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The use of digital materials for instruction in sport topics at the University of West Hungary

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ABSTRACT

This article describes research and development work, in the course of which a digital multimedia course book was produced, and its effectiveness examined in regards to teaching sport subjects at the Faculty of Pedagogy in the University of West Hungary. The purpose of this study was to examine whether applying ICT in teaching Physical Education (PE) increases pedagogical effectiveness. The special e-book on sports was made in CD-ROM format, because of the low rate among our correspondence students who have access to the Internet. The CD-ROM contains theoretical and practical general material used in the course of teaching PE, demonstrates specialized vocabulary through videos and charts and provides the possibility for testing and self-testing. The CD-ROM also contains an audio version of the material for the benefit of sight-impaired students. The experimental group consisted of 133 correspondent students from Sopron who used the digital course book and then were given written examinations on three topics in PE, while a control group of 99 correspondent students from Papa studied with a traditional textbook, and then wrote examinations on the same topics as the experimental group. The results indicated that using ICT increases the effective factor in teaching PE.

Keywords*: digital education materials, ICT, sport recreation*

INTRODUCTION

Sports play a key role in maintaining one's health, bringing about completeness and improves one physically and psychologically. This approach in attitude is useful in higher education also. Every Branch in the Western Hungarian Colleges teach physical education, but there are some faculty departments where course specific athletic training lessons are practiced. These courses are Teaching, Kindergarten Teaching, and Social Education training. The Elek Benedek Faculty Department of Social Pedagogy employs to its advantage fundamental theoretical and applied basic constituents which make up the training instruction, where the students receive not only educational support in order that they may survey their own fitness level and development, but in addition they are also given the learning tools to exploit in exploring health developments and athletic maturation possibilities (Bucsy, 2003). The presently selected physical education topics (Sport recreation, Leisure time sports theory and practice I and II) have been worked up in a digital format, consisting of e-learning materials, in order that the supervision of the education level and effectiveness might be enhanced.

PRELIMINARY SURVEY OF THE STUDENT BODY

Method

At the outset of developing the teaching materials, a written survey was given several years in advance in order to determine the possible usefulness of digital materials among the Social Education Training Department first year students, as well as their knowledge of basic computer skills. The questionnaire was given to 83 students in 2002, in 2003 to 88 students, and in 2004 to

87 first year full-time students. Furthermore in 2004 the questionnaire was extended to correspondent students also, which there were 169 students, a body which was comprised of 82 students from Sopron and 87 students from Papa. What the researchers wished to determine was what percent of students actively used their own computer, used the Internet, and how many years had they studied computer science related subjects, the results of their digital attitude were then mapped out (European Commission, 2005). The survey employed was supplemented with questions pertaining to the area of health culture using standard basic sociological information science questions (Aszmann, A., 1997). The questionnaires were filled out by the students at the beginning of the school year.

Results

Of primary interest was what the percentage results within the main categories of the data processed would show how these categories would be distributed and how they had changed. The results gathered together may be seen on Table 1.

Table 1: *Results of the preliminary questionnaire polling the number of students who own a computer, have internet access, and have previous knowledge in computer science*

	Full-time students in Sopron			Correspondence students in Sopron	Correspondence students in Papa
	2002.	2003.	2004.		
Home PC	59 %	70 %	80 %	85 %	80 %
Home internet access	27 %	40 %	48 %	51 %	45 %
Length of the preliminary computer science study more then 4 years	41 %	59 %	61 %	13 %	15 %

The table's data plainly show that the bulk of the student body employs the use of their own computer, but that only every other student has Internet access available at home. ,, There exists however, serious differences between the different categories of students - full-time and correspondent - which is primarily of a generational in nature. The results also indicate that personal home PC use and the use of the Internet at home is increasing among the student body is growing steadily year by year, as well as increased ability in computer sciences.

Conclusions

The personal use at home of the Internet in 2004 still remained around 50%, which obviated to the researchers that they would not be able to devise learning materials based upon the Internet, and that they would not be able to employ classic e-learning frameworks. For this reason a self-contained work was developed, in which the student could bring home the materials on CD-ROM. Parameters at this time indicate positive change, that within a few years the students' digital competency, and embodied within this, expanded Internet possibilities will have been developed to a level, indicating that such materials may soon be expandable for use in the student curriculum in correspondent teaching.

DIGITALIZING THE INSTRUCTION MATERIALS

For the digitalization of the instruction materials as well as their development, reliance was made upon both at home and abroad international sport e-learning observations and experiences (Kokvay, 2003, White & Bridell, 2003). The digitalization was made by NeoBook software (NeoSoft Corp., 2003). During the time when the learning materials were to be compiled together, the Social Pedagogical's Physical Education curriculum was already fixed (Sport recreation, Leisure time sports theory and practice I and II), educational programs that included actual investigational results. The result was that material received the name *Sport Recreation: a Digital Course Book of Basic Knowledge on Recreational Training*. The book's chapter divisions occur along a unified concept, and thus the authors strove to adapt the subsections of the digital course book to conform to this—its understandability, transparency, ease of use in how it was integrated. The headings of the book touch upon the basics of sport recreation, the role of sports in the preservation of health and welfare, issues involving the concepts of exercise and its components, stages of fitness, and recreational training basics and constitution. Moreover the book's supplement contains charts showing actual investigations and results are made known.

Far more theoretical and practical materials were developed and worked up into the model than were necessary for the beginning project, as forethought had convinced the authors that such materials would be advantageous down the road, thus yielding formidable tool known, as an "input approach" to be offered in other subjects of study also. At the time of compilation, outside of the subject's ordinary domain, the authors of the work also endeavored to create a digital tool that could offer help to those also who are interested in recreation and sport recreation, or those whose line of work these elements wish to use. At the time of compilation, the text of the book's content and understandability were the main criteria. For this reason at the time of determining the form and level of recreational related materials and similar web-pages to be selected, the overall appearance was chosen which would be similar to other sport e-learning materials in circulation. (Ying-Koh, 2006). On the other hand, in structure what was striven for, that the material to be familiarized with would reveal its deep structure, allowing for self-motivated study and use as well as easy navigation should be a consideration on behalf of the user (Forgo S. - Hauser Z.- Kis Toth L, 2005).

The approach in the course book of leading to an understanding of the kinetic movements in turn were described in text, in drawings, and on video approaches, thus through three channels each would reciprocally strengthen the understanding of the others. An visual example of this may be seen in Figure 1.

In the digital course material's structure a place was given for testing and self-testing possibilities also. At the ending of every heading and subheading self-help questions can be found, upon which the user may click on the given choice of related topic questions, and in this way test his or her knowledge. An important part of the structure's contents is the Test and Exam module, which gives the student the possibility of taking a factual examination of equal form and content as would be required on different subjects, allowing them to take a trial exam with the help of the CD-ROM on the student's own computer. Acquaintance through the attainment by employing the mechanism avoids having the module end with exam questions formed unintentionally, that the student is unfamiliar with. (When in the actual practice of examining students, it is with this program that the students are tested using a central leading module that has been created, and in this way in the faculty department of information it may give its exams on-line to allow students to give account of what they know.)

The course book was developed in an audio version as well, which would be of aid to the sight-impaired as well as giving the blind student benefit of the materials use. The audio text may be activated through the use of the mouse and key-stroke commands. In the interest of integrating

the materials into the educational coursework, it was decided that special terms and the presentation of related course subject items, that a conventional paper text would also be released.

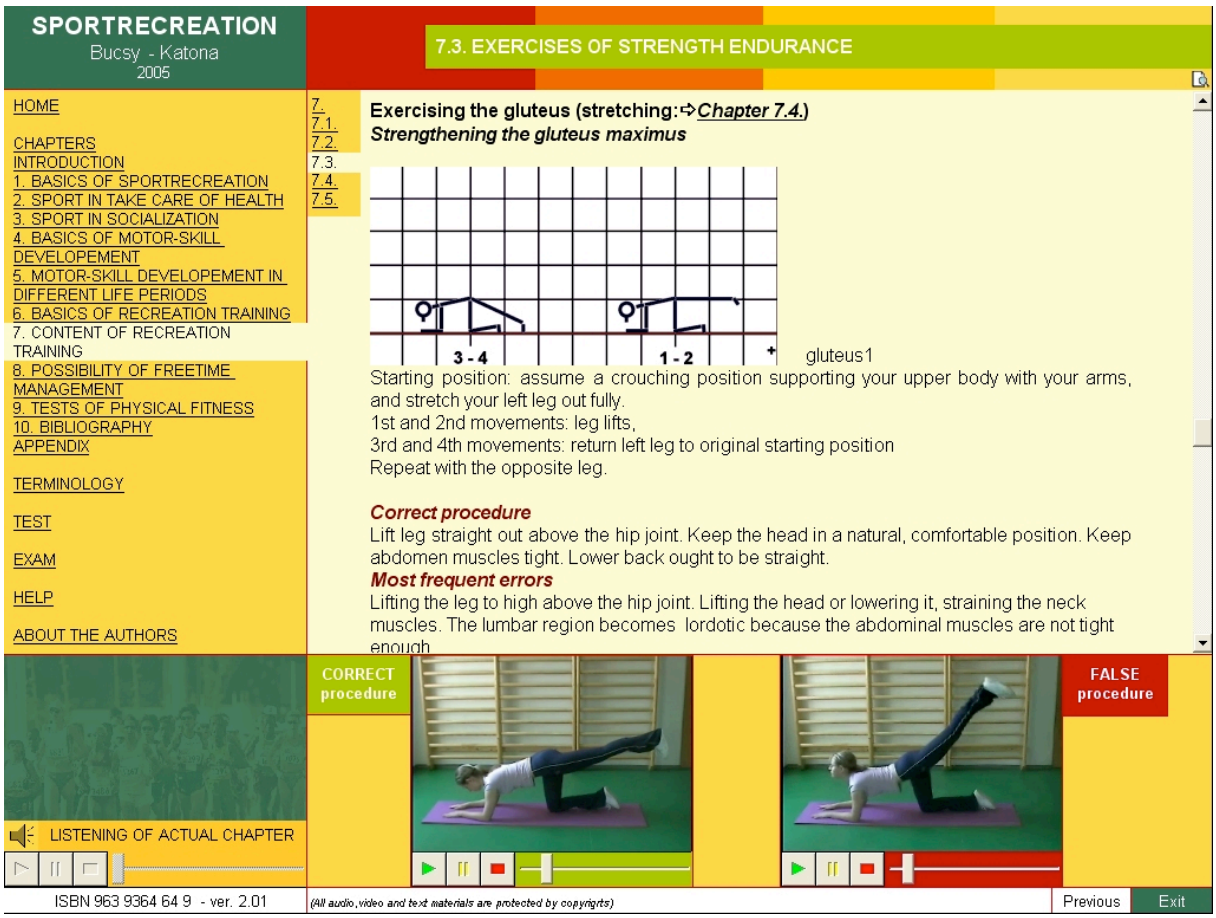

Figure 1: *A sample page of the digital book showing the application's structure with the main menu on the left side and the three demonstration channels of movement material*

QUALITY CONTROL

Method

The digital package of educational material, created as stated above, was first employed in the 2004/05 school year in the Social Education department. At the beginning of the second semester, a written questionnaire was distributed among the students about the digital course book, inquiring about its quality, ease of use, and faults. The bulk of the questions were answerable on a scale of five degrees using the Likert scale, but there were other types of fixed questions and an open ended question as well, where the student might write in using his or her own words their personal opinions. The 218 students (123 correspondent students, 50 part-time students, and 45 full-time students) gave their replies in which they truly "ranked" the digital course book, layer by layer (aesthetic questions, technical program questions, communication

structure questions), appraising the work. The received means and standard deviations have been put together for viewing in Table 2.

Results

The results clearly indicate that the students both in its parts and as a whole were satisfied with the digital course book, giving the book a "B" average. Replying to the overall question "What grade would

***Table 2**: Students' opinions about the digital book on a scale of five*

Value layer	Mean	Standard deviation
Aesthetic questions	4,07	0,85
Technical-programming questions	4,06	1,23
Structural – communication questions	4,30	0,87
Overall question	4,03	0,76

you give this digital course book?" the means differentiated by class divisions (full-time mean, 4.22; part-time mean, 4.12; correspondent student mean, 3.92) and the standard deviations as well (full-time, 0.64; part-time, 0.72; correspondent, 0.81). This is observable in the target diagram (Figure 2.)

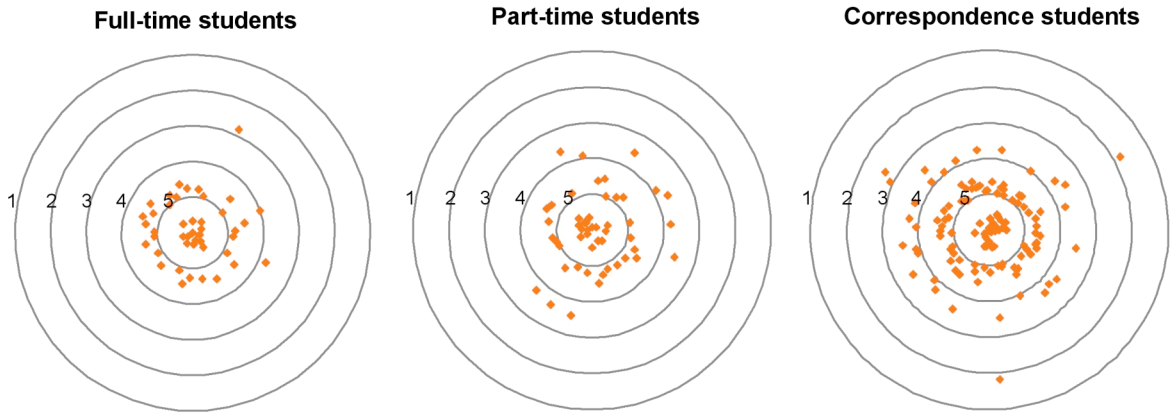

***Figure 2:** Distribution of answers to the question, "Give an overall mark to the digital book!" Arranged from left to right: full-time, part-time and correspondence student groups (the random amplitude is 0.5)*

Conclusions

The opinion of the full-time students on means and standard deviations well indicates that the younger generation are more predisposed and open toward digital materials, contrasted with the older part-time and correspondent students. When analyzing the open question on the

questionnaire, the result was that the students said they gladly employ in other subjects as well teaching in an e-learning format.

EDUCATIONAL EXPERIMENT

Method

Also it was sought to determine how conventional teaching materials compared in effectiveness compared to the digital course book with the students, which is why and experiment was conducted in which direction a test group (133 correspondent students in Sopron) studied with the digital educational materials, while the control group (99 correspondent students from Papa) learned with the aid of conventional textbooks three subjects of study (Sport recreation, Leisure time sports theory and practice I and II). The learning materials, the subjects of study, the presentations during lessons, and even the test questions were wholly identical in both cases. The measure of effectiveness would be in the test results from the final exam that would be administered.

Comparing the results of the two final exams by two sample T test, which is appropriate in the case of two samples with identical standard deviations to discover any given significant that are to be displayed. Assuming a null hypothesis, that there was no difference in knowledge between the two groups. Prior to the T test an F test was completed, in which it was verified that the standard deviation of the two samples might be deemed equal, and for this result a T test, or a Welch test was depended upon, where the received results gave a theoretically 0.05 significant level which was taken into consideration.

Results

The results of the experiment are grouped together in Table 3. It can be readily read from the table, that in all three subjects that were made use of in the experiment, the group taking advantage of the digital course book had significantly better results compared to the students making use of conventional educational materials. This is shown in Figure 3. also.

Table 3: *Results of the tests of the experimental and control group and significance of difference between the two groups*

Subject	Experimental group (133 persons)		Control group (99 persons)		T-test/Welch test results $p < 0,05$
	Mean	Std. dev.	Mean	Std. dev.	
Sport recreation	3,57	1,19	3,26	1,14	(T test) t = 1,99 significant difference
Leisure time sports theory and practice I	4,06	1,03	3,08	1,07	(T test) t = 7,06 significant difference
Leisure time sports theory and practice II	4,76	0,56	4,48	0,96	(Welch test) t = 2,64 significant difference

Conclusions

The educational experiment demonstrated that for the social education department instruction of sport related topics, the use of digital educational materials was in fact more effective.

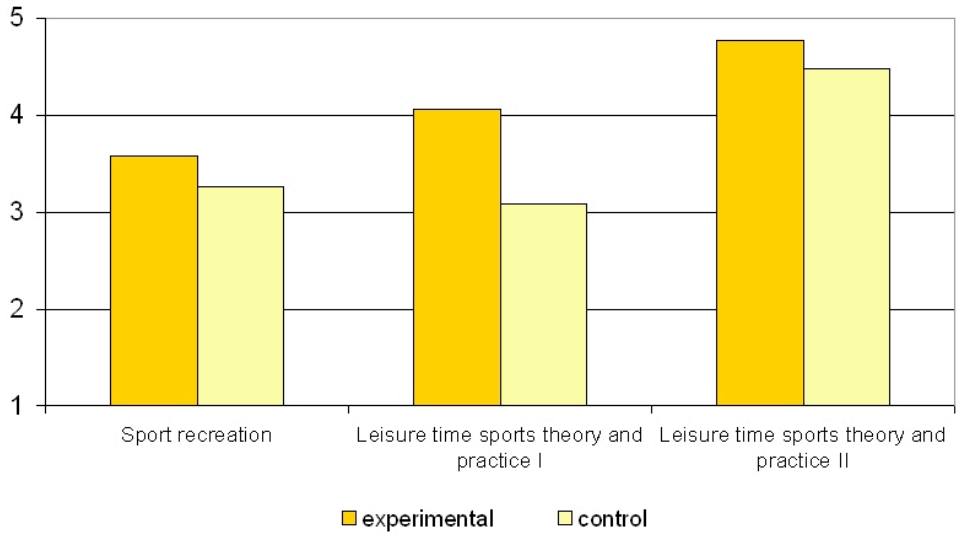

Figure 3: *The experimental (Sopron, 133 persons) and control (Papa, 99 persons) group according to examination subjects in the experiment.*

DISCUSSION

This developmental experimental project indicates that without making preliminary student surveys, it is not possible to develop useful educational materials, and in the course of conception it turned out that materials useful for the teaching of physical education can only be effectively prepared where by professionals who are willing to be innovative and cooperative in carrying the work out. The quality of the digital course book is determined by the quality of the various phases of development. If compromises should develop, whether they be gaps or faulty paths, they will affect the educational materials worth and use.

The prepared educational material was accepted positively by the students, though foremost in the matter of human interest, the majority of students who took part operated with a low level of digital competency. The usefulness of the course book is also supported by the fact that already in the third semester and the fourth teaching center it is being used in higher education.

As a result of the experiment it was also brought to light that an interactive course book in Physical Education was not only a beneficial material for teaching athletics in itself, but that the spread of the digital culture also played a role in that the students indicated that in other subjects as well they would gladly use similar educational materials.

The employment of a multimedia course book in educating also indicated that in learning from digital materials, the pitfall of mechanical or rote learning is more difficult to avoid, and thus when creating educational materials of this sort one needs to be especially aware while creating the

complex form. Furthermore, unified opinion gathered from the experience of the educators is that teaching Physical Education through the use of a digital course book is only successful when combined in a mixed form, that of using conventional materials with digital systems used in parallel (blended learning).

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