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APPLICATION OF HEURISTICS INTO MATHEMATICS TRAINING VIA E-COURSES

Abstract

The article deals with the possibilities of implementing new trends into mathematics training and learning management system – MS Class Server. At the beginning of the article, we present our creative e- course – elementary functions in LMS – MS Class Server. The article discusses the heuristics using absorption and discovering relations (properties and behavior), too. A thorough emphasis is given to the interaction itself in each of the e - courses.

0 Introduction

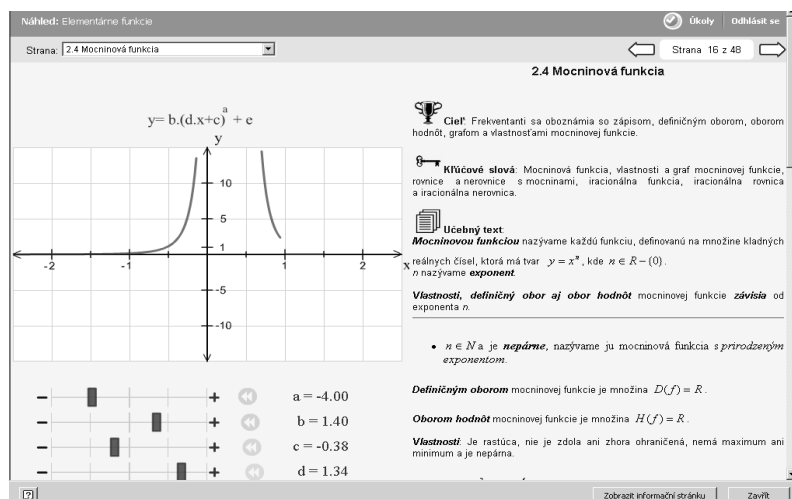
Our society is characterized with great Information technology development - the development, which penetrates into all branches of society, including education department. In Slovak republic, these days, MC EDU Company in cooperation with Infovek is training teachers of elementary and secondary schools for work with learning management system (LMS) MS Class Server. The LMS implementation into elementary and secondary schools offers teachers a space for modernization their teaching lessons. This modernization is not only an implementation of brand new technologies, but also in application of heuristics methods into education, bigger visualization and student's interactivity, causing the increase in student's motivation for given subject, and from that a bigger work effect, what is for the teachers the most important and also the hardest.

1 Electronic course – elementary functions

We have created e-course – elementary functions, which form the most learning materials of school's mathematics. One of the main aims was to apply heuristics into the study, to create a space for students, where one can on his/her own "discover" certain attributes of elementary functions. Via creating the e-course, we touch ourselves with two principles: First principle of activity, students on their own discover

principles, and the second principle is principle of motivation, students attain with this form interest about given study.

The e-course is combination html code and flash and is implemented into learning management system MS Class Server. In software Macromedia Flash, we created interactive animations, where student can change basic parameters. After this change the plot of the function is automatically changed. The animations have not only character of interactivity, but also the character of visualization.



Picture 1 Sample of e-course

You can find the e-course at virtual school: www.virtual.ukf.sk/dives

Login: matematik

Password: 12345678

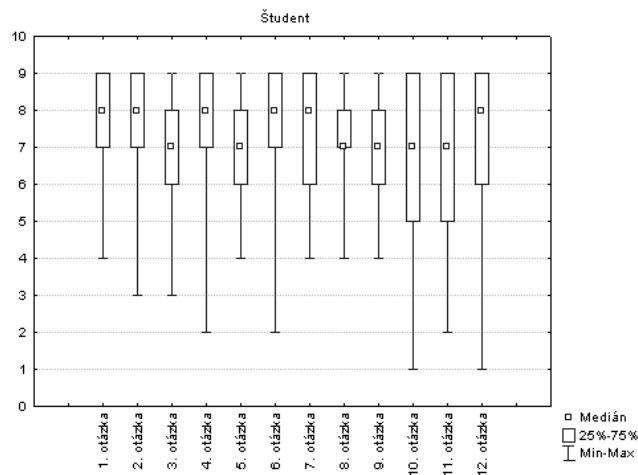
Class: matematika

2 Course evaluations by teachers and students

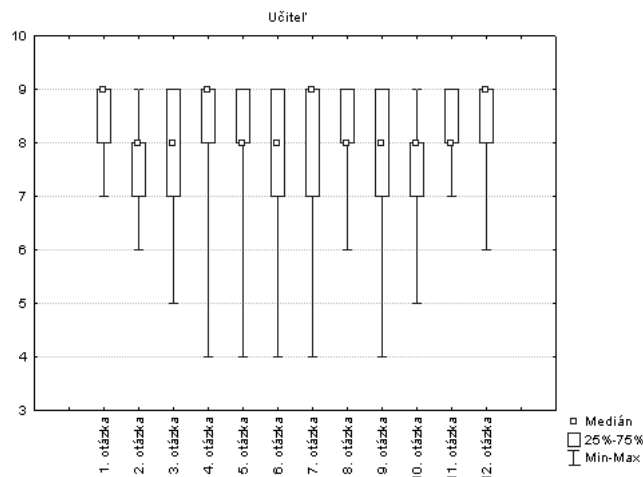
We gave the course to disposition math's teachers, who were retrained in working with LMS Class Server and students at secondary schools. At the end of the school year, we sent them questionnaire to evaluate our course separately for teachers and separately for students. All together 84 filled in questionnaires came back 27 from teachers and 57 form students. The questionnaire contained following statements and the participants were assigned to each of the statement in scale from 1 (absolutely do not agree) to 9 (absolutely agree):

1. (Student) Manipulation with the course is simple. /
(Teacher) Manipulation with the course is simple.
2. (Student) Course structure is clear. /
(Teacher) Course structure is optimal.

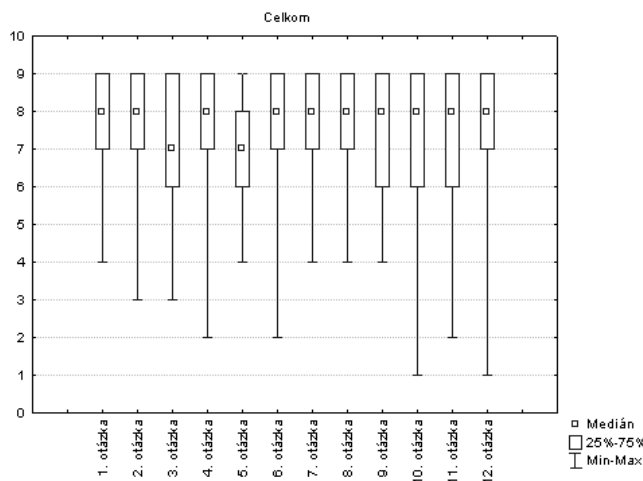
3. (Student) I am satisfied with the arrangement of graphics and text part. /
(Teacher) Arrangement of graphics and text part is optimal.
4. (Student) The course is graphical enough. /
(Teacher) The course is a practical and graphical aid for studying mathematical functions.
5. (Student) Learning materials and solved examples are clear enough. /
(Teacher) Learning materials and solved examples are clear enough.
6. (Student) Plots and calculators are interactive enough. /
(Teacher) Plots and calculators are interactive enough.
7. (Student) Graphical visualizations of functions are sufficient. /
(Teacher) Graphical visualizations of functions are sufficient.
8. (Student) Interactive calculator is suitable for the solving problems. /
(Teacher) Interactive calculator is suitable for the solving problems.
9. (Student) The course provides enough exercises and study's material. /
(Teacher) Content area of the course is sufficient.
10. (Student) Math lesson would be more interesting and comprehensible with using this course during the lesson. /
(Teacher) The course motivates with its form to study elementary functions.
11. (Student) Using this course during the lesson would help to understand a given theme. /
(Teacher) Using this course during the lesson would help to understand given theme.
12. (Student) This course, respectively similar courses should be a part of math study. /
(Teacher) I recommend teachers to use this or similar course during their lessons.



Picture 2 Evaluation of individual statements of students



Picture 3 Evaluation of individual statements of teachers



Picture 4 Evaluation of individual statements both groups

The teachers and students evaluated individual statements – attributes of course. Both groups evaluated the most positively the statements 7, 8 and 9, i.e. visualization, interactivity and amount of course. Vice versa the most negative statements 3 and 5, design and understanding. Next thing, we were interested in, if these differences in evaluation of each statement between students and teachers are important. Statistically, the important differences we found out between statements 1, 4, 5, 8 and 11, thus in course manipulation, visualization, understanding, interactivity and using this course during the math's lessons. Teachers evaluated these statements

higher (numerical). For testing of these differences between independent samples we used Kolmogorov – Smirnov and Mann – Whitney U test / two samples Wilcoxon test.

3 Conclusion

In complex evaluation of this e-course, both groups expressed their attitude towards the course positive. Both teachers and students hold positive approach to implementation of LMS into study and using of electronic courses during the lessons.

Literature

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