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

ISSN: 1790-5109
Published by WSEAS Press
www.wseas.org
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 Alcalá
Campus Universitario
28805 Alcalá 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 Szentimrei, USA
Michael Peter Kennedy, IRELAND
Paresh C. Sen, CANADA
Michel Gevers, BELGIUM
James S. Thorp, USA
Armen H. Zemanian, USA
Guannrong Chen, HONG KONG
Edgar Sanchez-Sinencio, USA
Jim C. Bezdek, USA
A. J. van der Schaft, the NETHERLANDS
Istvan Nagy, Hungary
Wasfy B. Mikael, 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 Katznelson, 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. Pauhraj, 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. Baggenstoe, 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
Elad 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 Ch. 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
Matti 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 A. 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
DISTANCE LEARNING, MULTIMEDIA and VIDEO TECHNOLOGIES

Learning Environment for Self-directed Learning, Collaboration and Social Networking
Tomaž Klobučar
91

The Role of Digital Eduative Material in Effective Teachings
Dragana Glusac and Zolti Nameostovski
97

Challenges for Wireless Sensor Networks Deployment
Zoran Bojkovic and Bojan Bakmaz
102

An Improvement of the Methodologies of the Inner Learning, E-Learning, and B-Learning in the Field of Intelligent Robotics
Vitaliy Rybak
109

Low-Cost Waveguide Oscillator for Research and Educational Purposes
J. M. Zamanillo, C. Pérez-vega, J. Saiz Ipiña and M. A. Solano
115

Platform for Intelligent Management of Industrial Machinery Based on Service-Oriented Architecture
Luis Felipe Herrera-Quiniero, Vicente Berenguer-Miralles, Felipe Restrepo-Calle, Raúl Gómez, Virgilio Gilart-Iglesias and Francisco Maciá-Pérez
121

3GPP towards IMS: Quality of Service and Charging
Alberto E. García, Laura Rodríguez, Klaus D. Hackbarth and Miguel Faro Rivas
128

Influence of the Traffic Engineering Scheme and QoS in the Dimensioning of Broadband Access Networks
L. Rodríguez de laope, A. E. García and K. Hackbarth
137

3-Dimensional Digital Terrestrial Television
Rafael G. Ayestaran, Jesús A. López, Vanessa Lobato, Víctor M. Peláez and Sonia García
146

Study into MBMS as a Public Warning Technology
Guillermo Esteve, David Valverde, Antonio Portilla-Figueras, Sancho Salcedo-Sanz and Javier Díaz-Estebaranz
151

Game-based Learning in Higher Education and Lifelong Learning: Bridging the Gap Between Theory and Practice
Andreja Istenić Starčić
157

Virtual International Business Management Learning Environment for Hospitality and Destination Management - VIRBUS: Pedagogical Design
Andreja Istenić Starčić
163

Simulation Game-Based Virtual Learning
Andreja Istenić Starčić
169

Learning E-portfolio Facilities and Functions
Andreja Istenić Starčić
174
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, Prosvesţni glasnik, 2001), textbook (Trebišćanin, 2001/a), workbook Razmišljanka (Gačanović, 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.
DISTANCE LEARNING, MULTIMEDIA and VIDEO TECHNOLOGIES

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

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

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

<table>
<thead>
<tr>
<th>Material: Tests</th>
<th>Game: to find and mark the right answer on the basis of former learning</th>
<th>Control: mouse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material: Questionnaire</td>
<td>Game: to write in the right answer on the basis of former learning</td>
<td>Control: mouse and keyboard</td>
</tr>
</tbody>
</table>

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.
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:

β New adjustments of technological tools improve education in elementary schools.

There is also a sub- hypothesis and that is:

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

β 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 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
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.

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.
DISTANCE LEARNING, MULTIMEDIA and VIDEO TECHNOLOGIES

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.

<table>
<thead>
<tr>
<th>GIVEN ANSWERS</th>
<th>STUDENTS NUMBER</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>didn’t like it at all</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>liked it</td>
<td>63</td>
<td>35</td>
</tr>
<tr>
<td>liked it very much</td>
<td>117</td>
<td>65</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>GIVEN ANSWERS</th>
<th>STUDENT NUMBER</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>It isn’t interesting</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>It’s the same</td>
<td>5</td>
<td>2.77</td>
</tr>
<tr>
<td>It is more interesting</td>
<td>43</td>
<td>23.88</td>
</tr>
<tr>
<td>It is a lot more interesting</td>
<td>132</td>
<td>73.33</td>
</tr>
</tbody>
</table>

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.