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Hello Aveiro! London Calling.
Creating bridges for training teachers in Technology-Enhanced Learning (TEL)

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Resumo / Abstract

This poster presents a conceptual framework, the technology-enhanced science and engineering learning in higher education (TeSELHE), which suggests a method for training university teachers in Technology-Enhanced Learning.

Rationale

Innovative technologies and online learning have been increasingly perceived as effective tools for improving the learning and teaching process (Guerra, 2012; Casanova, 2014). However, having access to innovative technologies and devices (hardware and software), such as virtual learning environments and smartphones, does not necessarily mean that university teachers and students make a competent use of them.

According to the European Union (2016) the possession of a 'digital competency' relates to using technologies in a critical, collaborative and creative way. University teachers and students should embrace these three attitudes so as to harness the potential of such tools and devices. Indeed, Mahmood, Bokhari, & Naqvi (2011) show that although students have a positive attitude towards technologies, when they are asked to deal with complex learning tasks, such as using critical thinking, their competency levels are generally low. In fact, frequently, students do not doubt the reliability of online information and their search for information usually results in insufficient understanding and insight of knowledge. Additionally, students' online behaviour should be more adequate so as to improve their safety and privacy.

Technological pedagogical content knowledge (TPACK) is a framework for evaluating the relationships between technology, pedagogy, and content and the effectiveness of the learning process (Koehler & Mishra, 2009). This framework provides a model for helping teachers to evaluate how they are using technology and it helps to evaluate the effectiveness of staff development in technology-enhanced learning (TEL) (Fig. 1).
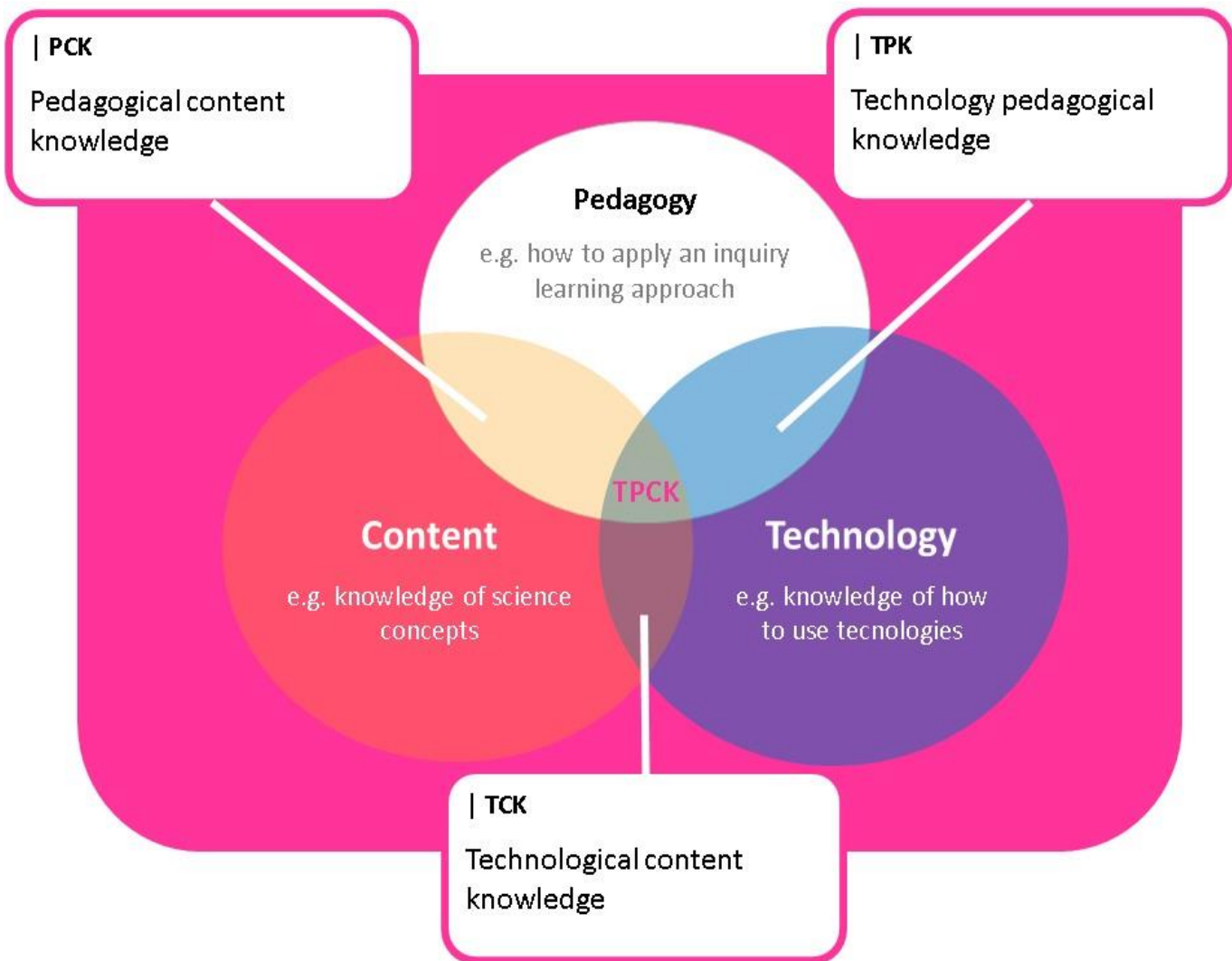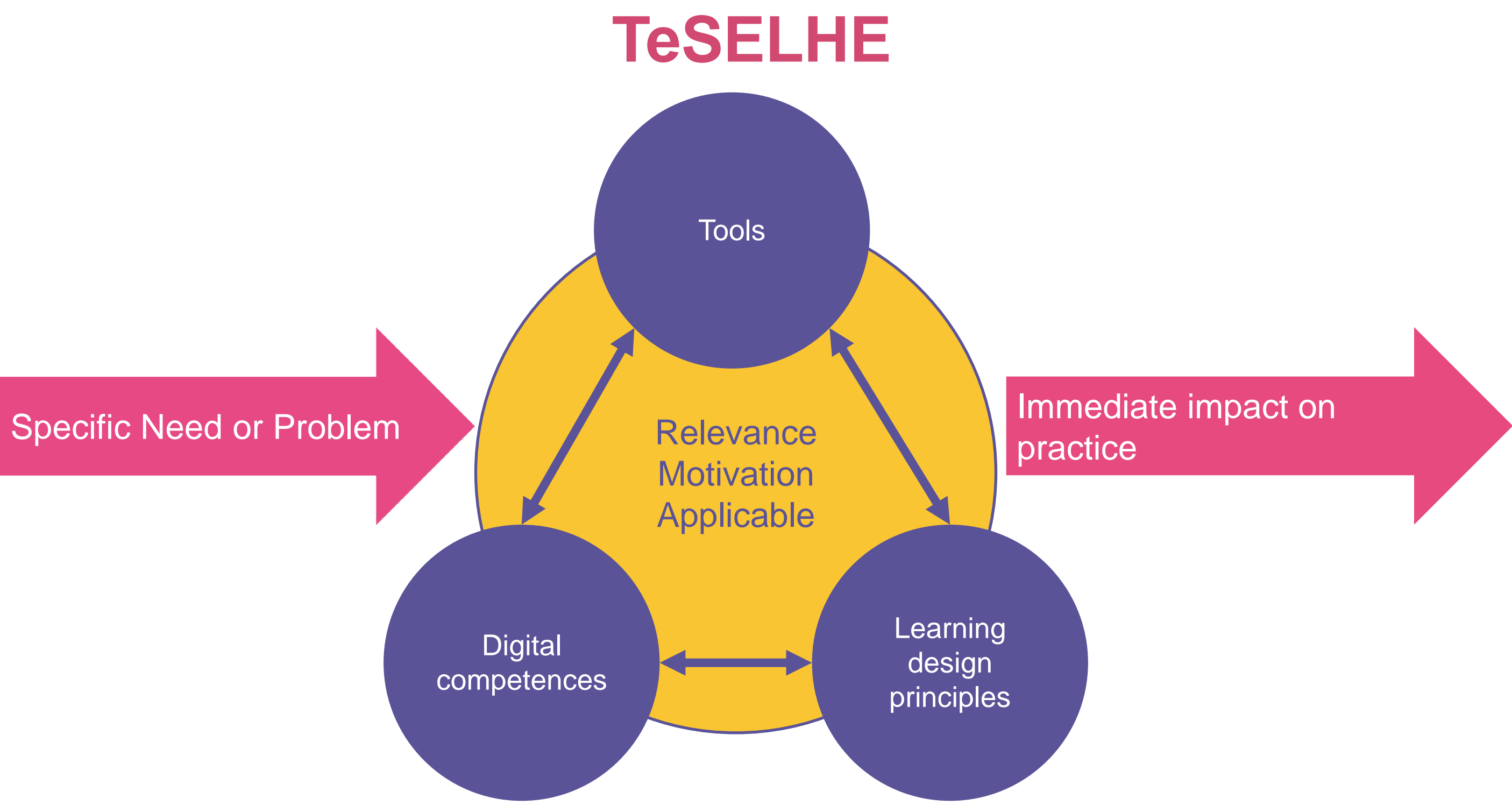
TeSELHE

Fig.4 Technology-enhanced science and engineering learning in higher education (TeSELHE)

TEL in Higher Education

TPACK suggests that 'Digital Competencies' are much more than using a smartphone for learning or sharing a learning material online.

Research conducted by Guerra (2012) and Casanova (2014) are good starting points to promote university teachers' awareness of the different particularities of effective use of TEL in Higher Education. Guerra (2012) presents a framework with guidelines for science teacher education programs with a TPACK orientation (Fig. 2), whilst Casanova (2014) introduces the concept of TEL in Higher Education providing a framework for its effective adoption in Higher Education Institutions (Fig. 3).
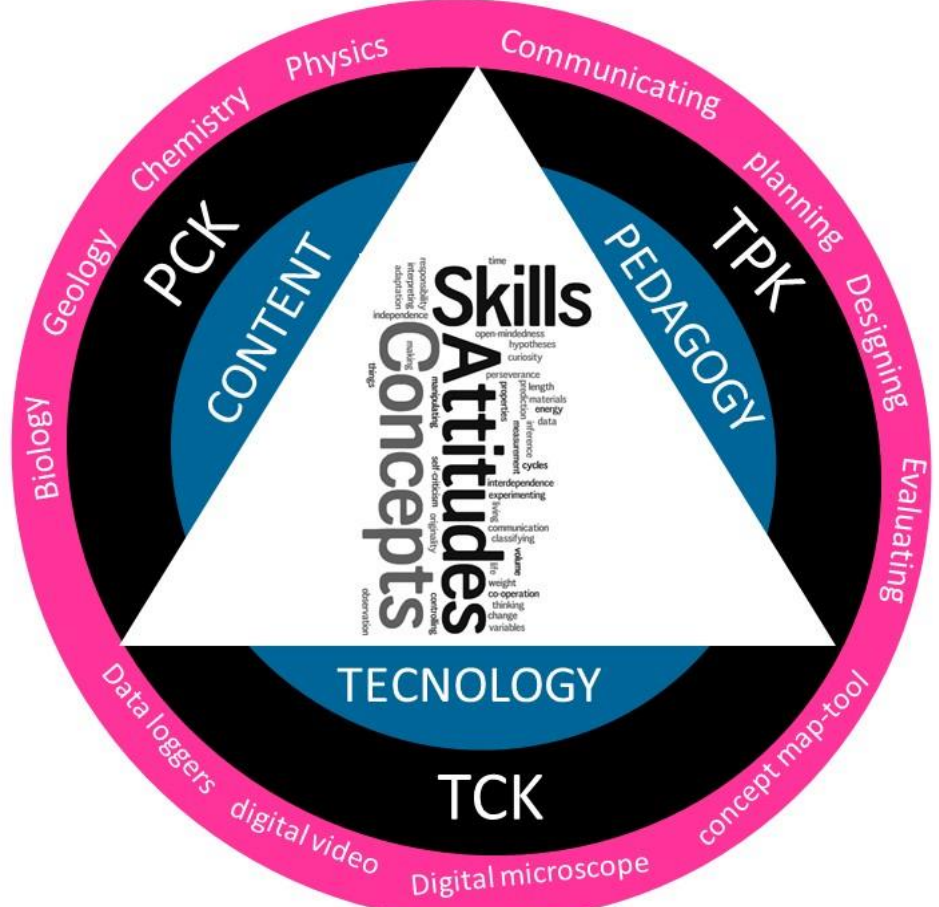

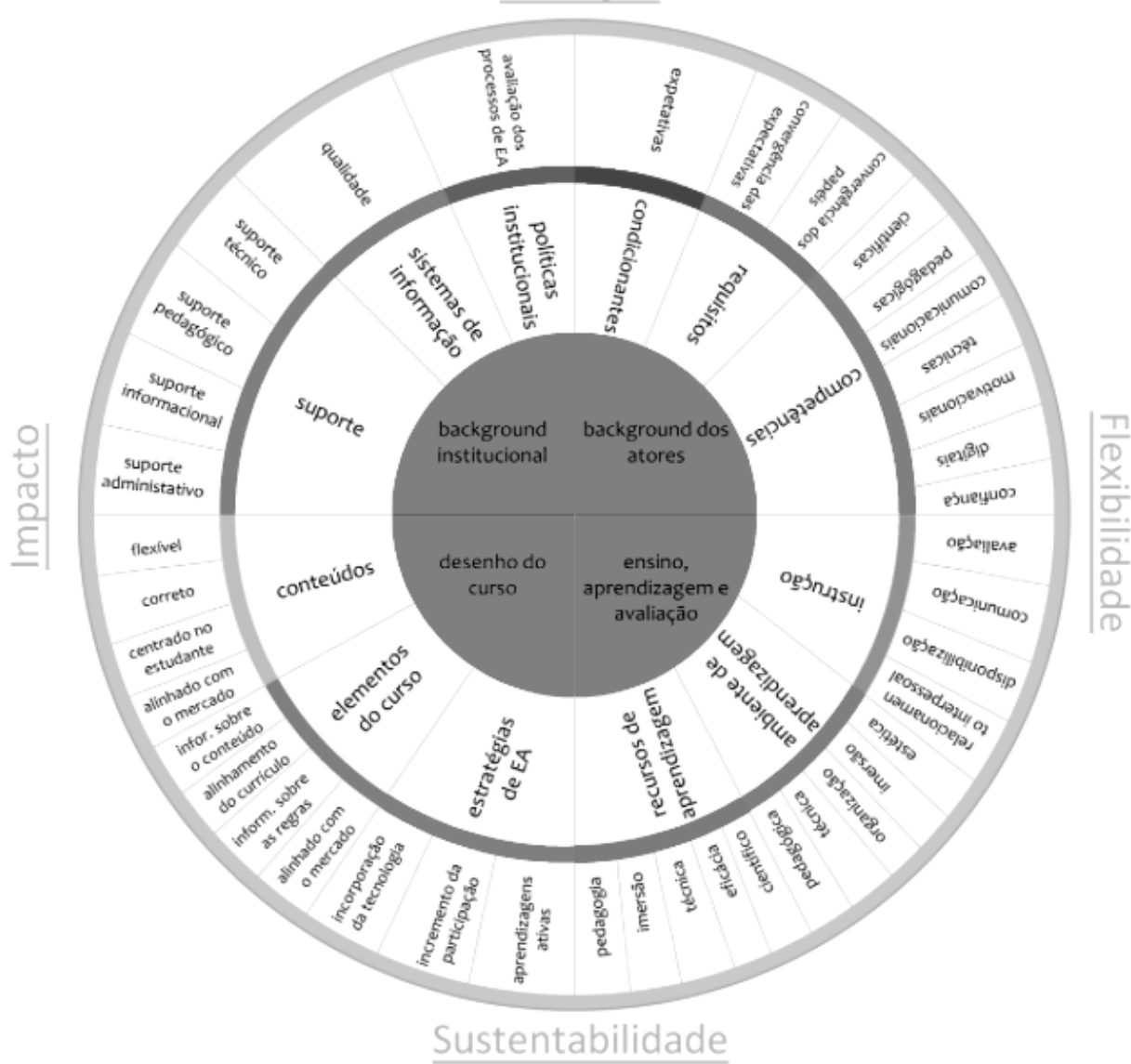Fig.2 Development of TPACK in science (Guerra, 2012)

TeSELHE conceptual framework

Figure 4 shows the Technology-Enhanced Science and Engineering Learning in Higher Education (TeSELHE) which is presents:

(i) Tools and technologies for science and engineering area (e.g. virtual laboratories);

(ii) 'Digital competences', a general description, examples of knowledge, attitudes and skills, and their applicability for different purposes;

(iii) Learning Design Principles for TEL, which are informed from the context of a UK University.(Kingston University London).

Conclusions

As this is still a conceptual framework, the *Teachingday2016* presents an opportunity for promoting discussions within the academic community aiming to provide possible improvements to the framework before a necessary validation. Based on the development of this framework, our aim is to ensure the creation of new development and training opportunities based on TeSELHE and promote the sharing of good practices between the University of Aveiro and Kingston University London, in terms of training university teachers and students in TEL and 'Digital Competencies'.

References

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Casanova, D. (2014). *Aprendizagem Potenciada pela Tecnologia no Ensino Superior: Construção de um Referencial de Qualidade.* Tese apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Doutor em Multimédia em Educação. Aveiro: Universidade de Aveiro.

Fig.1 Technological pedagogical content knowledge

Fig.3 SIIF module for TEL integration (Casanova, 2014)