Instituto de Salud Carlos III

MINISTERIO DE SANIDAD Y CONSUMO

BIOTIC Informática Genómica Salud

An e-Learning Experience in a Biomedical Research and Public Health Institute

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Introduction

- The National Institute of Health Carlos III (ISCIII) provides scientific support to all the National Health System of Spain.
- The Area of Biomedical Informatics (BIOTIC) aims to develop new computational approaches for facilitating genomic based medicine.
- Research lines are: Biomedical Informatics, Bioinformatics and Microarrays and Convergent Technologies (NBIC) in health applications.
- BIOTIC carries out an intense teaching activity in its areas of specialization and it is involved in the e-learning program of the National School of Public Health of Spain.
- BIOTIC has developed and it is now teaching a virtual course on methodological and technological aspects of e-learning (the scientists of the BIOTIC Department had previously taken this course).
- They develop and teach virtual courses in their field of knowledge and specialization both at the national and the international level.

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Materials and Methods

- BIOTIC participates in educational programs of several national and international institutions, both public and private.
- The area is involved in the National Institute of Bioinformatics (INB), funded by "Genome Spain Foundation" through the Horizontal Training Node".
- The main objective of the INB is to contribute and to apply bioinformatics solutions to the development of projects in the fields of genomics and proteomics.
- BIOTIC has developed several courses to disseminate and train health professionals in Bioinformatics and other applications of Information Technologies in the Biomedical field (Figure 1). Traditionally these courses were taught "face to face".
- Nowadays BIOTIC is a member of the e-learning commission of the ISCIII.

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Materials and Methods

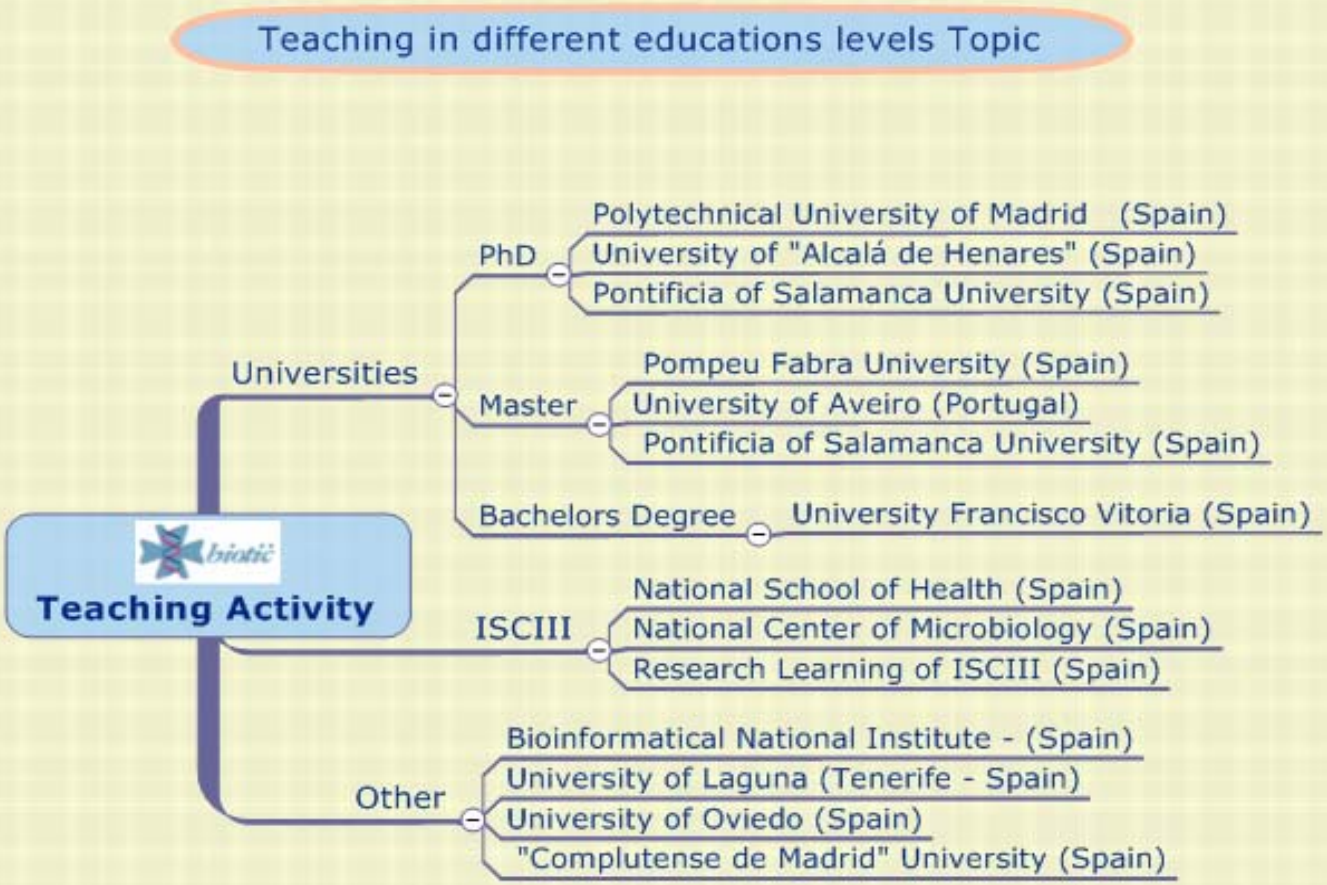

Figure 1

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Materials and Methods: Teaching Methodology

- The teaching methodology implemented has several steps:
  - analysis of the learning needs and the profile of the students,
  - design of the contents and definition of the evaluation criteria
  - preparation and/or adaptation of the available resources (technical, human and material).
- After careful assessment of pros and cons the ISCIII acquired a tele-educational platform (WebCT). There is a need to train future online teachers both at the technological, didactic and curricular level.
- BIOTIC developed a virtual course for training online teachers through the WebCT platform. The objectives were:
  - experience themselves the advantages and disadvantages of e-learning
  - learn how to use the WebCT tool
  - development of abilities, knowledge, an attitudes that online teachers should have
  - Application of the acquired knowledge by designing an online course in their professional field based on a curricular perspective (Figure 2).

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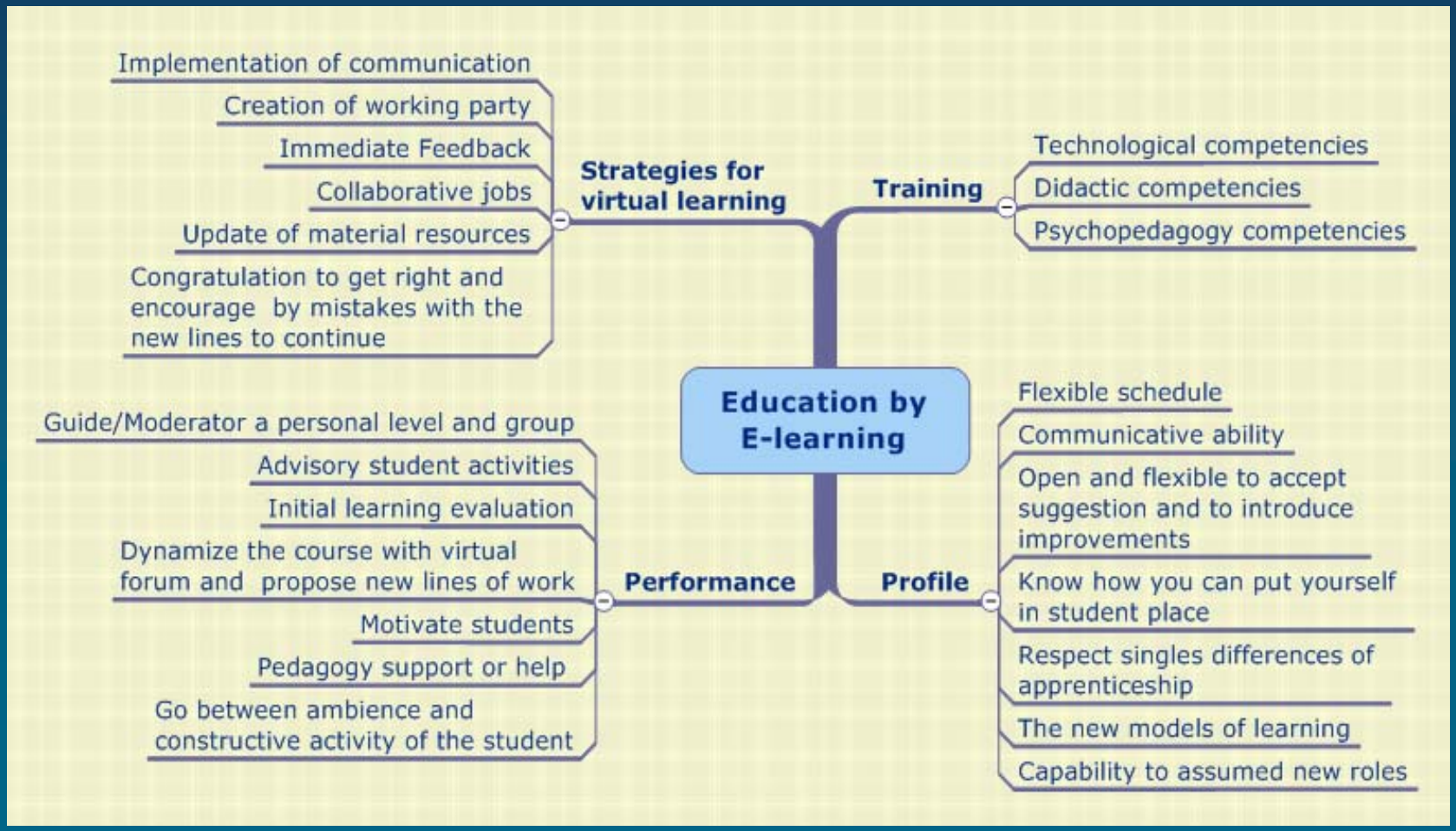
Materials and Methods: Knowledge in e-learning education



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Materials and Methods: Teaching Methodology

◇ Elements that define the teaching methodology online:

- The teaching experience of the teachers, as well as their knowledge of the subject they teach.
- Models validated through scientific research: analysis of the educational needs in the field of knowledge, the instructional resources and the method of teaching (face-to-face, virtual or mixed).
- The evaluation of the students' previous knowledge and their expectations about the course.
- Activities that encourage students to actively participate should be designed with the conviction that the student is the first agent of its own learning.
- Continuous update of the learning contents.

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Materials and Methods: Teaching Methodology

◇ Elements that define the teaching methodology online (cont):

- The practical activities are carried out through computers connected in a network.
- In some cases students go the microarray laboratory to acquire their knowledge "in situ".
- Evaluation activities such as exams and/or practical exercises are carried out to check that the students have learnt the concepts.
- Evaluation of the teachers and in general of the quality of the course

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Results

- The results of the evaluation of the courses taught by BIOTIC have been highly positive
- The circle of centers and universities in which researchers at BIOTIC teach is getting wider and some of these courses have been awarded with a "Mention of Quality"
- One of the achievements of the course online taught by BIOTIC is the development and or adaptation to the WebCT platform of several courses or Masters´ modules related to the professional specialty of the students :
  - Master in Health Administration (MASe) (semi-online)
  - Expert in Health Research Methodology (online)
  - Operation of the Level 3 (P3) Biosecurity Installations in the National Center for Microbiology (semi-online)
  - Field Epidemiology: Study of outbreaks (online)

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Results

◇ Researchers in BIOTIC have designed the following courses:

- Integration of Protein Classical Biochemistry with New Technologies (online)
- Introduction to Bioinformatics and Proteins and Nucleic Acids Sequence Analysis (online)
- Introduction to Biostatistics in Biomedical Informatics (online)

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Conclusions

- It is important to approach e-learning with an open mind
- Online teachers have to be familiar with both Information and Communication Technologies (ICT) and pedagogic strategies for virtual environments
- Be aware of the possibilities and limitations of virtual environments
- Knowledge of the different learning theories
- Knowledge of group work technique adapted to the virtual environment
- Its important not to confuse means with the ends. Technology should be at the service of education

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