TEACHING HUMAN ANATOMY THROUGH A COURSE BASED ON THE WORLD-WIDE WEB: A BRAZILIAN EXPERIENCE

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Abstract

The world-wide web is an important means of health education for university students. The great challenge is to use it to promote effective results. We present here a proposal on a course of Human Anatomy, with essential contents for students enrolled in the area of health at the Centro Universitário (University Center) Hermínio Ometto. Our aim is to expose the frame used for its management, as well as the difficulties in its implementation and the students' evaluation of the results. The results evidenced the effectiveness of the course for the students' understanding of the contents considering both quantity and quality. Moreover, it contributed a lot for the horizontal integration with the other disciplines studied in the first year of the courses in the area of health offered by the institution.

Key words*: human anatomy; university education; long-distance education.*

Introduction

In the last century, the scientific and technological development allowed new advances in the area of Human Anatomy, with the sprouting of techniques like computerized tomography, magnetic resonance, ultrasonography, bone densitometry and the nuclear medicine that have allowed visualizing the internal structures of living individuals without any type of invasive approach. Together with these advances, we saw the appearance in the last decade of the XXth century of a powerful tool of communication and distribution of long-distance information, the Internet.

In the educational area, we face today the challenge of offering information and new technologies created in reference centers to an increasing number of professionals and institutions. This challenge is particularly important to the sciences of health, where the precision of data and high definition of the medical images are essential for a comprehensive professionals' training and their continued education.

In this context, proposals of new methodologies for education in the area of Human Anatomy - including technologies mediated by the Internet - are very

desirable. Such methods are potentially capable to reach out an expressive number of students, allowing their access to the last findings in this area, evolving with increasingly rapidity. Moreover (and importantly), this new methodology can contribute to improve the students' learning, both when it is used as a complementation to what was learned in class and when practiced integrally at distance.

The present work aimed at evaluating reciprocity and students' interaction with the preliminary content of a long-distance Human Anatomy course, representing an extra means of learning in the area of health at the University Center Hermínio Ometto.

Methodology

a) The educational framework

The model employed finds support in works pointing the long-distance education as a modality indicated for the situations where, besides the necessity to overcome difficulties in accessing information as to settings and time, there is a rapid and constant consultation to the teachers [1,2].

The choice for the employed model considered the time schedule flexibility to accomplish the activities and the means of formatting the content as the course evolved. Moreover, it was possible to increase the number of participants with a relatively low cost for the institution, once it was already providing infrastructure to its center of technological development and to the teachers in such context.

At the same time, we tried to organize a long-distance education context with a functional presentation in terms of accessibility, with flexibility as to modernizing and disposing contents logically, in a compact format, with proper language and graphical elements related to the themes being studied [1,2].

In this context, the Technologic Center (CETEC) of the University Center Hermínio Ometto - UNIARARAS adopted the TELEDUC (NieD/UNICAMP) program/platform and implemented some graphic modifications, that promoted modernity and facilitated its use by the professors responsible for the contents and by the students.

b) The course format

The preliminary program of the Human Anatomy course included thirteen modules in which anatomical cuts associated with topographic dissections, radiographic images, computerized tomography and magnetic resonance were used. This material was taken from the database of the "The Visible Human Project" supplied by the National Library of Medicine (NLM) of the National Institute of Health in the United States of America (NIH-USA). The content was installed inside the modified TELEDUC program, and allowed unrestricted access to all modules, with total freedom of choice of contents to be consulted and studied, and availability of printing the items desired.

The organization of each module was centered in sets of images associated with questions related to the existing structures to be identified. When opening one of them, the student could access the information on the subject, its presentation, concepts included and purposes. Initially, the student was stimulated to review his knowledge on the anatomical regions presented. He had, besides the "key images", access to the complementary activities and to the suggested bibliography. The review was centered in questions elaborated by the responsible professors. Such questions were presented in "pop up" format text windows. When signaling an answer, right or not, a new window containing comments on the chosen alternative appeared. When the option was not the right one, there was a suggestion for more study on that topic. When the answer was right, the student could proceed to the next question. At the end of the review the student could return to the initial set of images.

c) The staff and support involved

The modules were organized by teachers actuating in Human Anatomy disciplines offered by UNIARARAS, who became the monitors along the development of the activities. All the students attending the first periods of Biology, Biomedicine, Physical Education, Aesthetic Cosmetics and Physiotherapy were stimulated to participate. As the access was provided for everyone, they were divided according to their careers of origin.

Considering the number of interested parties, a sequence of different schedules was established to satisfy everyone's needs as to consultation to teachers with agility and exactness. The operational implementation of the program was carried through by a teacher actuating in the CETEC/UNIARARAS. He was responsible for the program logistics, monitoring the students' accesses and the contacts with them.

The monitors were responsible for the clarification of doubts on the modules content, verification of the students' performance and elaboration of reports on the assistance given.

The communication among students monitors and coordination was established by means of forums and e-mails provided by the CETEC.

Besides the pedagogical assistance, another group took care of the technological structure. The modules, at first elaborated by the responsible teachers, received a graphic and aesthetic formatting carried through by "web designers" at the university. Also the TELEDUC platform adaptation was in charge of PHP programmers in the CETEC. After the establishment of the groups of students, the cadastre process and release of modules by the system were made by the staff in the Computer Science Department.

d) Evaluation and support

The evaluation in each module involved questions/diagnosis related to the content in each image and multiple choice tests on the themes present in each stage.

The results of evaluations applied in each module were available in the academic system. The access to such information was through individual password.

At the end of each module, the student was invited to answer an auto-evaluation questionnaire as well as another one involving the evaluation of the course. The questionnaires took into consideration the participants' opinion as to the contents presented; stimulation to learn more through technological means with monitors' orientation; and aspects concerning navigability in the system involved. All the answers were compiled in tables.

It is important to mention that some events were promoted by the institution aiming at spreading and orientating the students as to the new

course, which was not imposed to them. However, to attract their interest, the University Center offered a certificate to those who accessed the system and accomplished at least 75% of the module activities.

Results and Discussion

The elaboration of a support course in teaching Human Anatomy should take into account the students' difficulties when they enroll in courses in the area of health, especially due to the great amount of new contents and the need to integrate them with the ones provided in the other disciplines.

The experimental implantation of the course took place in 2005 and was offered to all the students in the first period of courses in the area of health provided by UNIARARAS. There were a total of 353 students. 82 of them participated in all the modules and accomplished all the activities, answering to the auto-evaluation questionnaires and the ones for evaluation of the course.

The great majority of those students evaluated the course positively. These reports are corroborated by the analysis of their interest and performance concerning the activities in the course and the ones during the Human Anatomy discipline classes (data not published).

Amongst the positive aspects raised, 57% mentioned the importance of the course for its professional formation. The media resources available in the modules were positively evaluated by 76% of the students and 58% mentioned their disposition to study deeply the Human Anatomy after accomplishing the activities of the course with Images. Moreover, 52% of them affirmed that the virtual learning was similar to the one in class.

Besides the specific aspects of the discipline, the technological resources used in the formatting of the course were analyzed by the participants. Around 80% of them enjoyed the discussion rooms, the system of e-mails exchange, schedule to consult monitors and the frames through which the contents were given. Finally, only 22% declared some difficulty in using the electronic apparatus or exchanging information.

These data confirm the importance of new initiatives carried out as means for pedagogical facilitation in teaching Human Anatomy. Moreover, the course favored the majority of the students' predisposition to work in

groups to resolve common problems. This behavior was reflected in the class environment. The almost daily involvement with technological resources in education allowed better commitments with learning and more positive teachers and students' interrelations.

There are some aspects that must now be reevaluated. Many students reported difficulties to conciliate the activities included in the program with the other ones required in class. Some referred that without the teacher's presence the activities at long-distance are seen as secondary. Also, it becomes evident the necessity to improve the contact between the parts involved in the whole process. The long-distance activities were also pointed out as impersonal, depending on constant motivation.

However, the exchange of information among the groups of students, monitors and coordination was intensified through "e-mails" groups allowing ample spreading of messages. Moreover, the TELEDUC platform modified by the institution provided everyone's free access to general information, optimizing the communication. This dynamics could humanize teachers and students' interrelations. Also, the coordination kept an exclusive e-mail for comments, critics and suggestions to improve the program.

Our experience confirms the data reported in other recent works that cite long-distance education as an excellent aid in the teaching/learning process. At the same time, it was possible to reinforce the evidences suggesting the use of new methodologies to meet the challenges involving data precision and medical images high definition as essential in comprehensive courses aiming at molding good professionals in the area of health.

Conclusion

The results obtained through the pedagogical process with technological resources for long distance education used in the implantation of the Human Anatomy course were strongly positive. We consider that the success of this project was due to the professionals' strong interaction and pro-activity and to the adequate choice of today available flexible technological resources. To conclude, it is important to mention that the implantation of the course

would not be possible if there were not integrated decisions on the part of teachers and Institution to guarantee the effectiveness of this program.

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