Carla Morais, João Paiva, José Barros
Faculty of Sciences, University of Porto,
Department of Chemistry and Biochemistry
Science Teaching Unity (PORTUGAL)
cmorais@fc.up.pt , jcpaiva@fc.up.pt, josebarros@ptdeveloper.net

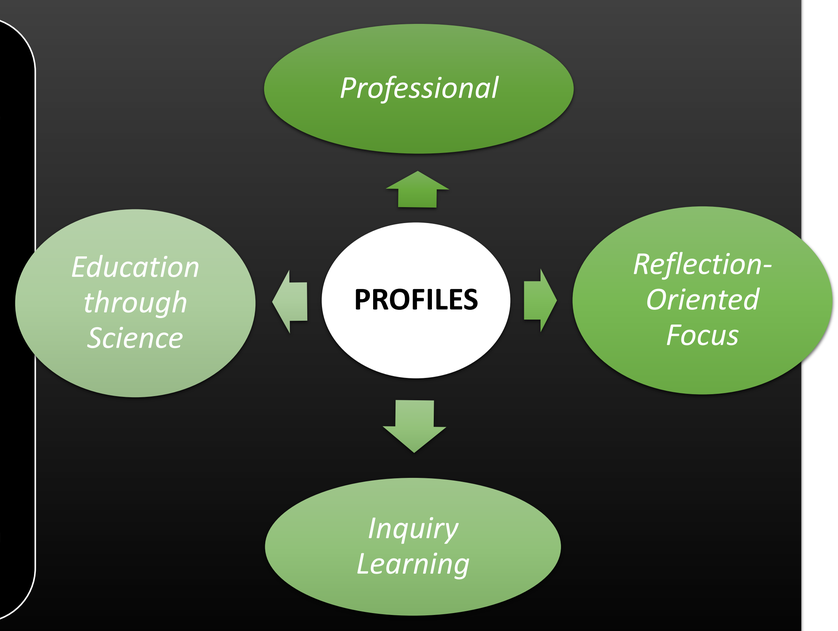
TECHNOLOGICAL SUPPORT FOR INQUIRY-BASED LEARNING: DEVELOPMENT AND USE OF DIGITAL RESOURCES IN SCIENCE EDUCATION WITHIN THE EUROPEAN PROJECT PROFILES

THE EUROPEAN PROJECT PROFILES

This project involves more than twenty participating countries.

Portugal is represented by Faculty of Sciences of the University of Porto.

More info at: http://www.profiles-project.eu



ABOUT INQUIRY-BASED LEARNING

- PROFILES promotes approaches based on Inquiry-Based Science Education (IBSE).
- "Inquiry-based learning is a process where students are involved in their learning, formulate questions, investigate widely and then build new understandings, meanings and knowledge". (Branch & Oberg, 2004)
- Knowledge acquired by the students may be used to answer questions, to develop a problem solution or support an argument.

TECHNOLOGY- SUPPORTED INQUIRY LEARNING (TSIL)

- The potential of digital technologies offer new opportunities to support inquiry-based learning. For example, the use of computer simulations is a successful way to promote the abstraction level that is required to achieve a sustained understanding of scientific concepts.

Properties of computing technologies offer benefits for IBSE

- Ability to store and manipulate large quantities of information
- Ability to present and permit interaction with information in a variety of visual and audio formats
- Ability to perform complex computations, the support for communication and expression
- Ability to respond rapidly and individually to users

Contributions from technology for the learning process

- Enhancing interest and motivation.
- Providing access to information.
- Allowing active, manipulable representations.
- Structuring the process with tactical and strategic support.
- Diagnosing and correcting errors.
- Managing complexity and aiding production.

"PARSEL MODULES"

The acronym PARSEL literally means *Popularity And Relevance of Science Education for scientific Literacy*.

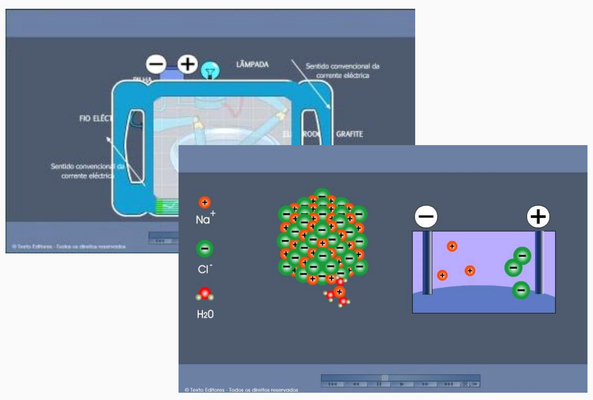
1. **FRONT PAGE** - *Title; abstract relating to science concepts; intended grade level; key EtS competencies*
2. **STUDENT ACTIVITIES** - *student script indicating tasks.*
3. **TEACHING GUIDE** - *suggested teaching approach (details).*
4. **ASSESSMENT STRATEGIES** - *suggested assessment of student progress (choice of different approaches).*
5. **TEACHER NOTES (OPTIONAL)** - *background for teachers; student worksheets - for teacher to consider usefulness; answers to questions posed; etc.*

STAGE 1
- The relevance for the student is reinforced connecting the title to a social situation instead of trying to present unknown scientific terms in the very beginning of the pedagogical approach of a specific theme.

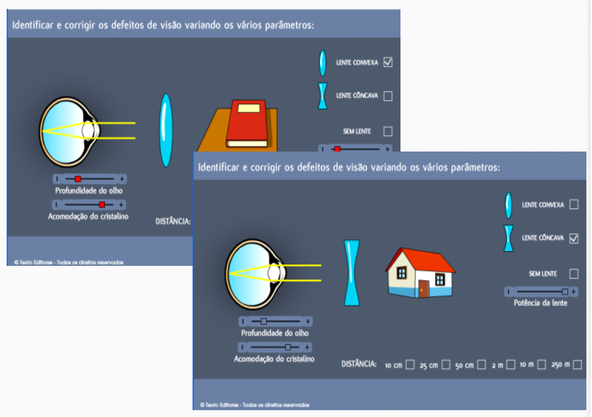
STAGE 2
- Scientific ideas, scientific problems to be solved, associated process skills, social and personal attributes, are, at this stage, embedded as teaching strategies.

STAGE 3
- Students consolidate their science learning through content transference of the formal contents retained for the socio-scientific question (presented in the first stage) and, through discussion and thought, reach a socio-scientific decision.

DEVELOPMENT DIGITAL RESOURCES FOR INQUIRY



Computational animation:
"Electric current through a solution".



Computational simulation:
"Correction of vision defects".

FINAL CONSIDERATIONS AND NEXT PERSPECTIVES' OUTLOOK

- Some students of elementary and secondary school give us positive signs in favor of technological support for IBSE, referring that the participation in inquiry provided them the achievement of specific investigation skills, and the better understanding of science concepts and principles.
- It is necessary that each teacher contributes actively to promote students' motivation for learning science, always incrementing a solid scientific literacy.
- It is this line of thought that the PROFILES has been implemented in Portugal and we hope that during the project can provide more examples of digital educational resources potentially useful for the teaching of science at different levels of schooling.

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