

## Evaluation of digital educational material for distance education in basketball

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The aim of the present study was the evaluation of digital educational material that had been designed and developed as part of educational parcel, for distance education, in the cognitive object of basketball. Two weeks after, the receipt of the educational parcel, the participants received by email a specifically drawn questionnaire which aim was to evaluate the educational parcel. Thirty-three (33) professors of physical education who, work in Crete, (22 of them serve in primary education and 11 in secondary education), took part in our research. The data analysis, as far as the designing, the content's layout and the interface of the digital educational material is concerned - from the analysis of the individual criteria - showed that the 87, 5% face positively the digital educational material and the 0, 94% negatively. The 75% support that with the particular form, that the digital educational material has, serves autonomy and study independence of place and time and allows the individual rhythm of study. As a conclusion, it is recognized the qualitative - functional, and not the quantitative, use of multimedia, which had come in harmony with the aesthetics of the medium lending coherence, completion and balance. At the same time the autonomy and the independence of the study is ensured.

**Keywords:** digital educational material, evaluation, distance education, basketball.

### 1. Introduction

People use computers, as tools, for the collection, the edit and the distribution of information. Computers are a fact in our lives because of the new computer applications, the continuously decreasing cost of purchase and finally the computer's power that increase. Today, we speak for a revolution of the information technology or for information society. Worldwide the development of all the human activities is led both from the information technologies and the communications. The need for continuous and long life training simultaneously delimits the challenges in the field of education (Kolitsis et al, 2001) [1]. A worldwide effort takes place for the new technologies' incorporation in education, so that, new technologies are going to be accessible and available to each citizen (Nikolaidou, 2001)[2].

The increasing importance of knowledge and imperative specialization appears in the field of work, creating new circumstances and new needs for training in the competitive field of education. Those changes involve the new curriculums, new books, the new knowledge production and the development of the new technologies. In Greece the teachers' training has adopted a bipolar model of training: the model who serves the needs of the educational system, and the model that serves the teachers' training needs (Mavrogiorgos, 1999) [3]. The traditional training centers cannot cover the needs for training and further more, they impose restriction concerning time, space and flexibility.

The physical education teachers, who serve in the compulsory education in Greece, are called to teach physical education according to the new Cross thematic Curriculum Framework for Compulsory Education (OJHR 304, 2003) [4], starting from September of 2006. The students in the last two grades of the Elementary school in Greece are expected to develop complex motor skills and sophisticated motor

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skills, to negotiate with the Indicative Fundamental Cross-thematic Concepts and develop basic individual offensive and defensive basketball skills [5]. On the other hand, physical education teachers are called to teach and negotiate with skills and significances which they hadn't been taught during their studies (Kioumourtzoglou, 1991) [6].

Educational material can very fast be transmitted to the learners via the ICT. As a consequence, an extensive concretization of distance education programs can be observed. Although as Avouris (1999) [7] said disagreements are expressed for the effectiveness of the new methods. Lionarakis and Lykourgiotis (1999) [8] supported that distance education can be as effective as the traditional one under two conditions: a) the educational methods used are suitable and b) there is an appropriate communication between student and the professors and among other students. A meta-analysis of 19 empirical studies found that online learning was always as good as or better than equivalent face to face classes. Online learning can be as effective, and in some cases better, as traditional learning (Hiltz et al., 2002) [9]. Over 2 million students are involved in distance education courses. A development of the technologies and systems which support distance education can be observed worldwide (Allen & Seaman, 2003) [10]. Distance education can contribute to the training of the physical education professors who serve in Greece. Antoniou et al (2001) [11] supported the necessity of training for the physical education teachers as it could improve their educational duties and teaching responsibilities. The distance education, via ICT, is proposed as the appropriate education method because the majority of the physical education teachers have the proper equipment, the know-how and the will in order to participate in a physical education training program. The distance education via ICT is a new challenge and a new occasion for the physical education teacher's training.

The ICT exploitation makes the medium more effective as it supports an adoption to the individual educational needs. The educational effectiveness of the digital educational material depends on the designing and the development procedure. The incorporation of multimedia (video, sound, graphic, movement) in the educational material lends important advantages and it makes the multimedia powerful educational tools which easily can be revised and upgraded, when this is going to be necessary. Critical issue for the distance education is the educational material, because it is the motive lever of distance educational process (Lionarakis, 2001) [12].

The purpose of the present study was the evaluation of digital educational material that had been designed and developed as part of an educational parcel, for distance education, in the cognitive object of basketball. The whole educational parcel contained printed educational material, digital educational material, study manuals and a four week indicative timetable of study. The digital material was additional to the printed educational material and it concerned the individual offensive and defensive basketball skills that are taught during the last two grades of primary school according the new curriculum of Greek ministry of Education. The production of this educational parcel was necessary because there was not educational material to teach basketball with the method of the distance education in Greece. Basketball was selected because according to Konstantinakos (2000) [13], the cross-thematic integration, anti-racist and cross-cultural education can be approached by teaching basketball.

The design and the development of educational material of our study were based on the particular background of the physical education teachers who serve in Primary education, in Crete, on the adults' education principals and on the learning theories. The model of West and Lionarakis (Lionarakis, 2001) [12] was followed for the printed educational material. In addition, for the digital educational material the "Helix" model was selected (Panagiotakopoulos et al, 2003) [14]. This model supports an evolutionary process during the development of the material with the repetitive implementation of circle phases. In the circle of each phase an intermediary publication of the final product is developed, which is evaluated and improved at the next circle. This process is continued until a publication that would satisfy the requirements of users is produced. This publication attributes to the final product. The digital educational material design and development was based on the web training principals, was manufactured with Internet tools and was developed on web pages form. The required steps, which were followed for the design and the development of educational software, were described by Panagiotakopoulos et al (2003) [14]. Trying to disengage from the internet, the web pages were stored in a cd - rom and in this form the digital educational material were included in the educational parcel. During the designing phase, the web

pages planning structure, their links and the interaction that we wanted to give at each phase between the web pages and between printed and digital material used had common factor. There was a consideration about the characteristics that a self-instruction software needs to have (Charalampopoulou, 2000) [15].

A thematic unit is a collection of activities, lessons and presentations that accomplish one of the sub-goals of the course. Each thematic unit is larger than an individual page. Each lesson is larger than an individual page and smaller than the whole course. In order to organize our educational units, activities, lessons and teaching methods the Horton model was selected (Horton, 2000) [16]. The educational units were finally shaped depending on the purposes that were called to carry out. Presenting them, they concisely had the following structure: a) a unit with web pages focused on the approach of the basic knowledge, b) a unit with web pages focused on the activity, c) a unit with web pages focused on the learner, d) a unit with web pages focused on the existing knowledge, e) a unit with web pages focused on the investigation of subject and f) a unit with web pages focused on sources. After an introduction, learners proceed through a series of web pages to a concept or a skill or they participated in an activity or the course branches down to a specific path for each learner or the learners proceed through a series of "test" until they reach the limits of their knowledge or they navigated a database or a web site in which they accomplish specific learning goals. At the end of these procedures, the learner reviews a summary of what taught or/and takes a self assessment test.

## 2. Methodology

### 2.1 Sample and research tool

The choice of sample became from a Stratified sampling (Cohen- Manion, 2000) [17]. Thirty-three (33) physical education teachers, who serve in Crete, participated in our research. For the evaluation of the educational material a specific questionnaire was drowned. In order to evaluate the educational parcel, axes were developed. Eighty three criteria were developed, apart from the demographic characteristics. In the first part of the questionnaire elements which referred to the demographic characteristics were included (sex, age, teaching experience, studies, existence PC, email and use PC). In the second part of the questionnaire, the evaluation criteria were developed. The questionnaire had been checked for its validity and reliability. This questionnaire was used for the evaluation of the educational parcel. The educational parcel was delivered by each one, following a telephone communication. Two weeks after the receipt of the educational parcel, the 33 participants received by email the questionnaire. They also received an accompanying letter in order to notify the importance of the research as well as to give assurances of confidentiality and to encourage their answers. The questionnaire should be returned by email when their study would be completed. Finally, thirty-two (32) of them evaluated the educational parcel.

### 2.2 Results and analysis

The teachers belonged in two different groups: eleven of them (n=11, 34, 38% of the sample) serve in secondary education and twenty-one (n=21, 65, 62 %) in primary education. Among them 14 were females and 18 males. The mean age was 37, 5 years (for men: s.d.: 5, 63 yrs, width 16 yrs and for women: s.d.: 4, 09 yrs, width 12 yrs). Their mean teaching experience was 9 years for the men (s.d.: 5, 44 years, width 26 yrs) and for women was 7 years (s.d.: 3, 59 yrs, width 10 years). The 93, 75% has a BEd degree in physical education and the 6, 25% holds an MSc degree. It is interesting to point out that the 100% of the sample has a personal electronic address (email) and a percentage as high as 78, 12% owned a computer at home. This percentage is considerably higher from 15% that corresponds to the percentage of the general Greek population that owns a PC [18]. This suggests that physical educational teachers may find computers as an important technology for professional and personal development, and computer ownership a necessary condition for achieving them.

The questionnaire data analysis, as far as the designing, the content's layout and the interface of the digital educational material concerned - from the analysis of the individual criteria - that positive opinion about the printed educational material - designing and layout - has the 80, 8%. A high percentage of 87, 5% has positive opinion about the digital educational material. This means that the 84, 15% of the sample has a positive opinion about the educational material. As it is evident from the data presented above, a difference is presented between the two educational materials. The digital educational material was something new and maybe this can explain the difference. When something new or different appears it's covered from the enthusiasm even if it's satisfies the minimal of the expectations.

The approach of the training contents for the educational material of our study corresponds to the educational content for the last two grades of the Elementary school, according to the new curriculum of Greek ministry of Education according to 89, 38% of the sample.

In the axis user interface was examined: the quality of the interaction, interaction between the educational material and learner, user interface's multimedia elements and the aesthetics of the educational material. According to the answers, the used language for the development of the educational material, was simple and comprehensible; the vocabulary was rich and homogeneous, with syntactic and grammatical consequence, while where terminology was used that had to do with basketball and it was explained with clarity and precision.

An 81, 25% of the sample supports that there is an interaction between the educational material and the learner. Another important evident of the data is that 90, 63% believe that interaction is easy understandings, useful and creative. In contrast, the 17% of the sample is not sure or disagree with the way that the feedback, positive or negative, is provided. These two evidences are remarkable important because, as Panagiotakopoulos (2000) [19] says, the interface of a digital educational material, constitute that piece which learner sees, reads, hears, comes in contact or it is the reason to begin a communication. Interface has a relation with the way that the educational material is presented and corresponds to the learner.

As it is evident from the data, a high percentage of 98, 7% of the sample recognizes the qualitative and functional, and not a quantitative, use of multimedia, which had come in harmony with the aesthetics of the medium lending coherence, completion and balance in the presentation of information.

It is also interesting to point out that the vast majority of the participants, the 84, 37 %, believe that there is a clear way to navigate the digital educational material. On another hand, the 15, 63 % finds some difficulties during the navigation. That observation maybe explains why 12, 5% is not sure or disagree with the structure that the digital educational material has.

The digital educational material serves autonomy and independence that concerns the place, the time and the individual studying rhythm is supported by the 75% of the sample. It deserves to remark that the rest 25% could not certainty answer, while opposite opinion did not exist. Overall, these differences in views may reflect issues or fears regarding physical education teachers' identity as teachers when the most striking result possibly is that the vast majority (96, 87%) of the participants consider that ICT might support the development or application of new or alternative teaching approaches of physical education.

### 3. Discussion

Evolving ICT to development educational material for the basketball opens new path not only for the presentation of educational issues with a different way but for the training of physical education teachers as well. The ICT give the opportunity to the educational community to design educational material which can combine the advantages of the printed educational material with the advantages of the digital educational material. Information and communication technologies give a bust to the distance education so, learners can cover their needs with less stress without submitted themselves in discomfort transportations. Learners can study in their personal place, in a time that they wish with their individual pace. The learner's partial disengagement from the internet while their study, but with educational mate-

rial that designed, developed and supported by internet tools, educated learners in technology that will be useful for them in the future.

The digital educational material, in that particular form, gives the learners the possibility to work in an interactive environment for a multifaceted education without the stress of internet connections, virus or/and Trojans inflection. The educational material can always reflect the new knowledge, as a costly updated edition is not required, while the access possibility is provided for a number of valid web pages. The traditional role of the physical education teachers is believed that will change. The new curriculum force physical educational teachers to find out what the role of the “co –coordinator” of the teaching – learning process is about. The ICT are viewed as the medium that will support the training of the in - service physical education teachers as well as the teaching procedure of the physical education courses. The digital educational material can constitute the natural allies of the ICT in this effort.

## References

- [1] Kolitsis, A., Mpaziakos, G., Agorogiannis, A., Goudos, S., Cheilas, K., Tsimpoukis, T. Proceedings of the 1st Hellenic Symposium for the open and distance education, Patras , Greece 25 -27 May 2001
- [2] Nikolaidou, S. Proceedings of the 1st Hellenic Symposium for the open and distance education, Patras , Greece 25 -27 May 2001
- [3] Mayrogiorgos, G. in Athanasoula – Reppa, A., Anthopoulou, A.A., Katsoulakis, S., Mayrogiorgos, G., School administration , 2, Human resources , Patras , Open Hellenic University (1999)
- [4] Official Journal of the Hellenic Republic 304/ 13-03-2003
- [5] <http://www.pi-schools.gr/download/programs/depps/english/24th.pdf>
- [6] Kioumourtzoglou, E. Thessaloniki, Salto (1991)
- [7] Avouris N., Proceedings of the 4th Panhellenic Conference on Didactics of Mathematics and Informatics in Education, Rethymno-Crete (1999)
- [8] Lionarakis, A., Lykourgiotis, A., in Vergidis, D., Lionarakis, A., Lykourgiotis, A. Matralis, X. Vol. A , Patras , Open Hellenic University (1999)
- [9] Hiltz, S. R., Zhang, Y. , Turoff, M. in Bourne, J and Moore, J.C. (Eds.) *Elements of quality online education*. Needham, MA: The Sloan Consortium. (2002)
- [10] Allen, I. E. and Seaman, J. Needham, MA: The Sloan Consortium. (2003).
- [11] Antoniou, P., Siskos, A., Farmakis, D., Proceedings of the 1st Hellenic Symposium for the open and distance education, Patras , Greece 25 -27 May 2001
- [12] Lionarakis, A. in Lionarakis, A. (Ed) *Opinions and reflections on the distance education*, Athens , Propompos (2001)
- [13] Konstantinakis P., in Charamis, P. (ed) *Athens, Center of Studies and Documentation of OLME* (2000)
- [14] Panagiotakopoulos, X. Pierrakeas, X., Pintelas, X., *The educational Software and its evaluation*, Athens, Metaichmio (2003)
- [15] Charalampopoulou, F., Proceedings of the 1st Hellenic Symposium for the open and distance education, Patras , Greece 25 -27 May 2001.
- [16] Horton, W. New York, John Wiley & Sons, Inc. (2000)
- [17] Cohen, L., Manion, L. Athens, Metaichmio (2000)
- [18] Measuring Information Society 2000, Available at [http://europa.eu.int/ISPO/basics/measuring/eurobaro/eurobaro53/docs/mis2000\\_report.doc](http://europa.eu.int/ISPO/basics/measuring/eurobaro/eurobaro53/docs/mis2000_report.doc)
- [19] Panagiotakopoulos, Ch. Vol. C, Patras, Hellenic Open University (2000)