Supporting the 'whole learning design life-cycle' through the pedagogical planner

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It is widely claimed that there is an urgent need for finding new methods and tools to support teacher education, so as to effectively foster their professional development and allow innovation to permeate the educational systems. The learning design research field (LD) can contribute to tackling this issue by providing methods and tools to support teachers in the delicate phases of designing and planning innovative educational activities, so as to target e-inclusion (special need students' necessities) through personalized learning actions. The paper illustrates an innovative tool called Pedagogical Planner (PP), which is able to support the three main phases of the learning design cycle, namely Conceptualization, Authoring, and Implementation. The LD tool has been used by teachers to support innovative and personalized educational interventions in the field of intangible cultural heritage education and has proved to present a number of advantages and innovative aspects in respect to other existing tools, which are discussed in the paper. The positive results obtained so far encourage adoption of the tool in teacher training contexts to support teachers in devising and planning innovative educational intervention when ICTs are to be integrated in traditional teaching/learning contexts in an inclusive logic, which also implies setting up personalized learning paths in order to ensure that no student is *left behind*.

Introduction

It is widely recognized that there is an evident gap between research and practice in the TEL (Technology Enhanced Learning) field, because what has been already investigated by the academic community and proved to be effective often finds barriers and obstacles in real educational contexts that prevent teachers from adoption of innovation in their daily practice. Among the barriers that prevent innovation to be adopted in real contexts, we could mention the lack of ICT infrastructures, the low level of teachers' digital competences, and the general complexity of managing innovative activities within educational systems originally conceived for transmissive approaches (Pelgrum, 2001; Bingimlas, 2009).

The complexity of rethinking the traditional lecture in such a way as to design and plan novel activities often keeps teachers far from these approaches; besides, nowadays the task of designing educational innovative educational actions is far more complicated, since the emerging concept of educational personalization and full e-inclusion of all students in mainstream education (UNESCO, 2005) has a multiplier effect on the number of learning paths to be designed: multiple educational paths need to be designed to reach each educational objective in order to meet the needs of each student (considering students' different abilities/disabilities and attitudes) (Ott, 2010).

The field of learning design (LD) is devoted to finding innovative and effective solutions to support teachers in the preparation of educational interventions, in sharing and re-using their own design solutions with colleagues, and in the delivery phase of their designs to students (Conole, 2012; Mor & Craft, 2012; Persico & Pozzi, 2015).

Obviously, there is no unique process for going from teachers' abstract learning design ideas to their delivery with actual students. The role of existing tools and methods in the LD field can be to support pedagogical reflection, to foster teachers' creativity in conceiving new educational solutions (possibly *adaptive* so as to meet, with slight but essential changes, the needs of *different* students), and to make their design knowledge explicit (and thus potentially sharable and reusable), along the whole process of going from design ideas to delivery (Muñoz-Cristóbal et al., 2012; Earp et al., 2013; Pozzi et al., 2015; Persico & Pozzi, 2015). Just to provide some examples, among the tools aimed at supporting the conceptualization of new activities, we can mention the Course Map (Conole, 2012), the 4SPPIces approach (Pérez-Sanagustín et al., 2012), and the 4Ts model (Pozzi & Persico, 2013) Persona Cards (Chacón-Perez et al., 2015).

Among the tools aimed to author the design, we can mention WebCollage (Villasclaras-Fernández et al., 2013), CADMOS (Katsamani & Retalis, 2012), OpenGLM, (De Liddo et al., 2011), LAMS (Dalziel, 2003), CeLS (Ronen et al., 2006), etc.

A more exhaustive overview of the existing tools, along with a discussion about their main characteristics, can be found in Prieto et al. (2013b).

In the paper, these same authors (Prieto et al., 2013b) acknowledge that the LD field is scattered and characterized by extreme diversity and complexity in terms of both technological and methodological solutions proposed. This often makes it extremely difficult for practitioners to find their way through tools and approaches (Persico et al., 2013; Pozzi et al., 2015b).

Such lack of integration and of a more comprehensive view on what exists has been acknowledged and partially addressed by the METIS project (http://www.metis-project.org) (recently funded under the LLP Programme), whose aim was to develop a single platform able to provide a unique access to a number of already existing LD tools.

Another weakness often pointed out when analysing the existing tools (Pozzi et al., 2015a) is their inability to support the whole design life-cycle, starting from the first steps of conceptualizing the design idea (defining the learning objectives, identifying the contents to be addressed, and choosing the most adequate pedagogical strategies), down to planning the flow of activities, associating the educational resources and tools to be used by students, and finally delivering the resulting design (being it a single activity or a whole course) to students through a Learning Management System (LMS).

In order to contribute to the field and fill in this latter gap, the present paper illustrates an additional tool, called the Pedagogical Planner (PP) (Bottino et al., 2008). One of the main assets of the PP (and its distinctive feature as compared to all the other tools) is its ability to support – alone – the whole design cycle in such a way that it allows a smoother and more organic design approach. This makes the PP unique in the LD research field, as it bridges and integrates all the main phases of the design process. From this point of view, the PP is a good candidate in teacher training contexts, where teachers often need to be supported in re-designing and/or re-planning their traditional teaching/learning activities in view of ICT integration.

In this paper, one particular instance of the PP is described as proposed within the i-Treasures project (Ott et al., 2015). The tool has been used by designers of innovative educational interventions in the field of intangible cultural heritage education. After discussing the tool, the paper provides preliminary data on experience of its use within the project, thus showing strong points and weaknesses of the PP and paving the way for further work in the field.

Context and background

As already mentioned, the instance of the PP described in this paper has been proposed and tested within the i-Treasures project (funded under the FP7). The project involves fostering innovation in the field of intangible cultural heritage education, that is, creating conditions for supporting the ‘passing down’ of rare and traditional artistic expressions (e.g. traditional dancing, singing) to new generations through the use of technologies. Thus, i-Treasures represents a genuine novelty in a field where educational practices are usually not yet well consolidated (Ott & Pozzi, 2011) and where technologies definitely represent a disruptive innovation (Ott et al., 2015). An exhaustive description of the project is out of the scope of this paper; here, it is enough to underline that in such a context, there is obviously a serious need of pedagogical reflections, and the learning design phase is essential to make the most of the available cutting-edge technologies, especially because most of them have never been used in these domains (Ott et al., 2015).

For this reason, within the project the PP has been proposed, the aim is to support the teachers/designers of pilot teaching/learning experiences in the various intangible cultural heritage domains addressed.

Teachers in i-Treasures need to be supported at the different stages of the design process and to reflect on the various elements at play and on the interactions between them, so as to ensure that these form a

coherent, manageable whole that responds effectively to learners' needs – insofar as this can be determined a priori (Jonassen et al., 1997).

The PP refers to the Learning Design Life-cycle model, described in Asensio-Pérez et al. (2014) and based on three main phases: Conceptualization, Authoring, and Implementation.
During the Conceptualization phase, educators make a rough design, define the learning objectives to be reached, the contents to be addressed, and consider the target population and the context. In the Authoring phase, detailed activities are planned and their flow is fixed; besides, teachers need to associate the related educational resources, etc., to each activity. In the final stage, during Implementation, LMS courses are created according to the design done in the previous phases. In the following sections, the paper illustrates how the PP is able to support the three phases of the cycle.

The PP

In this section, the PP is described as proposed and used within the i-Treasures project.

The PP is a scalable cross-browser web-based application developed in PHP, MySQL, and javascript. As already mentioned, it is intended to cover the three learning design phases. Consequently, the tool can be conceptually seen as subdivided into three areas (see Figure 1):

1. The Conceptualization area
2. The Authoring area
3. The Implementation area (which takes the form of the LMS).

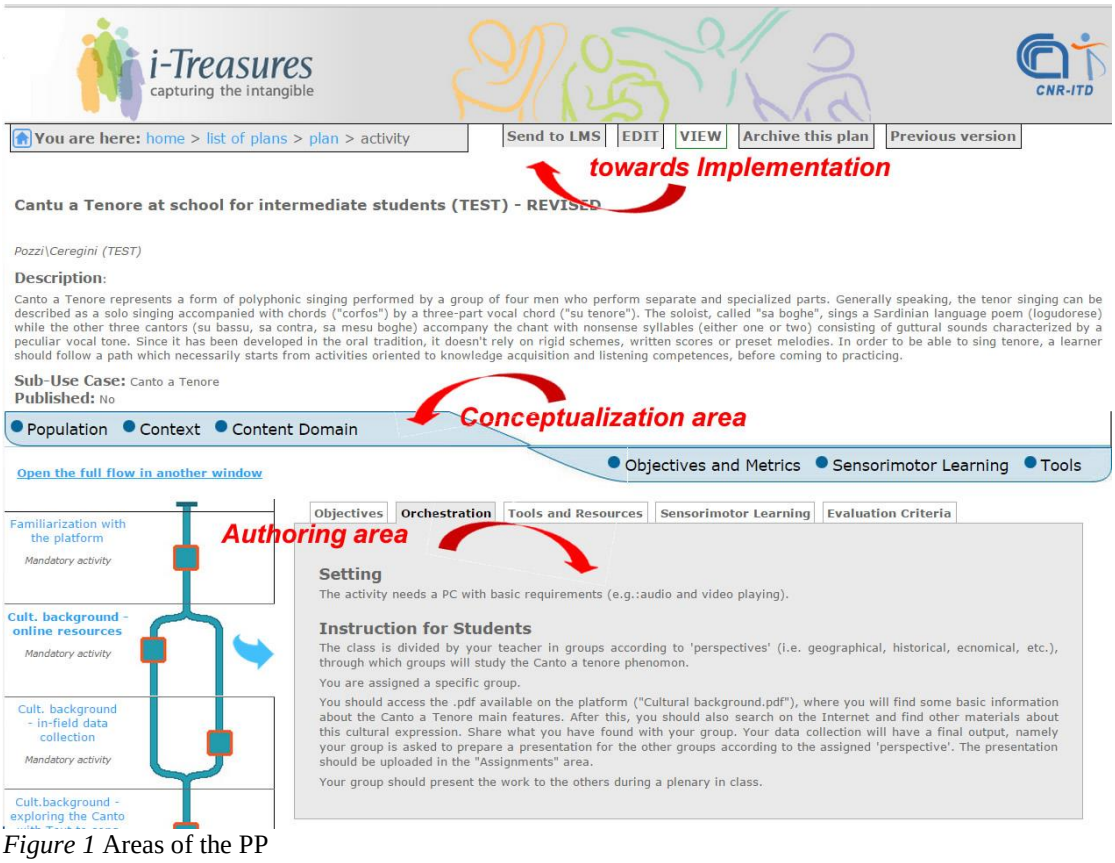

Figure 1 Areas of the PP

In the Conceptualization area (Figure 2), the designer is guided through the definition of a number of aspects, among which is

- the target *Population*: Here, the designer can reflect on and then make explicit the main characteristics of the population, their ages, their pre-requisites (if any), etc.

- The learning *Context*: Here, the designer can define the learning situation/environment where the educational intervention will be carried out. In particular, type of context, constraints (if any), and timing and setting are defined
- The *Content domain*: The designer defines the main aim of the intervention and builds a map of the content to be addressed (see Figure 2);
- The *Objectives and Metrics*: Here, the designer is supported in defining the main learning goals the intervention is meant to reach, as well as the criteria to monitor and evaluate the teaching/learning process (during and after the enactment);
- The *Tools*: Here, the designer can tentatively define the innovative tools and the features s/he is planning to use during the enactment phase with learners.

This Conceptualization area is where the teachers' reflection about inclusion issues should start; that is, in particular the PP tool helps them to decide *whether* and *to what extent* the activities should be differentiated according to the different students' needs.

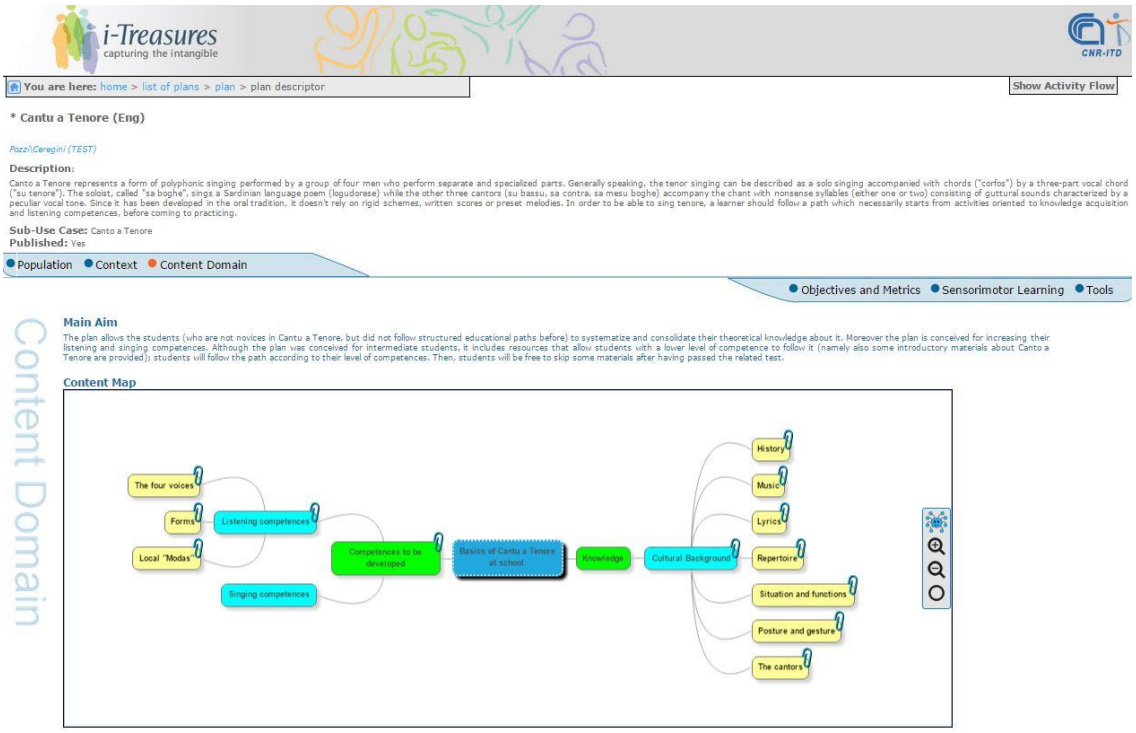

Figure 2 The Conceptualization area – Content domain

In the Authoring area of the PP (see Figure 3), the designer is supported in the definition of the activity flow – that is, the sequence of activities to be proposed to learners (left side of Figure 3) – which should then lead learners to reach the learning objectives. The tool allows the designer to use either mandatory or optional activities, each one having a different graphic representation in the flow. Besides, the activity flow can be sequential, random, or can include more than one way, so as to allow a certain degree of personalization in case one wants to propose different activities to different learners (or groups of learners) to reach the same set of objectives.

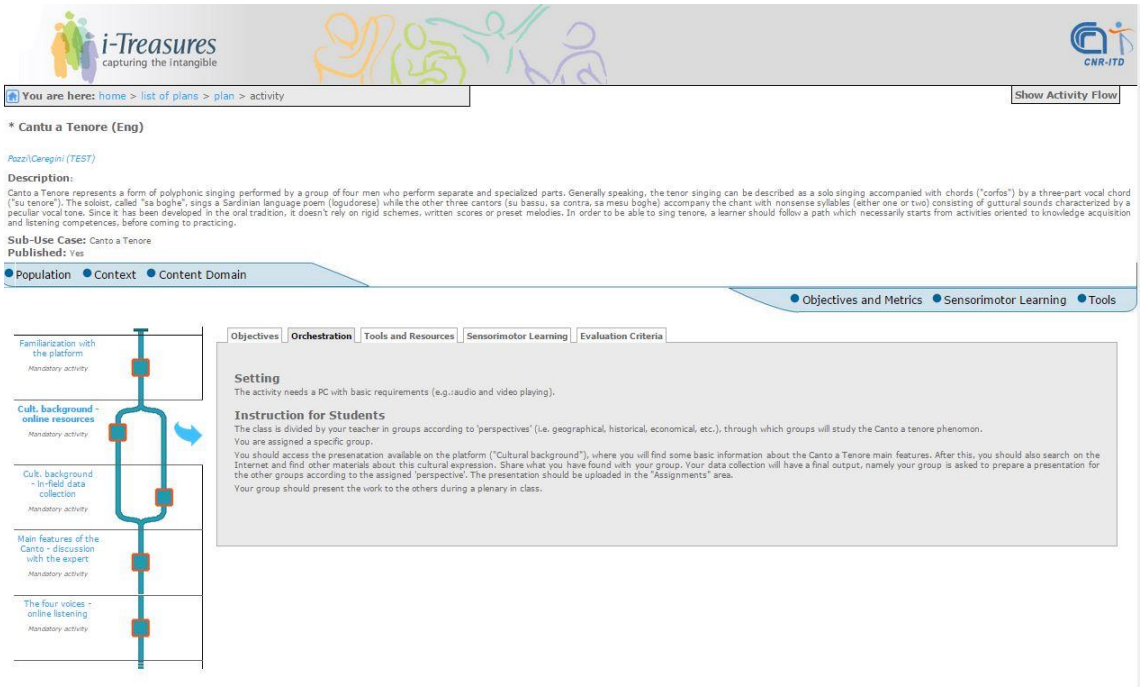

Figure 3 The Authoring area

In any case, each activity is designed in terms of Objectives (where specific learning objectives of the single activities are defined); Orchestration (where the required setting is described and the instructions for students are provided); Tools and Resources (educational resources and tools to be used by learners during the enactment phase are provided); and Evaluation Criteria (criteria to be adopted in order to evaluate the effectiveness of the activity are defined) (see right side of Figure 3).

Once the Conceptualization and the Authoring phases are completed, the PP is ready to support the Implementation phase (button 'Send to the LMS' in Figure 1), that is, the automatic configuration of the LMS. In i-Treasures, the LMS adopted is Chamilo (https://chamilo.org/): once the first two design phases are done, all the design knowledge contained in the PP is automatically migrated to Chamilo, where a new course is created, which contains all the basic information about the educational intervention (objectives, contents, etc.), as well as the activity flow, already filled in with the educational resources and tools provided by the designer in the previous phases (see Figure 4).

From a technical point of view, in order to allow the migration from the PP to the LMS, once the design is ready, an XML is produced. The XML document, conveniently encrypted, is then sent through a POST form to the LMS, which elaborates the request and uses the received information to create and properly populate a new course in Chamilo.

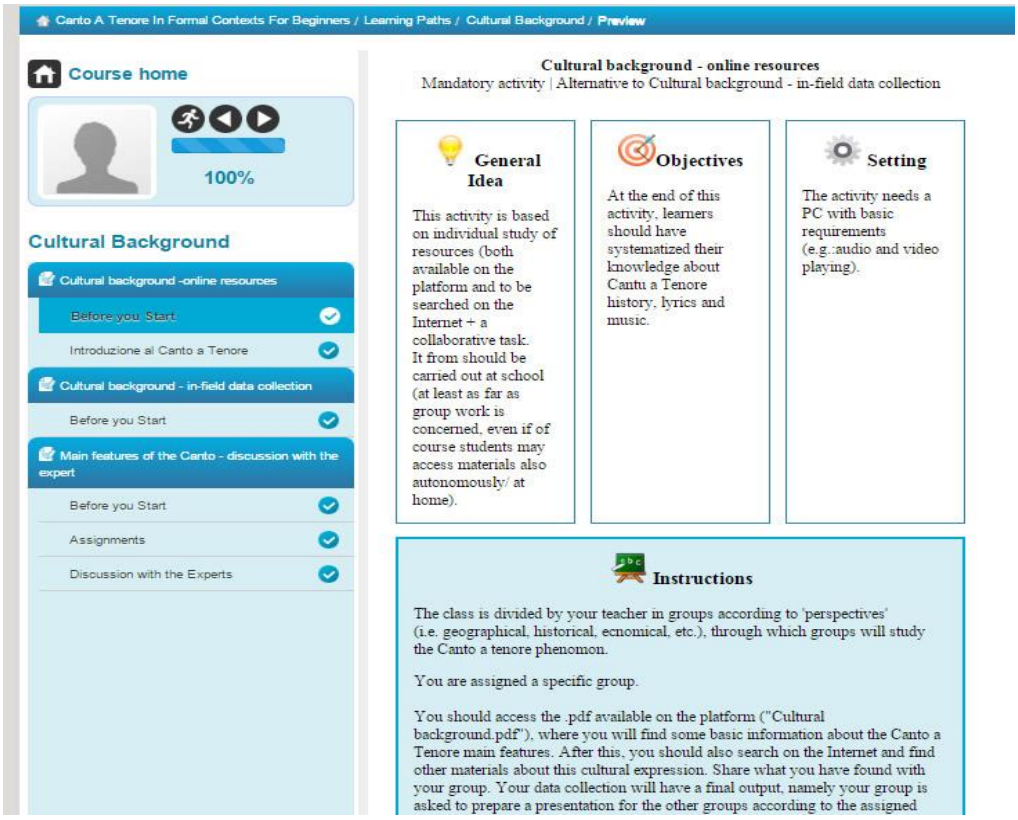

Figure 4 Implementation in the LMS

Discussion and conclusion

So far, the PP has been used by the teachers involved in the i-Treasures project to conceptualize, author, and implement pilot innovative interventions in various intangible cultural heritage contexts, as well as address a variety of different populations having different backgrounds, interests, and potentialities.

During the experience, we collected qualitative feedback from the teachers/users, thanks to a continuous dialogue with them during actual use, as well as through final individual interviews. The teachers have been positive regarding both ease of use and usefulness of the PP.

The tool has proven to adequately support the three main phases of the learning design process, thus providing full coverage of the whole learning design cycle. This is an innovative feature in the Technology Enhanced Learning field; even if other tools exist, usually these are able to bridge Authoring and Implementation (i.e. Prieto et al., 2013a) rather than Conceptualization, and managing the whole cycle within one single tool, remains – to our knowledge – a novelty.

Furthermore, the PP offers other advantages in respect to other existing tools: for example, it allows multiple forms of representations of the design knowledge (textual representations, as well as graphical representations, such as the content map and the activity flow). Representations in the LD field are one of the most debated topics and, allowing multiple representations, is certainly an asset of the PP (Pozzi et al., 2015), enhancing its flexibility.

Regarding the Conceptualization function, the PP embeds a *neutral* pedagogical approach; that is, it can be used to design any activity independently on the intended pedagogical models behind it; it thus well fits the need for differentiating educational interventions by offering not only a variety of different contents but also by envisaging the adoption of different educational approaches, strategies, and methods. This *neutral* approach is different from the one adopted by other tools, such as the 4Ts (Pozzi & Persico, 2013) or the 4SPPIces (Pérez-Sanagustín et al., 2012), which are exclusively intended to support the design of collaborative or problem-based learning activities respectively.

Furthermore, the PP has proved to be particularly easy to use, which is one of the most critical aspects often raised by teachers in similar experiences. For example, it has been recognized that the tool does not require any particular technological skills from the teacher to manage both the Authoring and the Implementation phase, which in other tools are far more complex and require high digital skills.

The ability of the tool to support the design of learning paths together with their *multiple variations* to accommodate differences in the target population needs has clearly emerged from the initial testing in the field of cultural heritage and suggests that the PP can be seen as a suitable tool for fostering personalization of learning interventions, which, actually, is a key aspect for supporting e-inclusion (Meyer, Müller, & Kubitschke, 2006).

All these positive features make the PP a good candidate as a tool to be used in teacher training contexts to support re-design of educational interventions by teachers who need to innovate their daily practices. As a matter of fact, experimentation in this direction has already started and other data will be soon made available to the scientific community.

Regarding the present drawback of the tool, we must acknowledge that the LMS used in i-Treasures for Implementation (i.e. Chamilo) is very user-friendly, but this is not the most popular LMS and it makes the PP not very much transferrable to other contexts, at least as far as Implementation is concerned. Nonetheless, this experience has proven the feasibility of the approach and it is already one of the developers' plans to develop the Implementation functions using other LMS (e.g. Moodle).

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