Teaching of Human Liver Anatomy with Learning Designs

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This paper presents a collaborative learning design in the area of human anatomy, focused on the liver, where they have been used educational standard and methods necessary to create quality and interoperability learning design and educational resources following the actual educational tendencies. The Institute of Human Anatomy has been responsible for designing and implementing the aim of learning about the human liver (with macromedia flash), while the Institute of AT addressed manage and process that pedagogical resources, integrating a software specialist (LAMS and Moodle) for the design and management of learning. LAMS was used to create learning activities based on design learning, and integrated into Moodle, as part of a course for students of Medicine.

Key words: Learning Design, Learning Objects, Human Anatomy, LAMS, Moodle

Introduction

The Faculty is realizing important advances in educational methodologies including the curriculum. That implies that it is necessary innovations in curricular structure and methodologies, and also new software t. The Faculty of Medicine has six careers: Medicine, Nursing, Kinesiology, Obstetrics, Odontology and Medical Technology. In particular the career of Medicine is experimenting methodological changes in the teaching-learning process. For this, it is necessary to reform the curricular plan with the creation of integrated courses and the development of multimedial resources in concordance with the new approach.

In the Institute of Human Anatomy there are not sufficient real organs to be analyzed by students. For this reason is necessary to have multimedial resources to cover this deficiency of bodies and organs. So, the Institute of Anatomy is using educational platforms and new pedagogical approaches for teaching anatomy. Since 2003 have been developed learning objects us reusable resources for teaching human anatomy. Moreover, the learning object is considered as an independent unit of content that can be used in different contexts. It is important to give to digital resources the character of learning object doing emphasis in reutilization and with an appropriate metadata we have learning objects for any learning context. The adequate use of learning objects supporting the understanding of human liver is better adapted to the new educational paradigms based in knowledge and collaborative learning. There is a change in the generation of educational tools from unidirectional to bidirectional and socially too, because there are many people involved in the process of generation of digital resources in some cases there are students involved in the process, therefore the learning is more effective. Now this work introduces a new approach to Institute of Anatomy, Learning Design (Koper, & Tattersall, 2005; IMS Global Learning Consortium, Inc., 2003).

Learning objects has been very useful through the last years; however, the most common definition (IEEE LOM, 2002) is so ambiguous and it is not sufficient to aid the learning. In this context the learning design, including learning objects, are much better to improve it.

This work uses a specific learning object for human liver anatomy. It was made by the Institute of Human Anatomy of the Austral University of Chile.

Learning Object: Human Liver

The learning object used in the learning designs it has been used from 2004 to teach in different courses about anatomy (Bucarey & Álvarez, 2004). With the integration of learning design, we can use this tested learning object following the logical sequence to create learning activities in LAMS.

The common teaching of liver anatomy is divided in five components:

1. Situation and Location: it explains the location of liver in the abdominal cavity, weight and dimensions.
2. External Structure: shape and external distribution of the liver and their interaction with near organs.
3. Hepatic Segmentation: it shows the elements that constitute and delimitate the segmentation of the liver.
4. Bile Ways: it includes the displacement of the bile and its varied tracks.
5. Vessels and Nerves: it shows conceptual maps. It contains an order of specific components.

Moreover three additional components are included:

1. Webgraphy: to review more information in the internet, with this tool a student can learn more about the human liver.
2. Imagenology: where different human liver illness are showed by ecotomographies.
3. Images of Pavilion. Pictures taken by students and personal of the Institute of Human Anatomy are presented.

Each section is improved year by year with the collaborative participation of the students at the same class. The conclusions of this interesting methodology where the students are part of their own learning were presented in XXVI Congreso Chileno de Anatomía VII Congreso de Anatomía del Cono Sur (Bucarey & Álvarez, 2005). The figure 1 shows the main screen of the learning object, with the eight components. The learning object is packed under SCORM.

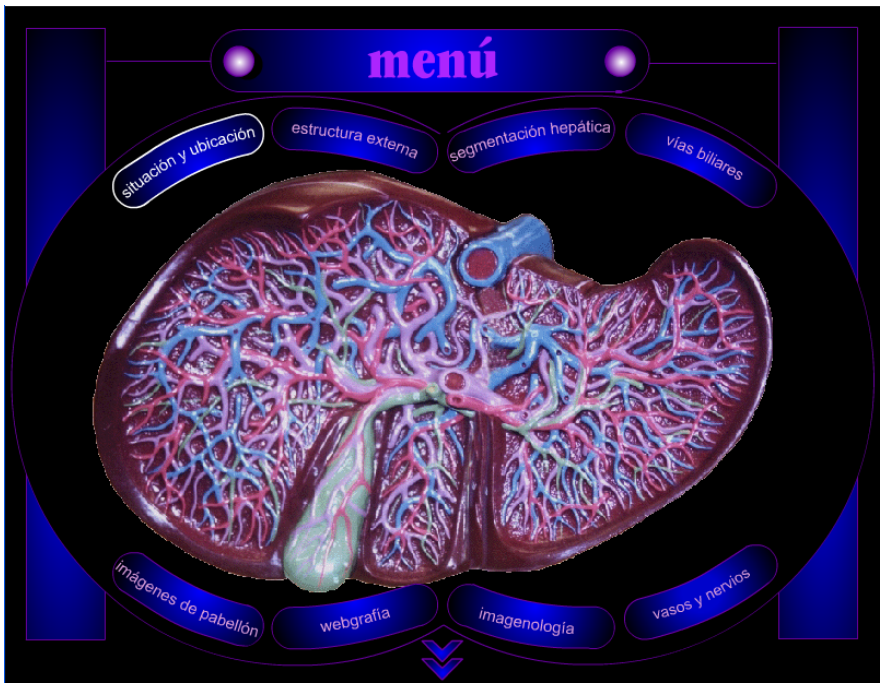


Figure 2: Main screen of the learning object to teach the human liver

The first five components of the learning object were replaced by five smaller than them, for build learning design for students of Medicine, Nursing and Obstetrics, because there are different kinds of specialist (Medicine, Nursing and Obstetrics) with different learning objectives. All the learning objects

are used by Medicine students. By the way, only Situation and Location, External Structure and Bile Ways are used by the Nursing and Obstetrics students.

A Simple Methodology to Build Learning Design

In general the procedure used to build a learning design is: the teacher does a lesson plans like a narrative text, analyzes the available LAMS modules and finally he builds the sequence.

Lesson plan

A lesson plan is like a guide, prepared by the teacher for a specific lesson. The lesson plan has two main sections: the metadata and the core. The metadata usually specify the title, author, roles (learners and staff), learning objectives, requirement, materials, etc. The core is usually divided in acts, some examples can be found at http://www.lessonplanz.com/.

The learning design proposed

Three learning designs have been developed, two for the career of Nursing and Obstetric and one for Medicine. The table 1, shows the lesson plan for the Medicine career.

Table 1: Lesson Plan for students of Medicine career.

STRUCTURE AND SEGMENTATION OF HUMAN

Title: ANATOMY OF HUMAN LIVER I
Author: Sandra Bucarey.
Date: December 13 /2007.
Level: Block Integrated Systems III, ESME-132.
Subjects: Human Anatomy/Anatomy of Human Liver.
Description: The hepatic segmentation in human anatomy allows us to divide the liver in more comprehensible, functional and structural segments.
Requirement: To have approved Block Integrated Systems III, ESME-132.
General Objetives: To understand the situation and location like external components of the liver and also the hepatic segmentation.
Methodology: The knowledge will be evaluated before carrying out the course through a test of diagnostic. It will have diverse resources for the achievement of the general objective. At the end of learning process it will be carried out a formative valuation to put in evidence the learning level achieved at the end of the course.
Materials:

- LAMS installed in a server.
- Learning Object "Situation and Location".
- Learning Object "External Structure".
- Learning Object "Hepatic segmentation".
- Learning Object "Imagenología".
- A computer for person connected Internet.

First Act.

1. The professor explains the methodology to use and he makes an introduction where he speaks of on digestive system and the liver like component this system. As complement to this learning a LO of imagenology is included.

2. They are basic topics as that the knowledge of the hepatic segmentation in human livers is very outstanding because it is an organ that can be transplanted in its entirety or partially. A person can live with part of the liver thanks to her segmented structure.

3. It will be informed that as first stage of the course, it is necessary to carry out a diagnostic evaluation so that each student verifies his advances at the end of the course.

Second Act

Answer test of diagnostic. Available in the enclosed file "Test de diagnóstico MED.doc"

Third Act

It disposes the following optional activities to carry out for the students.
1. To revise the Learning Object "Situación y Ubicación".
2. To revise the Learning Object "Estructura Externa".
3. To revise the Learning Object "Segmentación Hepática".
4. To revise the Learning Object "Imagenología".

Fourth Act

To participate in the forum:implicancia clínica de la segmentación hepática.
The forum begins with the following debate question: ¿Cuales son los componentes responsables de la segmentación hepática y cómo dividen éstos al hígado?

Fifth Act

To send the professor a brief text with the obtained conclusions of the debate in the forum.

Sixth Act

To answer test of alternative available in the enclosed file **"**PREGUNTAS ANATOMIA HIGADO HUMANO I MED.doc"

Seventh Act

Analysis of the diagnostic evaluation and correction of the errors, comparing the initial level with the end reached in the course.

Condition:
IF the results of the test are not satisfactory THEN the students revise the Object of Learning corresponding to the test again.

Implementation of the learning designs in LAMS

To implement the learning design using LAMS, were developed three learning objects designed with similar methodology. Same methodology was used to develop the three learning design. The figure 2 shows the learning sequence in LAMS for Medicine students. This sequence is the implementation of the lesson plan showed in the table 1.

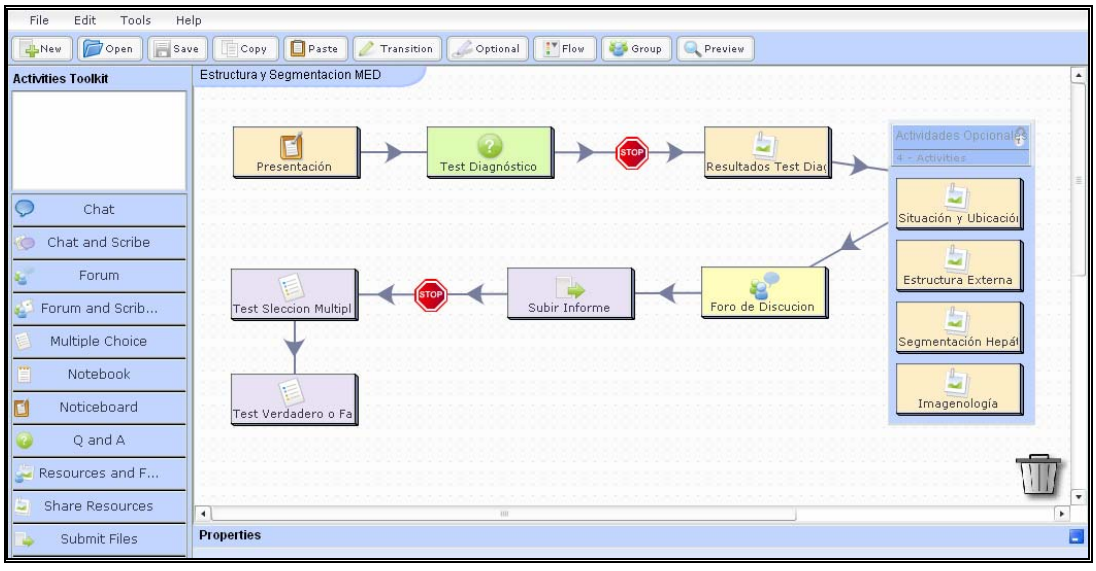


Figura 2: LAMS version for the structure and segmentation of the human liver in a LD for Medicine career.

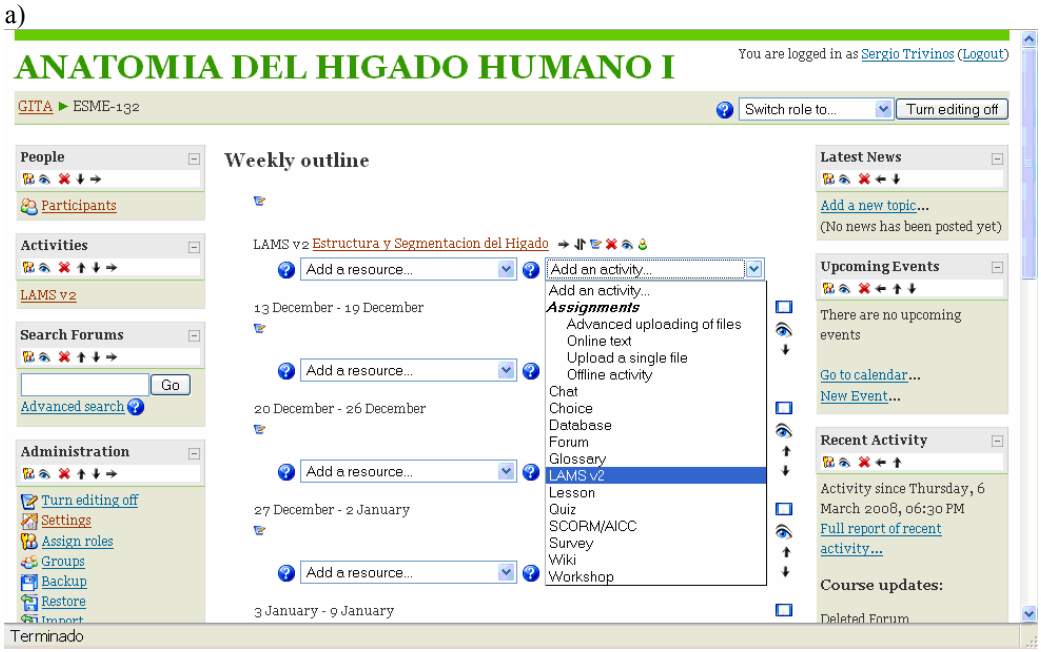
All the students must complete the diagnostic test to review the learning objects As a consequence; a STOP module was included between modules “Presentación” and “Test Diagnóstico”. A same module is used between “Subir Informe” and “Test de Selección Múltiple”.

Common lessons are complemented by learning designs .

Using Moodle to Run Learning Activities in LAMS

The LMS Moodle has several advantages, as a large number of additional modules and plug-ins (see http://moodle.org/). In other hand, LAMS use learning objects only in one module (share resources), but management users is better in Moodle than LAMS. The solution is use Moodle and LAMS integrated.

a)



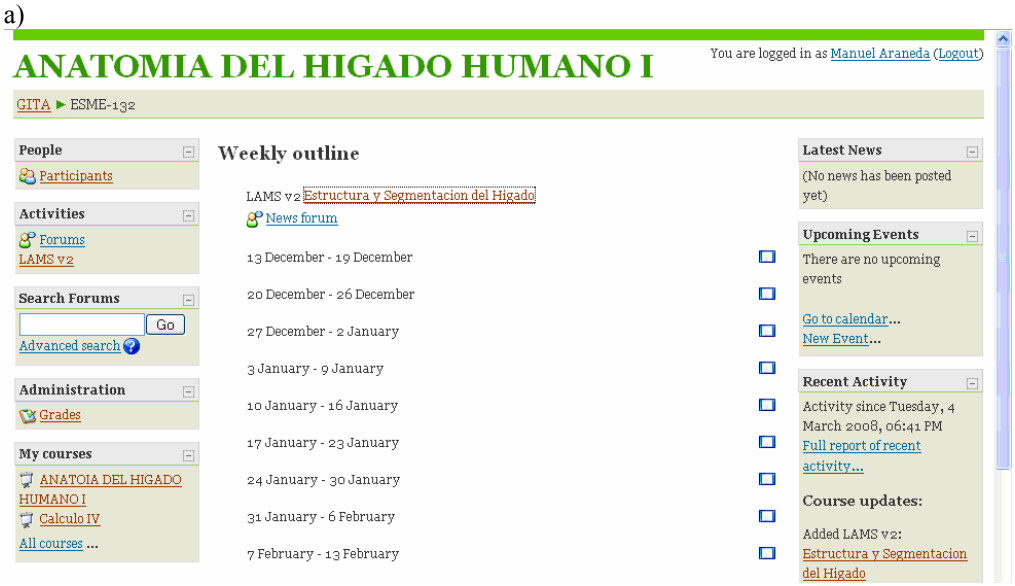
b)

Figure 3. Screens used for the teachers to build a learning design in LAMS using Moodle.

Some advantages to use LAMS integrated to Moodle are:

1. The user management is only one. The module for user administration of Moodle has more functionalities that the same module in LAMS. By this way is sufficient one account for each user.
2. Have all advantages of LAMS and Moodle only in one platform.
3. For students and teachers is easier use only one platform.
4. Both platforms are open source. In particular, Moodle have a good evaluation (The Open Polytechnic of New Zealand, 2004).

a)



b)

Figure 4. Screens used for the students to use a learning design in LAMS using Moodle.

The academic year begin in March, and the learning design will be used with students of different careers before mentioned date.

Conclusions

Learning plans is a good methodology before to do learning design, especially when the concepts of learning design are not used for the teachers.

The learning designs will be used like a complement of the common lessons.

The learning objects can improve a learning design and learning objects developed in collaboration with students can improve a learning design.

It is a hard work to do a learning design and is necessary a long time to do it and this also improve the common lesson.

For users of Moodle is easier make learning design in Moodle - LAMS integrated than only in Moodle because they see LAMS as another module of Moodle.

Future Work

We are building learning object and learning design to teach the human kidney and we will continue develop learning design for the main organs of the human body.
Include students in develop of design learning objects generate better and more effectiveness learning objects for this reason we will consider the participation of the students as leaning designers in our next projects.

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