Multimedia resources as a complementary tool of teaching and learning. Case study of a game designed to teach immunology contents.

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New Technologies in Education

• Since 2000 the University of Porto is concerned about integrating educational technologies in the teaching and learning process.

• The unit for New Technologies in Education (NTE or GATIUP) is part of the Digital University Department and was created in 2003 as a strategy of the University to enable and encourage initiatives of open and distance learning.

• The implementation of a project like this in a traditional and large like University of Porto was (and is) a complex process.

  ✓ About 29,000 students; 15 schools with autonomy; 69 scientific research units

• Mission of the unit is to provide several services to all the teachers working with educational technologies.
**NTE activities**

- Direct support to all the teachers that combine face-to-face classes with on-line component;
- Teachers training;
- On-line tutoring;
- LMS management (Moodle);
- Technical support to online assessment;
- Development of multimedia contents;
- Videoconference, telepresence and streaming.
Multimedia development service (1/2)

• Multimedia: two or more digital contents in a single application (video, graphics, animation, simulation, audio, text...).

• In the last years the development of educational multimedia contents is one of the most relevant activities at the office.

• NTE is a multidisciplinary team (8 persons).

• The multimedia development is made by 4 persons.
Multimedia development service (2/2)

• As the number of teachers using Moodle platform increase, the teachers started to feel the need of “improve” the learning contents available.

• Multimedia resources can be seen as a new “type of learning”, allowing students:
  - Autonomy
  - Continuous training
  - Self-assessment

• In the last years the number of teachers interested in multimedia contents grew and the number of requests increased.
Multimedia development process (1/2)

- **How to manage the number of requests?**
  1. Online form;

- **How to know what is possible to be developed?**
  2. Teaching purpose and relevance (learning objectives);
  3. Reusability of the contents;
  4. Expertise and available personal.
Multimedia development process (2/2)

• **1st stage** – evaluation of the request.

• **2nd stage** – if approved, it will be allocated to one element of development team (number of developers depends on the type of content and workload).

• **3rd stage** – work meeting (developer/teacher): definition of the concept, collection of materials and definition of scenarios.

• **4th stage** – implementation/development of resources.
Immunology game (1/8)

• A good example of a relevant multimedia educational content: a simulation developed by NTE, teachers and students of Basic Immunology from the Faculty of Medicine.

• Shows how multimedia resources can be a pedagogical tool for students self-training and knowledge development.

• Positive feedback obtained from teachers and students with this simulation.
Immunology game (2/8)

Background

• Immunology Department from the Faculty of Medicine is responsible for the undergraduate medical education in the field of immunology both to medical and dentistry students.

• Provide students the knowledge of how the immune system develops, how the body defends itself against diseases and what happens when it all goes wrong.
Immunology game (3/8)

Methodologie

- 1 hour lectures (twice a week)
- 90 minutes of seminars (every other week).
- Final grade based on a final examination (0 to 20) and adjusted with students' performance in seminars and on-line quizzes.
Immunology game (4/8)

Proposal

• Based on a work made by students, in the academic year of 2007/2008, the teachers presented a proposal:
  
  ✓ Develop a web-based knowledge games on immunology contents for third-year medical students;

  ✓ Compare the performance of students that had contact with the games with students that only had access to the classical lectures.
Immunology game (5/8)

Game development

- Between 2008 and 2009 were developed 3 games.
- The first was “Who wants to B a lymphocyte?”

  1. Adobe Flash 8;
  2. Simulation of a board game;
  3. Played with a virtual dice and “B cell-pawns”;
  4. Maximum 3 players - not at remote points but in the same computer.
**Immunology game (6/8)**

**How it works?**

- Game board contains 55 squares, the goal is to reach first the final square;
- The players roll the dice moving their pawn according to the number rolled;
- Whenever a player lands on a green square (there are 16) has to provide the correct answer for two questions in 30 seconds each;
- The questions are sort randomly from a database of 80 questions elaborated by the students and revised by teachers.
Immunology game (7/8)

Game results

• Students were randomly allocated into lecture (LG) and game (GG) groups.
  
  ✓ LG - consisted of an exposition of 60 minutes and during that time students were able to discuss the subjects.

  ✓ GG - played for 45 minutes and teachers did not intervene.
Immunology game (8/8)

Game results

- An evaluating quiz based on 28 questions of immunology textbooks was administered before and after the intervention.

- Changes in scores were statistically compared:
  - Improvement in number of correct answers of the quiz after the lecture and the game in both groups;
  - However, the mean increase was significant higher in the LG.
Conclusions

• “Who wants to B a lymphocyte?” - from feedback obtained and from the experience done with the students it clear that this tool when used autonomously and regularly can improve students knowledge in some complex learning contents.

• The use of multimedia resources is now growing in many educational areas, however nobody can deny the importance that face-to-face classes still have.

• NTE intend to increase the number of teachers using multimedia resources, however we know that we can’t produce contents without specific learning objectives or reusability concerns (quality vs quantity)

• AND we still belive that is important to question facts like costs, human resources needs, and the real impact they have in students learning process (trace of outcomes).
Thank you!

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