

# Development of an educational software for the learning of obstetric anatomy addressed to nursing

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## Abstract

Computational technology, such as software, computer program, has been a great tool for the Teaching-Learning process, mainly in Health Sciences. The aim of this study was to develop software (didactic CD-ROM) on the Learning process of Obstetric Anatomy for Nursing by means of a judicious choice (Portuguese and English languages) of 107 anatomical keywords related to the Obstetrics and sites related to the theme. This CD-ROM (Macromedia Dreamweaver® a computational tool), addressed to the Learning of Obstetric Anatomy for Nursing, could provide logical apprehension of obstetric anatomical terms from didactic texts, images and sites from Web. The educational software development favors an interaction between experts of Human Anatomy, Pedagogy and Computer Science. Computing tools applied to Health Sciences are useful to promote knowledge on virtual environments and to complement the Learning of Obstetric Anatomy.

**Keywords:** learning, anatomy, obstetrics, nursing, education.

## 1 Introduction

Nowadays computers have been an integral part of the modern Learning, although CBL (or Computer Based Learning) is not a recent educational innovation existing for almost 30 years. Rudimentary experiences in a form of simple questions and answers, such as “correct/incorrect” or “try it again” were everything that computerized systems could perform. Since then, new significant applications of the pioneering work of the “teaching machines” have been occurring. Such efficacy educators and psychologists began to test in the decades of 1950 and 1960. Currently, it is observed that the computational technology is highly sophisticated and, consequently, it has been happening important changes in the Learning process starting from technologies based on the Internet (ROSENBERG, 2002).

There are several resources such as the e-learning virtual environments for creating and structuring educational courses in the modality of distance. The Education based on the Web (or Web-Based Education) uses the Internet to spread contents through didactic resources previously organized. It can provide interactivity between students and their tutors; to evaluate feedback by means of tests during or after courses. Such environments have been developed mainly aiming educational purposes, to ease the creation of classes for the Teaching-Learning process; integrating communication and management devices for collaborative Learning. According to such view, students are not mere spectators: they are considered part of the whole process; teachers become tutors to address them the stages of the process (JACQUES, 2003).

At first, virtual environments have been developed in the form of commercial software (Learning Space and Web CT).

Afterwards, the educational models were created in universities by some research groups, such as Aulanet, Eureka and TelEduc. In Brazil, virtual environments were developed by some universities such as TelEduc pointed out due to the use of Portuguese language and functionalities and resources that differ in their pedagogic conception; therefore, being appropriate for specific uses (PONTIFÍCIA..., 2006).

Learning Management System (LMS) is the computational descriptor more used to elaborate courses and consequent management of student. LMS programs are typically based on Web programs and they have been made available to enroll students, to schedule and to promote courses, and to evaluate income and scores of tests. In this context, the descriptor LCMS (Learning Content Management System) designates Systems of Administration of Contents of Learning and it manages certain amounts of Learning objects that are “reused” (Reusable Learning Objects or RLOs) (KRUSE, 2005).

Browser-based training is the term used to describe a courseware (any type of educational or instructional software) that needs a Web Browser to access; that is, the application of a software that exposes pages of the worldwideweb (or Web) originally written in HTML format (Hypertext Markup Language), performing either as a Website or as CD-Rom. Such resources are also denominated hybrids or hybrid CD-ROM. Distance Education or EaD (distance learning or distance education) is also a term frequently used, and it refers to instructions mediated by tutors and education based on the Web addressed to corporate companies or to universities (PONTIFÍCIA..., 2006).

The use of technology in Obstetric Anatomy addressed to Nursing could be made, initially, by means of a simulator developed starting from the Plateau (Maternity Nursing) system (LEWIS, 2001). This on-line communities or environments were created for practices mediated by electronic discussions (forums); nurses have been sharing theoretical-practical cases commonly available for the professional's practice. Updating regarding the use of the CBL programs (Computer-Based Learning) in Nursing have been discussed in international Congresses, and starting from isolated initiatives, which explore varied types of information the Technology by means of instructional software can offer to the nurse and which guidelines have been providing research for these academic-professionals (WALKER and WALKER, 2002; AGUIAR and CASSIANI, 2007).

The objective of the present work was to develop an educational software (didactic CD-Rom) aiming the learning of Obstetric Anatomy addressed to the Nursing.

## 2 Material and methods

The study was divided into two different phases. Phase 1 aimed at surveying the descriptors or key-words related to Obstetric Anatomy, as well as to select the reliable current sites related to the theme worldwide. Phase 2 comprised the development of the computational program Macromedia Dreamweaver® (visual editor) for the creation of educational software (courseware) (ROSENBERG, 2002; MATOS, 2005), in the form of a didactic CD-ROM, mainly addressed to the learning of Obstetric Anatomy to the Nursing.

The survey of terms was suggested by the International Anatomical Terminology (last review) on Obstetric Anatomy (INTERNATIONAL..., 1998). Terms were also checked in the list of the descriptors of scientific terminology available by both the Brazilian Society of Anatomy (COMISSÃO..., 2001) and the Health Virtual Library. After this survey, the words were listed in a total of 107 descriptors, initially in alphabetical order, available in pairs with their respective corresponding either in Portuguese or in the English language (INTERNATIONAL..., 1998; COMISSÃO..., 2001). Afterwards, they were grouped according to the headword importance plus their modifiers, that is, terms with generic meaning and then the ones with more specific meaning, followed by their corresponding modifiers, in order to establish, at the first search, a panoramic view of all the listed terms and, then, a more specific search in Obstetric Anatomy.

After the words already defined in their respective grouping, a database was created subdivided into: Entry (Portuguese and English); Definition; Division; Subdivision; Illustration and Addresses of sites recommended for research (Portuguese and English) surveyed by means of GOOGLE searching engine. The survey of electronic sites or Web addresses were carried out typing on the GOOGLE Search button (or the "enter" key) for a list of relevant web pages afterwards selected. GOOGLE, a trademark for a search engine, was chosen since this system has an electronic pagerank that interprets a link of a page to the other as a vote; the more votes a page possesses, higher importance it will have as well as the best place among the main sites

of the list (MATOS, 2005). The search through Web was developed being used a microcomputer (PC) with an AMD DURON Processor.

After the typing of the keyword combined in the GOOGLE search engine, site addresses related to these keywords were selected. The sites which have presented better visual impact and objectivity of information, as well as content quality in the supporting for the researched keyword were included into a database (UNIFESP VIRTUAL, 2006). Addresses were excluded with redundant contents and those that demanded conditional download payment. The relevant aspect for the choice was the academic value of the sites from scientific magazines and newspapers, encyclopedias, atlas, discussions of clinical cases, collections of consensus or guidelines related to the Obstetric Anatomy. The final decision on the more appropriate site addresses comprised the agreement of the experts' evaluation (PONTIFÍCIA..., 2006).

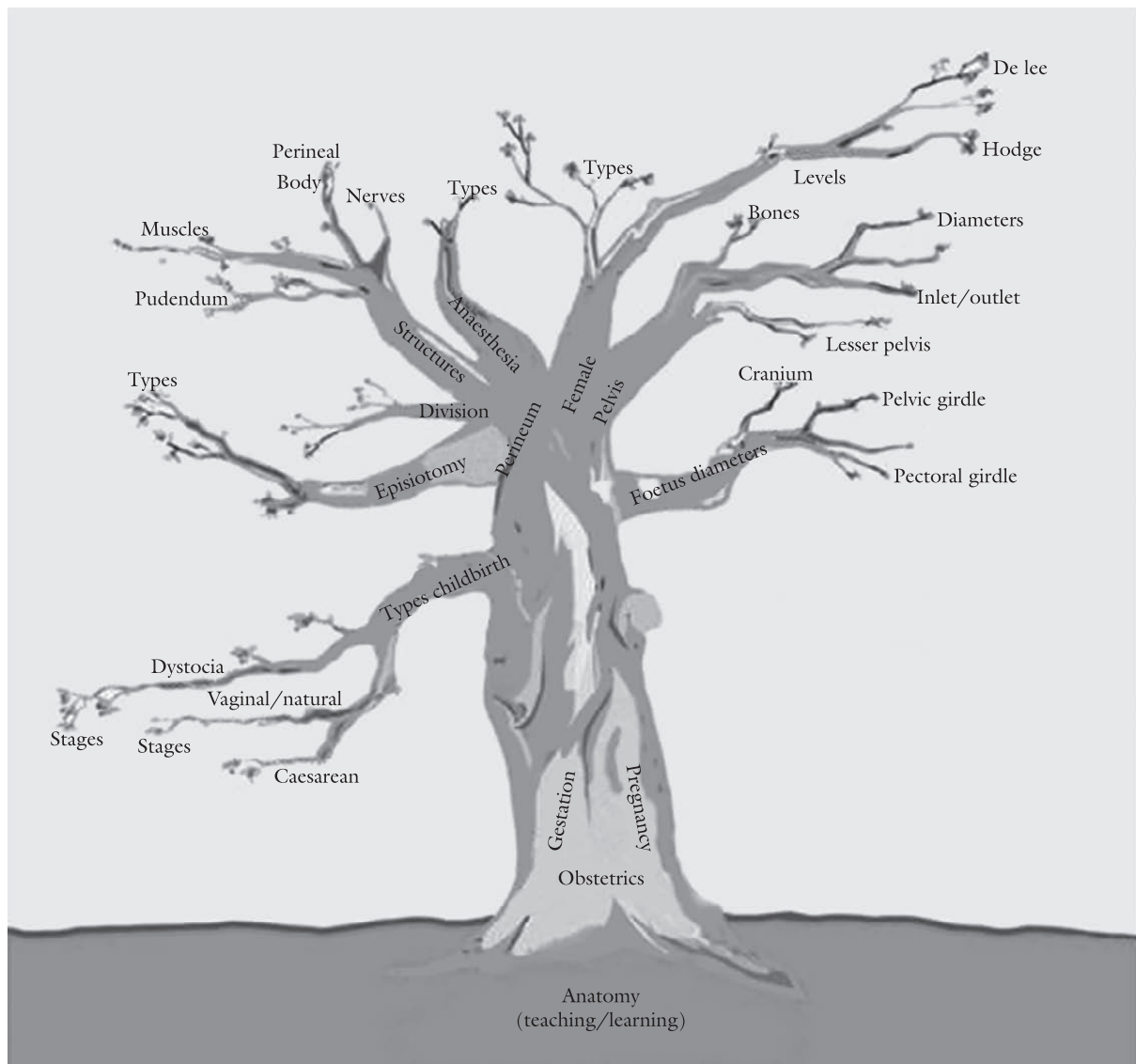
After the creation of the database, a Website was developed with appropriate programming devices for the production of contents that provided experience of an adequately addressed learning. Among some prototypes of software developed in the technological market, it was chosen the visual editor Macromedia Dreamweaver®, with solutions based on free and attractive software with non-acquisition cost (ROSENBERG, 2002).

## 3 Results

The disposition for the selected keywords, that is, the design of these keywords in the educational software or didactic CD-ROM was concluded in the following way: after the creation of the CD-ROM cover, the Opening screen was designed to provide access to the buttons (links) in the top of the screen. At first, the "Button 1" exposes the index of the 107 keywords alphabetically in Portuguese and English languages; "Button 2" shows the grouping words, that is, the generic and specific ones with their modifiers; "Button 3" concerns to development of the program (definitions, illustrations, divisions, subdivisions and recommended sites for researching); and "Button 4" provides the study (self-test) properly addressed to the Nursing, composed by four questions and four clinical cases.

Links to the search of keywords were also inserted into the design of a bushy tree (Figure 1), that is, the keywords were available by links disposed in a tree as a life symbol associated to the Obstetric Anatomy. The following distribution was used: the generic words were listed above the root and in the beginning of the stem and, afterwards, the specific words with their nuclei and modifiers in the bushes of the tree.

After selecting the link to access the searched term (the bottom at the top of the screen or the words into the tree), it is obtained the definition of the word, illustration and recommended sites for researching (English or Portuguese language). When the headwords requested modifiers, a proper sequence is also available, such as their types, division, characteristics and other aspects related to each headword. After consultation, the user finds the instruction "return to the tree". The suggestions for researching and updating sites in Portuguese and English vary in amount, according to the selected keyword.



**Figure 1.** Opening screen: one of the two available accesses to the search of the keywords disposed by means of links in a tree.

#### 4 Discussion

Several studies have been discussing “e-revolution” and the impact that the computers or ITs (Information Technologies) have been on the education system. The teachers’ and students’ continuum learning and updating information are available through the access to the global knowledge based on the computer with Internet accessing. Studies about education based on technologies have been pointing out that Education issue, while a process or product, still needs to be much more discussed. New effective dimensions must be addressed to teachers’ training for the use and creation of technologies in the teaching-learning process (MURRAY, 2003).

In this perspective, it is important the concern in promoting integration of new technologies based on the Web to create didactic materials from effective programs of Universities and ITs companies, above all, to provide technical subsidies for such integration could be well

succeed. Teachers should optimize didactic contents, while programmers need to develop these into information technologies. These professionals work on the planning and the design, elaborating the media processing, animation, programming, besides text creation and continuous supporting (NIETSCHE, BACKERS, COLOMÉ et al., 2007).

For the development of educational software, it is important to evaluate the level of Compromising, Curiosity, Simulation, Practice, Improvement (education content of Correction and Extension) and Training. The concepts of Active Learning (elaboration of suitable projects for some working environment) should be taken into account when creating computational tools based on the Web; since the students’ evaluation and feedback will be considered as a parameter to measure the low or high outcome of the Learning process (AGELESS LEARNER, 2005). In the present study, the choice for the search engine GOOGLE was due to its wide database (the amount of three million site

addresses) and for its wide acceptance close to government official sites (MATOS, 2005). Moreover, GOOGLE search engine is capable to compose lists of results starting from their own bases of data denominated URLs (uniform finders of resources), and quotes (“like this”) around a set of words were used to query the matching of them exactly (NIETSCHKE, BACKERS, COLOMÉ et al., 2007).

The proposal for developing this educational software was mainly directed to the academic field which usually uses technological products of teachers’ their own authorship created on virtual learning environment. In most of the cases, such contents are structured on a baseline organized by the collective construction, compiled in text format, centered on the participants’ development and related to the groups’ activities (ROSENBERG, 2002). With the recognition of the potential of the Internet in acting in the globalization providing information for patients and professionals of the Health, the interest in the computers and their influence in the professionals’ formation have been increasing, as well as the need to know the new forms of Learning, Teaching and Research favor the democracy and the social integration (MASIE, 2001).

In Brazil, such tendency has been observed in some medical institutions in the Health field, such as the Laboratory of Distance Education (LDE) from the Health Department of the Federal University of São Paulo, SP, that aims to promote integration of the new technologies to the didactic materials of the effective programs starting from technical subsidies (UNIFESP VIRTUAL, 2006). Also other institutions have been implementing the use of the technology as pedagogic resource starting from the nuclei of Distance Education in the support to the teachers and students (JACQUES, 2003; PONTIFÍCIA..., 2006).

Specifically in relation to the Obstetric Anatomy in Nursing, several definitions for Computer science have been created, and the most accepted worldwide includes the concept of integrating the Nursing in the management of Information Technologies, in order to provide effective care to the Health (O’DONNEL and WHITE, 2007). Another important link between Nursing and Computer science includes the concept of the use of Information Technologies in any one of the functions performed by Nurses such as Care, Management, Education and Research (JACQUES, 2003). Considering the evaluation of the Learning in Nursing based on computer, recent progresses in the computer technologies have been making possible the development of software or CBL programs (Computer-Based Learning) using complex sceneries in the process of Teaching and Learning for Nursing students and teachers.

The development of the Learning of Obstetric Anatomy in Nursing based on Computer has been divided into two phases: systems that only use texts and the development of materials for CBL that provides high graphic quality and animation to improve high interactivity (WALKER and WALKER, 2002; AGUIAR and CASSIANI, 2007). As example, models of simulators can be mentioned in the use for the Subjects of Obstetrics and Pediatrics of the School of Nursing of the University of Pittsburg (LEWIS, 2001). In this project, students learn Obstetrics addressed to the Nursing with simulators of high clinical stages called Slim Baby and Birthing Simulator. These can be considered an effective complement and training to the Learning of

Obstetric Nursing. Due to the specialized nature of the practice of the Obstetric Nursing and the need of a care of high consistence for the patient, the training on these simulators has been providing the opportunity of some acquisition of practical experience for Nursing students (O’DONNEL and WHITE, 2007).

When being considered efforts to promote applicability of these North American models of technological resources of high cost for the Teaching and Learning of Obstetric Anatomy in Nursing (LEWIS, 2001; WALKER and WALKER, 2002) to the Brazilian environment, it was necessary to determine all of the possibilities to be up-to-date on knowledge and Pedagogic *Praxis* based on the computer. Therefore, the application and the use of software (CD-ROM) properly addressed and supported in a rational way; that is with no high cost, the study of Nursing contents, in the case the Obstetric Anatomy, was object of the present study.

In some Nursing Brazilian educational settings, similar efforts have been made, such as the educational self-instructional software “Burns: Service to the Adult Patient in the Initial Phase of the Injury” (PAIVA, 2001). This CD-ROM has widened the possibility of Learning in Emergency Units on the initial care of burned patients from eight steps, subdivided into presented items starting from a secondary menu. Other works, such as, an educational software on Diabetes Mellitus for professionals of health; Nursing physical examination of the newborn at a term (educational software) and other with different technological resources have already been developed aiming education support (PADALINO and PERES, 2007). Similarly, in this study, the proposal for the development of educational software was the careful elaboration of the content starting from a judicious choice of the related keywords or descriptors in Obstetric Anatomy to ease the search of information and resources.

In this study, the didactic-pedagogic approach was the main concern for the elaboration of this software that could be created starting from a reliable choice among recognized computational models like the Macromedia Dreamweaver Flash 4.0® by Microsoft Windows 98 Full (O’DONNEL and WHITE, 2007). This chosen software was compatible with the content to be developed. After this choice, an Informatics expert has charged all of the stages during the creation of the software according to the computational selected product (Macromedia Dreamweaver MX®) (ROSENBERG, 2002).

To succeeded on the creation of a software in the Educational area, it is necessary the participation of an adequate team based on the practice of tasks directed by the project manager, specialist in the domain of Specific Knowledge such as the programmer, graphic designer, instructional designer and quality manager (MASIE, 2001). In the proposed study, there were specific tasks for each one of the participants, and the didactic-pedagogic expert has drawn the picture of a bushy tree to illustrate the main menu (Figure 1), in order to promote analogy between the Life (root) and the importance of the Obstetric Anatomy and the Medicine (pelvis, fetus, gestation, childbirth, episiotomy, anesthetize, and others) in the concept and preservation of the Humanity.

In this context, a constant articulation was provided to the proposed study since a team of different professionals



worked on all the defined and different stages of the project: survey of the keywords; selection and distribution of them (alphabetically listed and after grouped into general and specific meanings with their modifiers); outline of dynamics and pedagogic strategies, graphic design, animations, publication of the activities in the virtual environment and development of the “puppet” (storyboard) (KRUSE, 2005). At the end of the working of the educational software, it was prioritized to obtain “Self-Instructional Materials”, or instructional materials that offer opportunities for self-application as well as self-practice of the new knowledge, such as the “Computer Assisted Instruction”, “Programmed Instruction” or “Self-Study Modules” (AGUIAR and CASSIANI, 2007). In this research, this CD-ROM allowed the availability of a self-manage study comprised by four questions and four clinical cases.

Computational Programs or software present some constraint, since they are available either to the teacher as to the students without needing the physical presence of both, in consequence, this can provide any distrust or misunderstanding (NIETSCHE, BACKERS, COLOMÉ et al., 2007). Once such methodologies of Teaching and Learning are innovative, it is necessary to implement multidisciplinary discerning analysis in relation to their advantages and disadvantages and to establish long term reflections regarding any technological and pedagogical strategies (O'DONNEL and WHITE, 2007).

## 5 Conclusion

The development of an educational software (didactic CD-ROM) starting from the interaction between professionals of the areas of Human Anatomy, Pedagogy and Computer science for the Learning of Obstetric Anatomy addressed to Nursing could provide a quick updating through the Web access, a practical and self-management Learning. The use of computational tools in Health Sciences is useful in providing knowledge in the virtual environments and in complementing the Learning of Obstetric Anatomy.

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