,6172
sv 1	10	5,8769	6,1721
sv 2	1360	799,2593	839,4092
P	0,0000	0,0000	0,0000

The results are consistent. Reject the null hypothesis with 99% confidence, which claims that scores of answers of respondents does not depend on the items/questions.
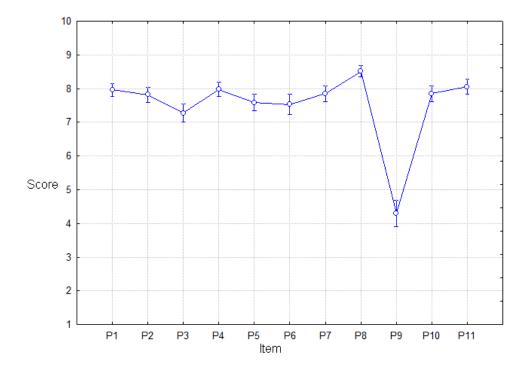

Figure 2. A graph of the average assessment of individual items and the confidence interval

After rejecting H0, we're asking a question: Between pairs of evaluation is statistically significant difference? The results of the multiple comparisons are listed in the following table (Table 4)

Table 4. Multiple comparisons (Turkeys HSD test) - the identification of homogeneous groups

POLOŽKA	Priemer	1	2	3	4	5
P9	4,299270					****
P3	7,277372			****		
P6	7,525547	****		****		
P5	7,591241	****	****	****		
P2	7,817518	****	****			
P7	7,846715	****	****			
P10	7,846715	****	****			
P1	7,963504	****	****			
P4	7,978102	****	****			
P11	8,051095		****		****	
P8	8,510949				****	

Statistically significant differences are mainly between item 9 and others items. Students were evaluated Item number 9 in the questionnaire as the least positive, the average scale values 4,299270. The best was assessed item number 8. However, this item for both academic years being tested is not statistically significant.

III. CONCLUSIONS

The implementation and use of interactive media elements in implementing the teaching process with the support of e-learning is currently among the basic methods, to encourage interactivity with the learner's learning materials so that there was a autoactivity, the development of cognitive and intellectual abilities. The foundation of good interactivity is not only well prepared hypermedia structure, but also the content of individual chapters of the e-learning course. Because only if it is possible to exploit the full capabilities of a learner, so that even to his motivation.

From the results of a questionnaire for students, we found that all of the items, in addition to the item number 9, rated very positive (on average between 7–8 from the maximum value of the range of 9). Students agree that the structure of the e-learning course in which they were implemented interactive animation is clearly arranged for them. Also agree that the e-learning course in Computer Architecture is sufficiently illustrative, individual animations are interactive and facilitate them with the understanding of concepts to learn. The way of teaching them the suit and would like to further educate themselves in this way. But not opinion-item number 9 (rated it on average range of 4,299270 which means that rather disagree), that would be sufficient for an understanding of concepts to learn them only the e-learning course, in which they were implemented interactive animation. This really clarified the US convinced that e-learning course as a support for teaching is an excellent teaching aid, but not always can fully replace direct contact of the teacher and the pupil.

Acknowledgements

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