Technology Enhanced Science Education: a design framework for primary teacher education courses

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|Synthesis ...

- Context and relevance of the study
- Theoretical framework
- Teacher education program
- Results
- Conclusions

|Context and relevance of the study…

» Integration of technologies in science teaching and learning «

- Lack of hardware and software in schools
- Insufficient primary teacher education courses (initial and in-service) in the use of technologies and their applications in science classrooms contexts
- Primary teachers' technophobic attitudes

… to understand which "guidelines" could contribute towards the development of primary teachers' **Technological pedagogical content knowledge** in a science teaching context

|Theoretical framework …

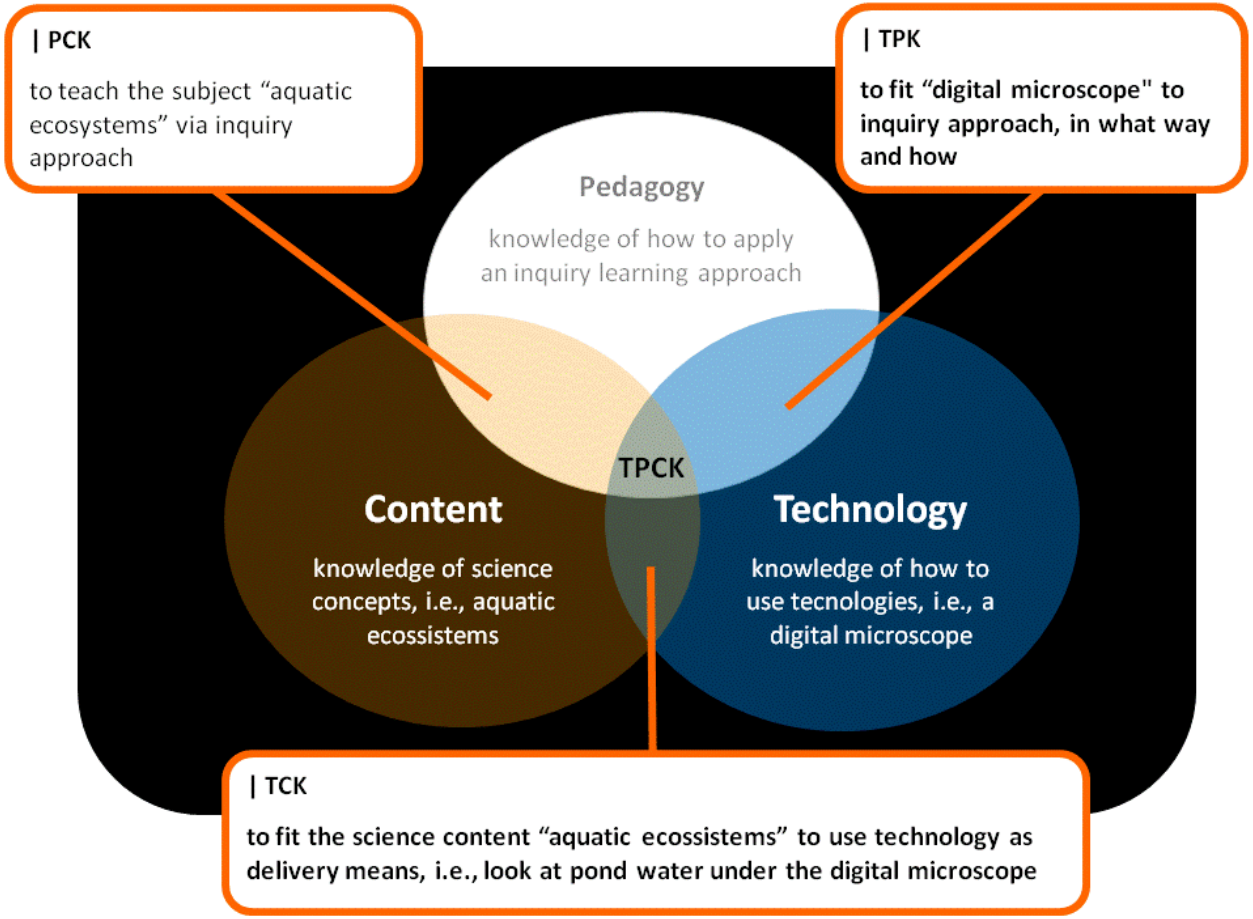


Fig.1 Technological pedagogical content knowledge (Koehler, Mishra, & Yahya, 2007)

|Teacher education program …

University of Aveiro:

Master's degree in Science Education (2nd Cycle)

(in curricular areas such as …)

- Sciences Teaching Methodologies
- ICT in Science Education

1st Year, 2nd semester (February 2010 to June 2010)

Participants

2 Teacher-trainees |
9 in-service primary teachers |
1 Researcher and tutor

|Teacher education program …

The central subject of each curricular area aimed at developing innovative pedagogical competences in ICT:

(i) integrating ICT into sciences teaching practices;

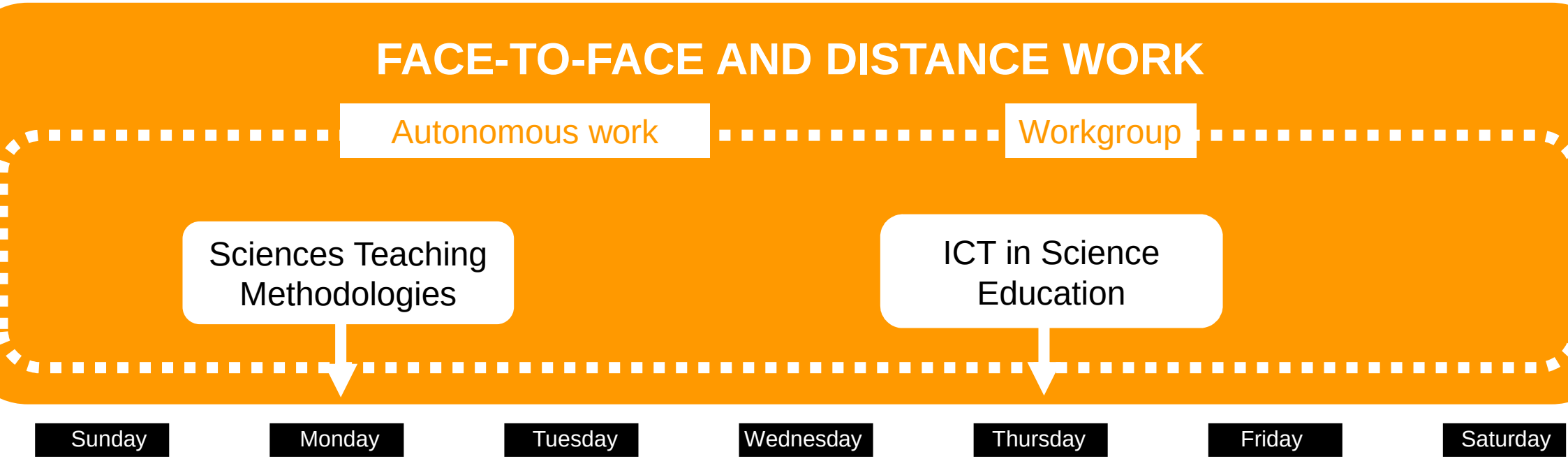
(i) promoting and exploring interaction practices when planning pedagogical activities (for formal and/or non-formal contexts);

(i) developing collaborative work;

(i) developing research competences.

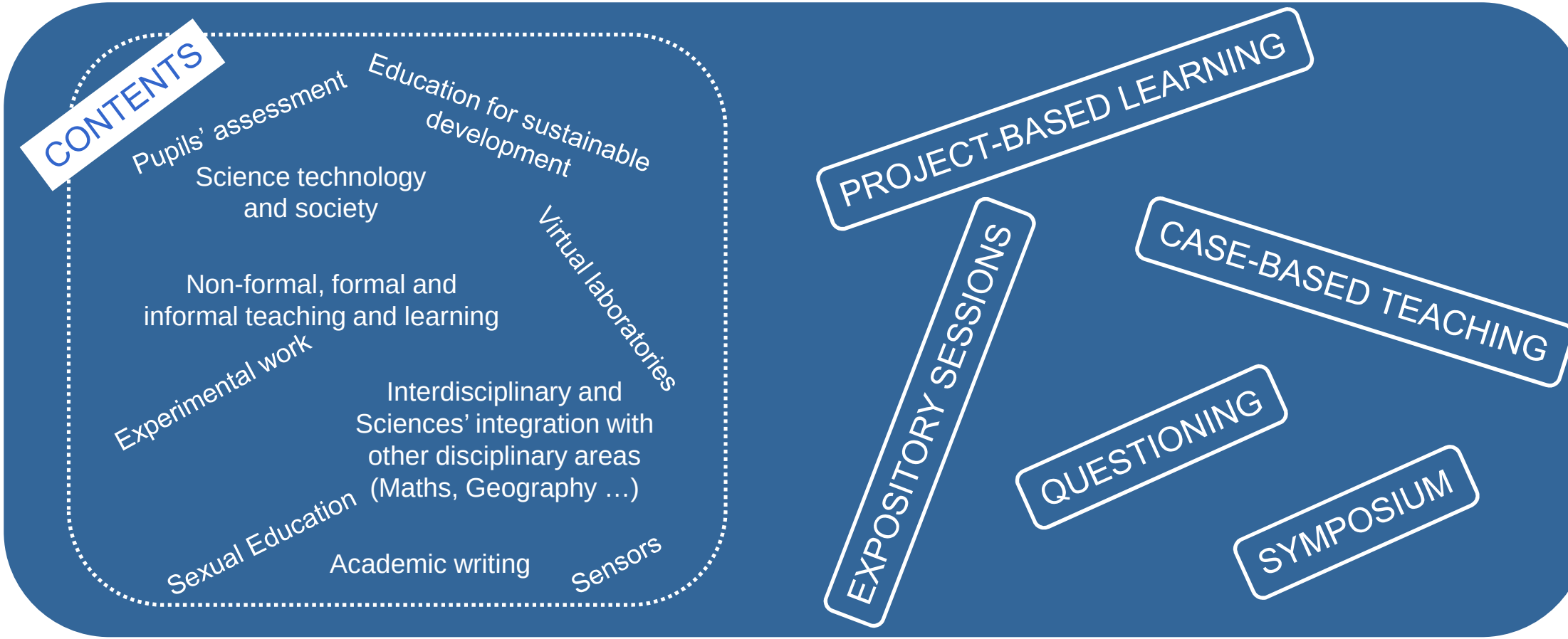
|Teacher education program …

ENVIRONMENT…



Teacher education program …

METHODS…



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|Teacher education program …

TECHNOLOGICAL TOOLS…

WEB2.0

- ***Ning*** - social networking…
- ***box.net*** - sharing …
- ***MindMeister*** - collaborative mind-mapping …
- ***WordPress*** - digital portfolios…
- ***Pbworks*** - wiki tool…

HARDWARE

- ***Sensors and digital microscope*** - experimental activities
- ***Mobile phones*** - questioning skills
- ***Interactive whiteboards***

|Teacher education program …

ASSESSMENT…

CONTINUOUS AND FORMATIVE

WRITTEN WORK

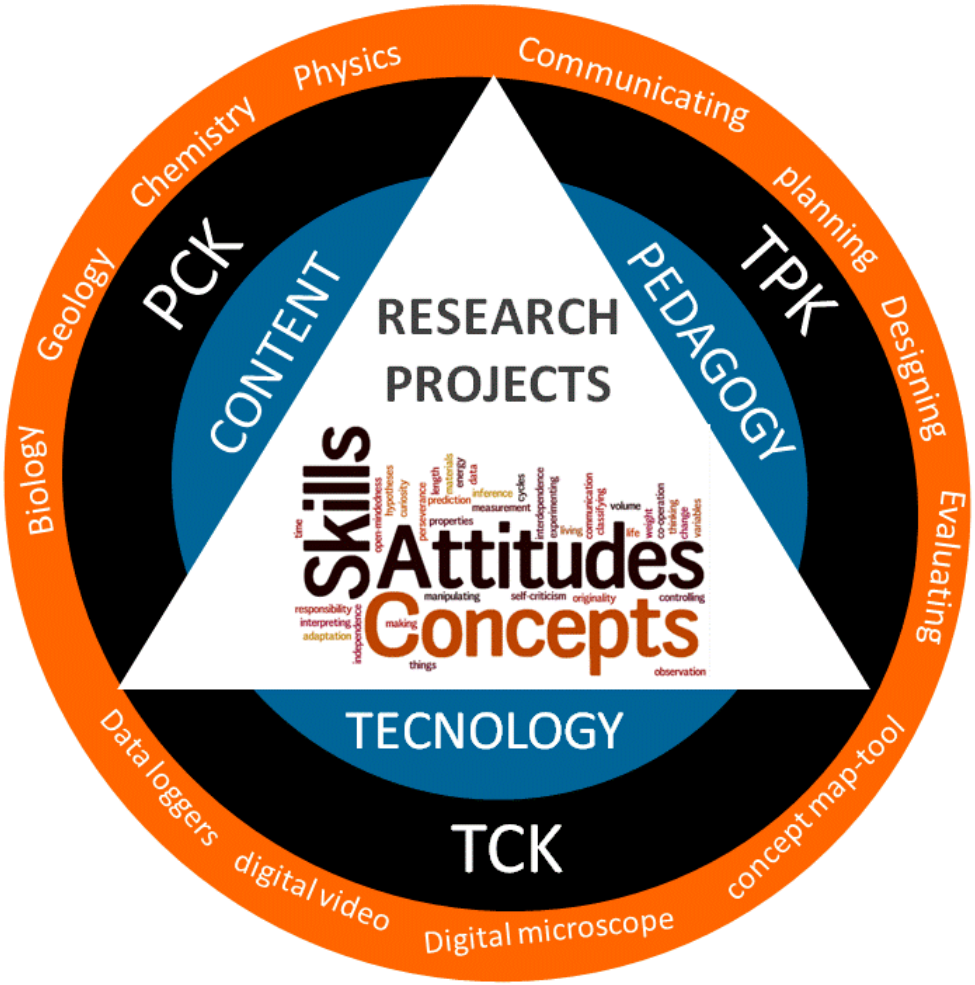
- A scientific paper (Pbworks)
- A digital portfolio (Wordpress)
- A concept-map (MindMeister)

SUMATIVE

OBSERVATION

- Face-to-face and online interactions
- Oral presentation at the Symposium

|Results …



Science, Technology and Society Projects developed by in-service primary teachers

Cecília Guerra, António Moreira, Rui Marques Vieira, Francislê Souza

Conclusions …

Primary teacher education course allowed to …

» Provide **authentic, meaningful and real-word problems** to the in-service primary teachers and thus engage them with learning sciences and technologies with and through ICT » **CASE-BASED TEACHING**;

» Give the students the opportunity **to take on a self-regulating role** in their learning process » **DIGITAL PORTFOLIO**;

» Offer the students the opportunities for **active participation**, **collaboration and social interaction** » **PROJECT-BASED LEARNING**;

» Afford opportunities for the **creation of artifacts**, which should represent students' understanding of the problems, resulting solutions and emerging states of knowledge » **SCIENCE, TECHNOLOGY AND SOCIETY PROJECTS**;

» Embrace the importance of **publication**, **reflection** and **feedback** » **SYMPOSIUM**.

Thank you

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