

Osteosynthesis for Surgical Management of Fractures for Orthopedic Surgeons and Biomedical Engineers

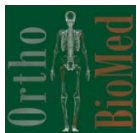
OrthoBioMed

Project No 2013-1-BG1-LEO05-08711

ANALYSIS OF TRAINING NEEDS IN MEDICAL ENGINEERING

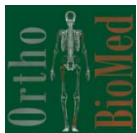
Purposes

- To identify and analyse user requirements and training needs on innovative eLearning materials and problem-based learning skills in medical engineering in Bulgaria.
- To undertake job analysis of medical engineer to collect information directly related to the nature of the interactive multimedia products in osteosynthesis under development.



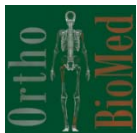
Limitations

- Users:
 - Limited number of users, because Medical Engineering is taught only at the Technical University of Sofia
- Instruments:
 - Non-responsiveness to questionnaires



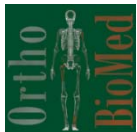
Main Questions

- What knowledge and skills should provide one course in medical engineering?
- What topics should cover the syllabus?
- Do the students in medical electronics need courses on biomechanics?



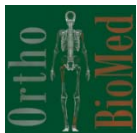
Sample

- 4th year students in Bachelor degree which would continue in the Master degree where medical engineering is studied
- Master students who have courses in medical engineering
- Teachers in medical engineering.



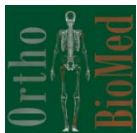
Instrumentation

- Questionnaire
 - published on the Web site of the Faculty of Electronics
 - distributed to the students during a lecture of the course Medical Image Processing
- Interviews (non-structured)
 - with some students (8-10)
 - same questions as in the questionnaire
 - with the dean, the head of department Electronics and four professors teaching courses in Medical engineering.



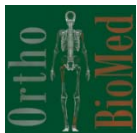
Results (knowledge and skills)

- Most of the answers were that a course in medical engineering should provide a grounding in fracture classification, fracture fixation (all),
- understanding of the concepts and principles of fracture classification, fracture fixation (19),
- and of the application and operation of medical imaging systems (20),
- practice design in bone biomechanics (16).



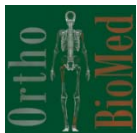
Results (syllabus)

- All agreed about the need of a topic on anatomy.
- All topics in medical engineering considered as important:
 - bone biomechanics
 - digital image processing,
 - embedded system design,
 - electromagnetic waves and the human body,
 - biomechanical design.
- Regulations and standards are less interesting for the students (4).
 - Comments: the regulations should be studied at the work place and are not so important for the university study.



Results (OrthoBioMed system)

- Engineering students can not assist at real surgeries.
- Regular students in Bulgaria, most of which must work and learn, need alternative providing more flexible learning: high-quality educational materials, continually brought up-to-date courses.
- *So, they all considered that the virtual courses developed within the OrthoBioMed project will correspond to their needs.*



Learning Outcomes

- **Knowledge:** Basic knowledge in the mechanical behaviour of the bones. Advanced knowledge in design criteria for the musculoskeletal system.
- **Skills:** Ability to apply optimisation criteria in the design of the musculoskeletal system in order to achieve minimisation of the level of stress to which its components are subjected under physiological loads while maintaining the mechanical support and protection functions with minimum weight.
- **Competences:** Demonstrate innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new modelling and design rules at the forefront of work or study contexts including research in osteosynthesis design.

