Editors:
Professor José Mª Zamanillo Sáinz de la Maza, University of Cantabria, Spain
Professor Pablo Luis López Espí, Universidad de Alcalá, Spain

HOSTS and SPONSORS:

University of Cantabria
Plaza de la Ciencia s/n.
39005 Santander, Spain

Universidad de Alcalá

University of Alcala
Campus Universitario
28805 Alcala de Henares, Spain

DISTANCE LEARNING, MULTIMEDIA AND VIDEO TECHNOLOGIES

- Proceedings of the 8th WSEAS International Conference on
MULTIMEDIA, INTERNET & VIDEO TECHNOLOGIES (MIV '08)

- Proceedings of the 8th WSEAS International Conference on
DISTANCE LEARNING and WEB ENGINEERING (DIWEB '08)

Santander, Cantabria, Spain, September 23-25, 2008

Recent Advances in Computer Engineering
A series of Reference Books and Textbooks

WSEAS

DISTANCE LEARNING, MULTIMEDIA and VIDEO TECHNOLOGIES

Proceedings of the 8th WSEAS International Conference on
MULTIMEDIA, INTERNET & VIDEO TECHNOLOGIES
(MIV '08)
&
Proceedings of the 8th WSEAS International Conference on
DISTANCE LEARNING and WEB ENGINEERING
(DIWEB '08)

Santander, Cantabria, Spain, September 23-25, 2008

HOSTS and SPONSORS:

University of Cantabria
Plaza de la Ciencia s/n.
39005 Santander, Spain

University of Alcala
Campus Universitario
28805 Alcala de Henares, Spain

Recent Advances in Computer Engineering
A series of Reference Books and Textbooks

DISTANCE LEARNING, MULTIMEDIA and VIDEO TECHNOLOGIES

**Proceedings of the 8th WSEAS International Conference on MULTIMEDIA, INTERNET & VIDEO TECHNOLOGIES (MIV '08)
&
Proceedings of the 8th WSEAS International Conference on DISTANCE LEARNING and WEB ENGINEERING (DIWEB '08)**

Santander, Cantabria, Spain, September 23-25, 2008

HOSTS and SPONSORS:

University of Cantabria
Plaza de la Ciencia s/n.
39005 Santander, Spain

University of Alcala
Campus Universitario
28805 Alcala de Henares, Spain

Editors:

Professor José Mª Zamanillo Sáinz de la Maza, University of Cantabria, Spain
Professor Pablo Luis López Espí, Universidad de Alcalá, Spain

International Program Committee Members:

Irwin W. Sandberg, USA
Asad A. Abidi, USA
Andreas Antoniou, USA
Antonio Cantoni, AUSTRALIA
Lotfi Zadeh, USA
George Szentirmai, USA
Michael Peter Kennedy, IRELAND
Paresh C. Sen, CANADA
Michel Gevers, BELGIUM
James S. Thorp, USA
Armen H. Zemanian, USA
Guanrong Chen, HONG KONG
Edgar Sanchez-Sinencio, USA
Jim C. Bezdek, USA
A. J. van der Schaft, the NETHERLANDS
Istvan Nagy, Hungary
Wasfy B. Mikhael, USA
M. N. S. Swamy, CANADA
M. Araki, JAPAN
Abbas El Gamal, USA
Franco Maloberti, Italy
Alan N. Willson Jr., USA
Yoji Kajitani, JAPAN
Mohammed Ismail, USA
Kemin Zhou, USA
Ruey-Wen Liu, USA
Nabil H. Farhat, USA
John I. Sewell, UK
Jerry M. Mendel, USA
Magdy A. Bayoumi, USA
Bertram E. Shi, HONG KONG
M. Omair Ahmad, CANADA
N. K. Bose, USA
Igor Lemberski, LATVIA
Alfred Fettweis, GERMANY
Brockway McMillan, USA
H. J. Orchard, USA
Jacob Katzenelson, ISRAEL
Vincent Poor, USA
Abraham Kandel, USA
Bor-Sen Chen, CHINA
C. S. George Lee, USA
Hamid R. Berenji, USA
Kevin M. Passino, USA
Lawrence O. Hall, USA
Ronald R. Yager, USA
Witold Pedrycz, CANADA
Agoryaswami J. Paulraj, USA
Ahmed H. Tewfik, USA
Alan V. Oppenheim, USA
Alfonso Farina, ITALY
Alfred O. Hero, USA
Ali H. Sayed, USA
Anders Lindquist, SWEDEN
Arthur B. Baggeroer, USA
Arye Nehorai, USA

Benjamin Friedlander, USA
Bernard C. Levy, USA
Bhaskar D. Rao, USA
Bin Yu, USA
Boualem Boashash, AUSTRALIA
Brian D. O. Anderson, AUSTRALIA
Bruce A. Francis, CANADA
C. Richard Johnson, USA
C. Sidney Burrus, USA
Charles M. Rader, USA
Desmond P. Taylor, NEW ZEALAND
Donald L. Duttweiler, USA
Donald W. Tufts, USA
Douglas L. Jones, USA
Earl E. Swartzlander, USA
Ed F. Deprettere, the NETHERLANDS
Edward A. Lee, USA
Edward J. Powers, USA
Ehud Weinstein, ISRAEL
Eli Brookner, USA
Ezio Biglieri, Italy
Faye Boudreaux-Bartels, USA
Georgios B. Giannakis, USA
Gonzalo R. Arce, USA
H. Vincent Poor, USA
Hagit Messer, ISRAEL
John V. McCanny, UK
Joos Vandewalle, BELGIUM
Jose C. Principe, USA
Jose M. F. Moura, USA
K. J. Ray Liu, USA
Kaushik Roy, USA
Kenneth Rose, USA
Keshab K. Parhi, USA
Kon Max Wong, CANADA
Kung Yao, USA
Louis L. Scharf, USA
Martin Vetterli, USA
Mati Wax, USA
Meir Feder, ISRAEL
Michael C. Wicks, USA
Michael D. Zoltowski, USA
Michael T. Orchard, USA
Michael Unser, SWITZERLAND
Miguel Angel Lagunas, SPAIN
Moeness G. Amin, USA
Mohamed Najim, FRANCE
Neil J. Bershad, USA
P. P. Vaidyanathan, USA
Patrick Dewilde, NETHERLANDS
Peter Willett, USA
Petre Stoica, SWEDEN
Phillip A. Regalia, FRANCE
Pierre Duhamel, FRANCE
Pierre Moulin, USA
Pramod K. Varshney, USA

Rabab Kreidieh Ward, CANADA
Robert M. Gray, USA
Rolf Unbehauen, GERMANY
Ronald W. Schafer, USA
Rui J. P. Figueiredo, USA
Russell M. Mersereau, USA
Sadaoki Furui, JAPAN
Shun-Ichi Amari, JAPAN
Simon Haykin, CANADA
Soo-Chang Pei, CHINA
Soura Dasgupta, USA
Stefan L. Hahn, POLAND
Steven Kay, USA
Takao Hinamoto, JAPAN
Takashi Matsumoto, JAPAN
Tapio Saramaki, FINLAND
Tariq S. Durrani, U.K.
Thomas F. Quatieri, USA
Thomas L. Marzetta, USA
Thomas S. Huang, USA
Thomas W. Parks, USA
Uri Shaked, ISRAEL
V. John Mathews, USA
Vladimir Cuperman, USA
William A. Pearlman, USA
Wolfgang Fichtner, SWITZERLAND
Wu-Sheng Lu, CANADA
Yaakov Bar-Salom, USA
Yingbo Hua, USA
Yong Ching Lim, SINGAPORE
Yoram Bresler, USA
Zhi Ding, USA
A. A. Goldenberg, CANADA
Angel Rodriguez-Vasquez, SPAIN
Erol Gelenbe, USA
F. L. Lewis, USA
Harry Wechsler, USA
Howard C. Card, CANADA
Lei Xu, P. R. CHINA
Leon O. Chua, USA
Marco Gori, ITALY
Narasimhan Sundararajan, SINGAPORE
Sankar K. Pal, India
Tamas Roska, USA
A. Stephen Morse, USA
Alberto Isidori, USA
Ali Saberi, USA
Andrew R. Teel, USA
Antonio Vicino, ITALY
Anuradha M. Annaswamy, USA
Benjamin Melamed, USA
Bruce H. Krogh, USA
David D. Yao, USA
Donald Towsley, USA
Eduardo D. Sontag, USA
Edward J. Davison, CANADA
G. George Yin, USA

Giorgio Picci, ITALY
Graham C. Goodwin, AUSTRALIA
Han-Fu Chen, CHINA
Harold J. Kushner, USA
Hidenori Kimura, JAPAN
Ian Postlethwaite, UK
Ian R. Petersen, AUSTRALIA
Jan C. Willems, NETHERLANDS
Jim S. Freudenberg, USA
Karl Johan Astrom, SWEDEN
Lennart Ljung, SWEDEN
M. Vidyasagar, INDIA
Mark W. Spong, USA
Matthew R. James, AUSTRALIA
Munther A. Dahleh, USA
P .R. Kumar, USA
Peter E. Caines, CANADA
Pramod P. Khargonekar, USA
Richard T. Middleton, AUSTRALIA
Roberto Tempo, Italy
Roger W. Brockett, USA
Romeo Ortega, FRANCE
Shankar Sastry, USA
Stephane Lafortune, USA
Steven I. Marcus, USA
T. E. Duncan, USA
Tamer Basar, USA
W. M. Wonham, CANADA
Weibo Gong, USA
Xi-Ren Cao, Hong Kong
Yu-Chi Ho, United Kingdom
Maricel Adam, ROMANIA
Mohd. Hasan, Ali KOREA
Fuad Alkoot, KUWAIT
Atef Al-Najjar, SAUDI ARABIA
Horia Andrei, ROMANIA
Alexandre Rasi, Aoki BRAZIL
Francisco Aparisi, SPAIN
Junichi Arai, JAPAN
Enrique Arce-Medina, MEXICO
Bhed Bahadur, Bista JAPAN
Razvan Bologa, ROMANIA
Chung Chang, TAIWAN
Tianzhou Chen, CHINA
Ting-yu Chen, TAIWAN
Ali Dastfan, IRAN
Darie Eleonora, ROMANIA
Huaiguo Fu, IRELAND
Hiroyuki Goto, JAPAN
Jyh-cherng Gu, TAIWAN
Jihong Han, CHINA
Athanasios Hatzigaidas, GREECE
Aghileh Heidari, IRAN
Jung-wen Hsia, TAIWAN
Yu-Jung Huang, TAIWAN
Supachate Innet, THAILAND
Dimitris Iracleous, GREECE

Shabiul Islam, MALAYSIA
Gangyi Jiang, CHINA
Ahad Kazemi, IRAN
Cheong Kim, KOREA
Thanatchai Kulworawanichpong, THAILAND
Suwat Kuntanapreeda, THAILAND
Marek Kurzynski, POLAND
Yangwon Kwon, KOREA
Heungjae Lee, KOREA
Tsang-Hsiung Lee, TAIWAN
Xiaolu Li, CHINA
Hengwuli Li, CHINA
Robert Lis, POLAND
Hongzhe Liu, CHINA
Jia-Jiunn Lo, TAIWAN
Ana-Ramona Lupu, ROMANIA
Ramezanali Mahdavinejad, IRAN
Nashat Mansour, LEBANON
Boonruang Marungsri, THAILAND
Nikos Mastorakis, GREECE
Tetsushi Miki, JAPAN
Mohammad reza Mollahoseini, IRAN
Dan El Montoya, VENEZUELA
Francesco Moschella, ITALY
Francesco Muzi, ITALY
Fumio Nishiyama, JAPAN
Anant Oonsivilai, THAILAND
Andrey Osipov, RUSSIA
Padej Pao-la-or, THAILAND
Suraj Pardeshi, INDIA
Sanda Victorinne Paturca, ROMANIA
Carlos Pedreira, BRAZIL
Edward Puchala, POLAND
Pallikonda Ravi Babu, INDIA
Carolina Regoli, VENEZUELA

Chen Rong-Chang, TAIWAN
Ahmet Sezer, TURKEY
Shiva Shavandi, IRAN
Miguel Strefezza, VENEZUELA
Sueo Sugimoto, JAPAN
Supaporn Suwannarongsri, THAILAND
Kiyoharu Tagawa, JAPAN
Tsuyoshi Takayama, JAPAN
Sun-Yen Tan, TAIWAN
Shu bin Tan, CHINA
Sejid Teүnjak, CROATIA (HRVATSKA)
Michael Theodoridis, GREECE
Dat Tran, AUSTRALIA
Sirirut Vanichayobon, THAILAND
Xun Wang, CHINA
En-Rong Wang, CHINA
Ning Wang, CHINA
Shugang Wei, JAPAN
Riyu Wei, AUSTRALIA
Wiphada Wettayaprasit, THAILAND
Khoi Loon Wong, AUSTRALIA
Chi-Jui Wu, TAIWAN
Fuli Wu, CHINA
Peng Wu, CHINA
Li Xiao, CHINA
Weiwei Xing, CHINA
Zhiguang Xu, UNITED STATES
Likang Yang, SWEDEN
Liu Yongqi, CHINA
Haslinda Zabiri, MALAYSIA
Mohamed Zahran, EGYPT
Chao Zhang, CANADA
Xingping Zhang, CHINA
Yanlei Zhao, CHINA
Jin Zhu, KOREA

THE ROLE OF DIGITAL EDUCATIVE MATERIAL IN EFFECTIVE TEACHINGS

Abstract: A multidisciplinary team of the project which consisted of a programmer, a pedagogue, a psychologist, scientists and a professor took on an action which specifies using the technology of information and communication as an educative system in elementary school. In order to do so a new software the Digital Map of Vojvodina is projected which implements the educative process of the lower classes in the elementary school. Three studies show that the usage of such methods led to more effective results in teachings of three subjects in the lower grades. Also students were more motivated. The empirical verification gave positive results. The study describes the software and the methodology.

Introduction

The idea of the Digital Map of Vojvodina project ensued from the educative system of the developed countries where the digitalized maps are already used in the teachings of the lower classes of elementary schools. Through this students are getting used to relying on technology. Also some scientific researches show that by using such methods in education motivates students to gain knowledge and to do a more effective work. Because of this the new Digital Map of Vojvodina software is contrived which results will be measured in the educative system.

The study of the Republic of Serbia is integrated in the subject of "Nature and society" and also in the subjects of History and Geography (in many countries there are subjects of country's History and Geography). The educative software enlarges the equipment which can be used on the classes in the teachings about the country. The map can be modified in order to make it easier to learn the geographical terms (the color of the map, water surface, inhabited places, population of different nationalities, width and the length of territories.)

The teacher is expected to actualize an equipment, which has a coherent and compatible content of the foregoing topics. He has the opportunity to combine the inner contents of subjects and also the levels of the classes. Basing on this he can work out a multidisciplinary access in constructing of terms.

During the adaptation of the Digital Map of Vojvodina (or the planning of the software) a high level of correlation can be reached on every category (subject or class) making the instructive form of the work in school more effective.

General information

The Digital Map of Vojvodina is a vector graphical map which is designed for children who go to lower grades.

The software is projected on a CD where all the applications which are necessary can be found. The player is made to a file start.exe and this is how the high compatibility are made for the function of the program. This is done through different software and hardware equipment.

The map functions in a way that the elements can be opened at the time when they are used. Every panel in the software is a separate SWF file. When the interface and the panel changes (eg. changing the language) new files are opened and the unwanted are closed. This method was taken from Internet sites (where those files are downloaded- SWF files- which are necessary). The advantage of this technique is that the unwanted files do not burthen the strength of the processor and do not engage the memory. These advantages secure a faster start and the work of the software.

The educational software for Nature and society lacks a certain tradition in teachings. Using the software the student perfects his knowledge on the computer. Also the educative software serves as a global and interesting resource of knowledge. This kind of information seems to affect more senses and secures interactivity. The advantage is that the software with its results affects the attention of the students in addition to nowdays mostly used method which is the chalk-blackboard- word method.

The software was made according to the curriculum of the Republic of Serbia (Službeni glasnik, Prosvetni glasnik, 2001), textbook (Treblješanin, 2001/a), workbook Razmišljanka (Gačanivić, 2001/b), and the methodical guidebook (Trebešljanin, 2001).

The software is built in a way that teachers, children and parents can use it too. The structure and use of the CD is easy and is suitable for the second graders of elementary school. It is enough to know how to use the mouse. Even smaller kids can learn to work with it.

Standards and protocols:

- Usage and modality of tools
- Independence of application and platform
- Durability
- Easy localization and tool adjustment for the user

The presentation can be used as an introduction on classes, or used when students are repeating or organizing. When there is a new topic it is necessary for the teacher to help students understand it.

The Digital Map of Vojvodina is built by a software Macromedia Flash MX 8.0 and it is recorded in the file "mapa.swf". File "start.exe" contains the right player for the "swf" files.

The software's didactical characteristics

Module Material

The aim of this software is learning, organization and repetition. In order to achieve these goals and to make learning more interesting we used developed, educative and technological tools. Studying supports multimedia.

Table No.1: Material type of a software

	Material: Information, Multimedia: text, picture, sound, animation, control: mouse
	Material: Animation, Multimedia: text, picture, sound, animation, control: mouse
	Material: Map, Multimedia: text, picture, control: mouse

Module for Didactical games

Didactical games are interactive and are supported by computer's multimedial abilities (text, picture, sound and animation).

The functions of didactical games in the software are:

- Detecting of knowledge
- Detecting of new references
- Verification of knowledge
- Repetition
- Development of logical abilities
- Development of mechanical abilities

Table No.2: Types of didactical games in the software

	Material: Puzzle Game: to find the suitable place for the object according to the principals of the game (the adjunction must be right) Control: mouse
	Material: Pairs Game: to find and to set up the pair to the right place and to make logical connection(picture-picture, text- picture) Control: mouse
	Material: Puzzle Game: with removing the pictures the big picture is made Control: mouse

Module Test

The educative software has a module test of knowledge which can show the user how much knowledge has he acquired from different subjects.

In the software we have integrated not only the module test but also the questionnaire. With the help of the test the users of the software can check their knowledge.

Table No.3: Types of tests in the software

	Material: Tests Game: to find and mark the right answer on the basis of former learning Control: mouse
	Material: Questionnarie Game: to write in the right answer on the basis of former learning Control: mouse and keyboard

During the adaptation of the Digital Map of Vojvodina (or the planning of the software) a higher correlation can be reached on every level (on the level of classes and subjects), making the education even more important.

The software is the most effective in the teachings of "Nature and society" in the third and fourth grade of elementary school where the teachings of the environment is foreseen as a part of the software (Province of Vojvodina). Beside this it helps in the orientation and in the reading of a map.

With the adaptation of the software a higher level can be reached in the teachings of some subjects.

The software can be used in the following subjects:

- The world around us (first and second grade), Nature and society (third grade), Nature (fourth grade), Society (fourth grade): in this curriculum the software helps in learning geographical terms starting with the map, the colors and all the structures and orientations of the map. Moreover the program contains the history, geography and political organization of Vojvodina (these terms also belong to this subject). The orientation on the map can be easily determined by the appearance and help of the compass.
- Mother tongue: the software contains the exact names of towns, provinces, regions, rivers, roads and borders.
- Foreign language: the user interface of the program is added on three languages so it can help in some cases.
- From toys to the computers (optional subject from the first grade to the fourth grade): The software can be used in acquiring some terms of informatics (CD-ROM, software, mouse, printing, etc.) and in improving mechanical abilities which are needed for the work on the computer (work with the mouse). The Digital map of Vojvodina is accommodated to the knowledge of an eighth grader.
- Also the software can be used in the acquiring of interdisciplinary projects like the Characteristics of our county.

DISTANCE LEARNING, MULTIMEDIA and VIDEO TECHNOLOGIES

Hypothesis of the study

The aim of the Digital Map of Vojvodina project is to make the education in the elementary school more effective. The software is used in the subject of Nature and society.

This study has tasks in the following chronological order:

- Analyzing the content and plan of Nature and society
- The construction of the software the so called model projection
- Experimental adjustment to the software
- The statistical process of results
- Conclusion

The general hypothesis is the following:

§ *New adjustments of technological tools improve education in elementary schools.*

There is also a sub- hypothesis and that is:

§ *Adjustments of new devices also improve the level of cognitive learning in elementary schools.*

§ *Adjustments also have positive effects in motivating students in learning activities in the elementary schools.*

The methodology of studies

In the setting up of hypothesis the following methods are used:

1. Methods of theoretical analysis- it is used in the analysis of the plan of Nature and society and in defining of some terms in informatics.
2. Descriptive method- it is used in the making and realization of the subject's goal and task
3. Experimental method- the dominant method is an experimental method which is going to show how effective the adjustments of the software are.
4. The method of model-producing- the production and development of the software

The study of initial knowledge

The study of initial knowledge is made in the experimental and control group in order to equalize the equivalence. The material was taken from the curriculum of Nature and society (third grade): Orientation on the geographical map of The Republic of Serbia (the charge density image, water, places, borders, traffic).

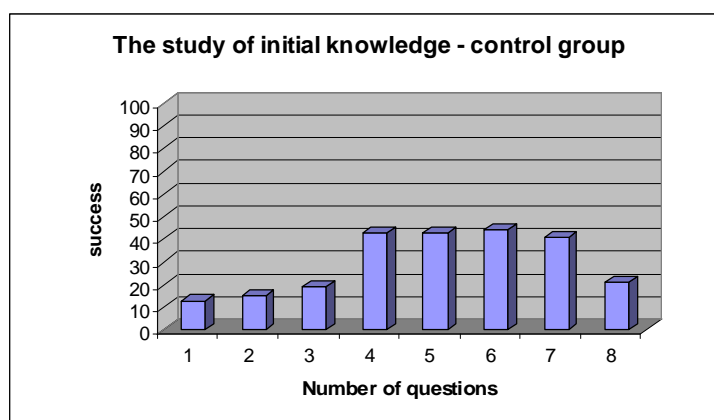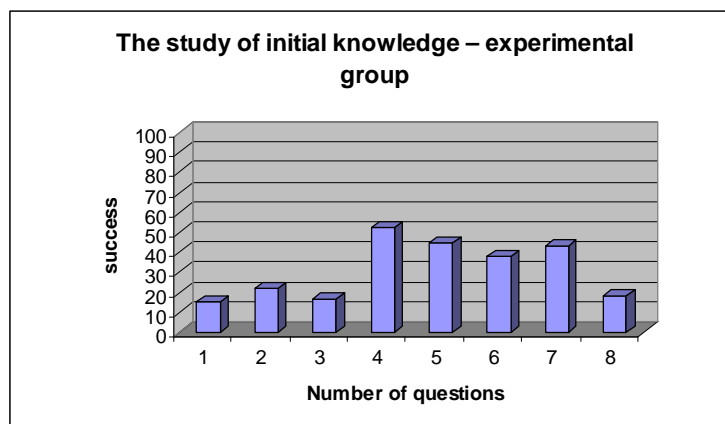*Chart No. 1: the study of initial knowledge- control group*

Chart No. 2: the study of initial knowledge- experimental group

**The study of initial knowledge – experimental group**

Final study of knowledge

Sample of studies

We made interviews with elementary schools in the Province of Topola (the North part of The Republic of Serbia, Province of Topola). We made interviews in: Bačka Topola, Bajša, Novo Orahovo, Pačir, Stara Moravica. In the control group there were 170 students and in the experimental group 180. We covered the curriculum of Nature and society in the third grade: the orientation on the geographical map of The Republic of Serbia (the charge density image, water, places, borders, traffic). The classes were chosen so that the level of knowledge would be similar.

Chart No. 3: Results- comparing the results of the experimental group and the control group

Comparing the results of the experimental group and the control group
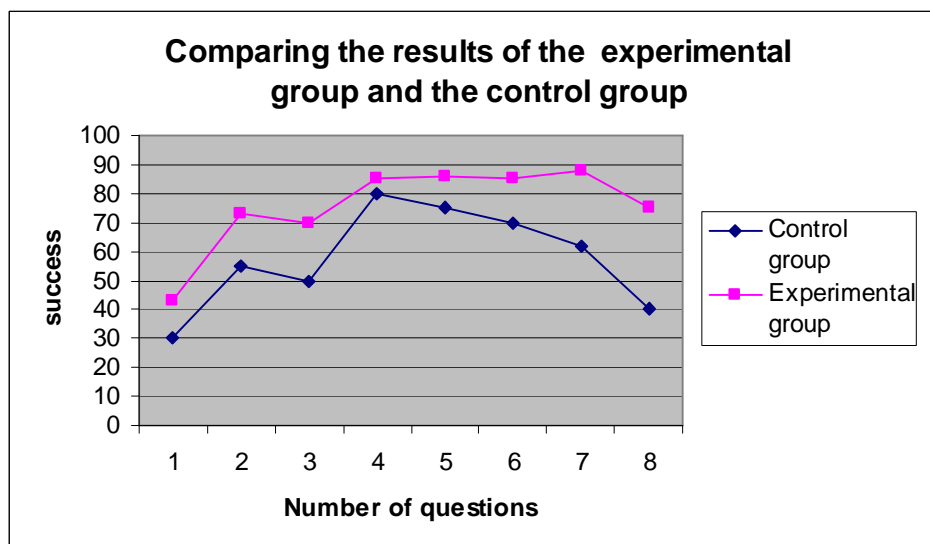
The analysis of the motivated students in the experimental group

In order to see how many students used the software for their work we gave the students questionnaires. We also wanted to see if they are more motivated on the classes where the educative software is used or on regular classes.

The questionnaire contains questions where we wanted to find out whether they are more motivated.

1. On the question: What do I think about the geographical map of the Republic of Serbia (the charge density image, water, places, borders, traffic) the answers were...

Table No. 4. : Answers on question 1.

GIVEN ANSWERS	STUDENTS NUMBER	%
didn't like it at all	0	0
liked it	63	35
liked it very much	117	65

2. On the second question: Is learning with the help of the new software more interesting than the regular class work…

Table No. 5. : Answers on question 2.

GIVEN ANSWERS	STUDENT NUMBER	%
It isn't interesting	0	0
It's the same	5	2,77
It is more interesting	43	23,88
It is a lot more interesting	132	73,33

Conclusion

With the new technical development of the Internet and information new opportunities are given to use these in education.

In this work through practical and theoretical knowledge we came to a final conclusion.

During this complex work (software + text) we worked in a team, accepting some professional knowledge from different scientific areas (pedagogy, psychology: The psychological and pedagogical knowledge added to the software in order to use it in education; Methodist: Analysis of content of Nature and society (The world around us and the adjustments to the software in this subject)

Beside the informatics (programming, methods of informatics) we did some pedagogical work too, starting with methodology, pedagogy and psychology.

For making the right conclusion we made questionnaires for students in schools (350 person). In our work we used workbooks and textbooks from different subjects.

The empirical part of our study was where we made hypothesis and sub- hypothesis and concluded that the motivation was higher and the learning was more effective when new adjustments are added as tools for education.

All this leads us to the conclusion that the educational system should be more improved with technical developments, multimedia software using the computer and other methods which would motivate students and would make better results in learning.

In professional sense, with pedagogical and psychological methods it is tried to be proven that new developments improve learning. However it is necessary to make some empirical studies too. In our work we wanted to show one of them.

Our study shows that the students who we interviewed were more motivated by the new type of teaching method and that using the computer in their school classes made the work more interesting and they were more than willing to accept it in their education.

DISTANCE LEARNING, MULTIMEDIA and VIDEO TECHNOLOGIES

Proceedings of the 8th WSEAS International Conference on MULTIMEDIA, INTERNET & VIDEO TECHNOLOGIES (MIV '08)
&
Proceedings of the 8th WSEAS International Conference on DISTANCE LEARNING and WEB ENGINEERING (DIWEB '08)

Santander, Cantabria, Spain, September 23-25, 2008

HOSTS and SPONSORS:

University of Alcala
Campus Universitario
28805 Alcala de Henares,
Spain

University of Cantabria
Plaza de la Ciencia s/n.
39005 Santander, Spain

Recent Advances in Computer Engineering
A series of Reference Books and Textbooks

Published by WSEAS Press
www.wseas.org

All papers of the present volume were peer reviewed by two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.
See also: http://www.worldses.org/review/index.html

World Scientific and Engineering Academy and Society