THIRDSPACE : ORCHESTRATING COLLABORATIVE ACTIVITIES IN PLES FOR FORMAL LEARNING

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ABSTRACT

This article presents *ThirdSpace*, a platform aiming at the integration of the learner centric and personalised Personal Learning Environments (PLE) with the more structured organisation of formal (institutional) learning. Towards this end, collaborative learning best practices are proposed to teachers through the WebCollage authoring tool. The resulting collaborative scripts are modelled using workflow technology and orchestrated automatically by a workflow engine. The ThirdSpace platform then allows the publication and monitoring of the learning activities in learners' PLEs.

1. INTRODUCTION

In this article we propose a platform aiming at the integration of the learner centric and personalised Personal Learning Environments (PLE) with the more structured organisation of formal (institutional) learning.

PLEs are built on Web 2.0 services and social software and are inherently user-centred. PLE services are selected, aggregated and managed by the learner, so that the most convenient tools for each person can be used to manage information and relationships on a learning topic. The concept has emerged from the pervasiveness of personal technologies and as a criticism of institutional control represented by closed Learning Management Systems (Wilson & Liber, 2007)

Web 2.0 technologies which form the basis for PLEs are deemed for their support for constructivist pedagogy by facilitating information production and management at an individual or collective level (McLoughlin & Lee, 2010). The social aspect of Web 2.0 also favours collaborative approaches (Downes, 2010).

On the other hand, in a formal learning context, the teacher and overall organisation are responsible for the definition of the learning path, resources and environment. Collaborative Learning is one way to organise the learning activities so as to enable interactions that support knowledge construction. Computer Supported

Collaborative Learning proposes collaborative scripts as a way to create the conditions for learning interactions to happen or to structure these interactions into specific activities (Kobbe et al., 2007). Collaboration design patterns facilitate the design of these scripts by providing best practices to support designers (Hernández-Leo et al., 2006).

Our belief is that we must preserve the structured approach of formal learning to have the desired learning outcomes while giving more freedom to learners (McLoughlin & Lee, 2010)(Dabbagh & Kitsantas, 2012). Among the emergent research themes identified during PLE Conference 2012 unkeynotes (Conole, 2012) we are most concerned by the following :
- "The need for structured, guided learning pathways"
- "The balance between loose institutionally controlled systems vs. portable, learner-controlled tools"

We address these issues from the perspective of the learning activities rather than the learning services or resources. Our platform provides support for (a) the design of pedagogically sound collaborative activities by teachers at an institutional level, and (b) the orchestration (i.e. automatic flow control) of the learning activities while learners may still use their own PLE. We believe that, in addition to facilitating the teacher's tasks of orchestration and monitoring of the learners, this will improve learning and motivation of these learners by (i) relying on their chosen tools and personalised environment which they already use for everyday activities (ii) engaging them in collaborative activities which are well supported by web 2.0 and social software.

In the following section, we will present existing approaches toward the integration of institutional/formal learning and personal learning environments. Next, we will show the overall approach we follow, explain the technical architecture and present an illustrating example before conclusion.

2.   INSTITUTIONAL LEARNING AND PLES

Some works already seek to combine the benefits from Web 2.0 and social services with a formal setting. Several LMS now integrate Web 2.0 services such as blogs or wikis. Still, this approach does not respond to the critics about LMS being closed and institutionally oriented systems that do not allow learners to personalise and adapt their learning environment (Dalsgaard, 2006; Mott & Wiley, 2009). On the contrary, SAPO Campus is an institutional platform that provides services commonly found in PLEs but it seeks to enhance sharing capabilities so as to enable the emergence of learning communities in a safe/institutional context. Enhanced "*collaboration, participation, openness and sharing*" are a mean to improve the engagement and motivation of the learners (Pedro et al., 2011). While, this platform supports openness and sharing including towards people external to the institution, the enhanced features seem to restrict the tools available to the ones provided.

Other works rather provide the ground for the integration of LMS and PLE services in a common environment. This environment can be as simple as a Web start page like iGoogle or Netvibes. These start pages support the integration of Widgets that are embeddable applications providing a user interface to a remote service. This has been done for instance by Casquero et al., 2008 using iGoogle and Widgets based integration of institutional services. Others seek to provide a specific integration environment like Taraghi et al., 2010 based on JavaFX to provide a more uniform user interaction. Marín et al., 2012 also rely on a specific Widget aggregator, SymbalooEDU for the integration of institutional and personal services. In most of these work the content of the PLE is defined by the institution but the technologies enable the integration of other Widgets thus enabling personalisation and appropriation by the learners.

If we consider the management of learning activities in a PLE, we can mention González-Tato et al., 2012 which also provide a set of Widgets to build an open e-learning platform based on iGoogle. These Widgets are dedicated to the management of learning activities from the author, tutor and learner perspectives. Mödritscher & Wild, 2009 propose an activity oriented mashup based on the *Learner Interaction Scripting Language* (LISL). LISL relies on {activity – outcome – tool} triplets to define a mashup of Widgets to

provide a specific and adapted learning environment. Like our use of design patterns, the authors envision that good designs of mashups can be shared based on their language. Again, the definition of the learning environment is driven by the institution/teacher. The activities are supported through a kind of dashboard rather than a plain orchestration.

3. FROM DESIGN TO ORCHESTRATION WITHIN LEARNERS' PLES

We propose to use Collaborative Learning Flow Patterns (CLFP) to help teachers design collaborative activities. CLFPs capture best practices in terms of collaborative learning activities (Hernández-Leo et al., 2006). Teachers can assemble and adapt known patterns such as *Jigsaw* or *Think Pair Share* using the WebCollage authoring tool (figure 2) which has been evaluated in real-life settings (Hernández-Leo et al., 2010). However, these scripts have been deployed in institutional settings (LMS) leaving no choice of environment to the learners.
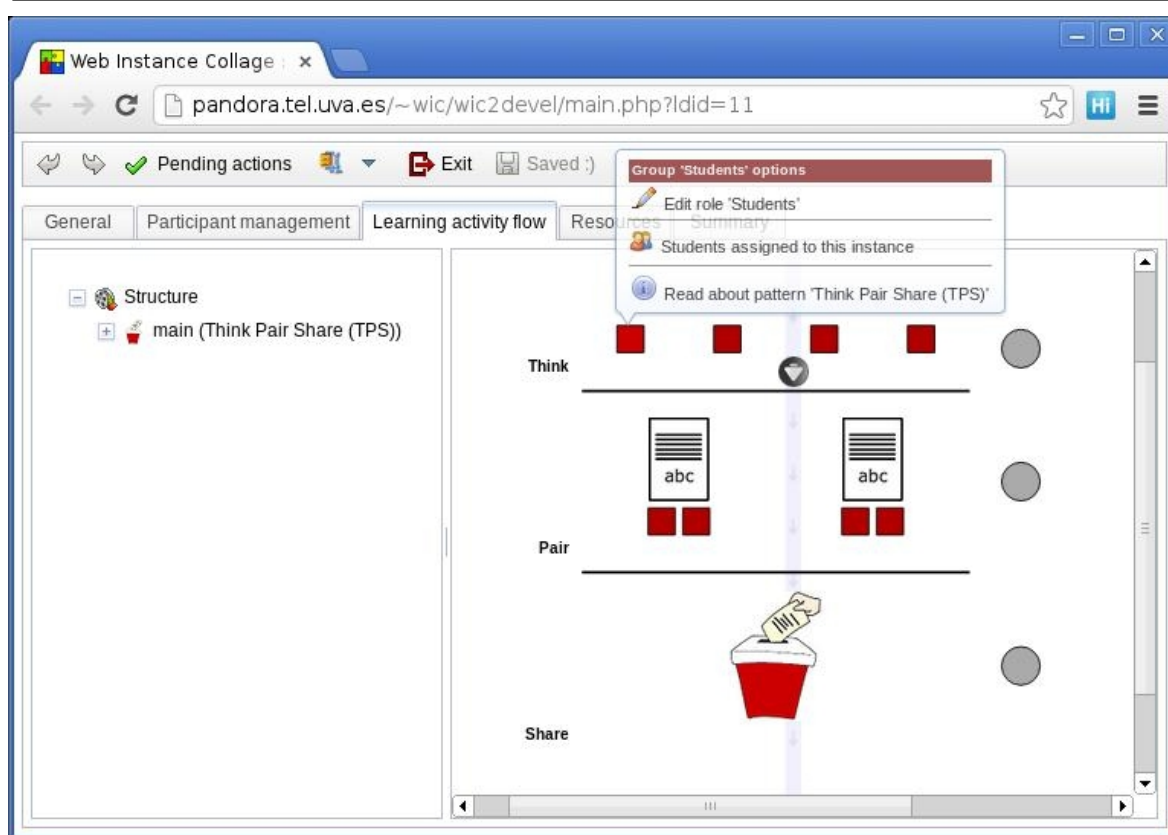

Figure 1: Think Pair Share pattern in WebCollage.

PLEs are appealing because they leverage learners' own tools and social networks providing an open learning environment. We would like to rely on this feature in a formal setting by providing collaborative activities based on CLFPs' best practices in learners' PLEs.

The orchestration of these activities (i.e. automatic advancement from one activity to another) in such open environment will lower tutoring needs and provide guidance to the learners directly in their personal services, thus sustaining their motivation (De-la-Fuente-Valentín & Delgado Kloos, 2013). However, few solutions exists for this orchestration. IMS-LD engines such as CopperCore/SLED (McAndrew et al., 2005) or LAMS (Daziel, 2003) are either outdated or provide a closed environment.

We use workflow technology for the modelling and orchestration of pedagogical scenarios (Peter et al., 2008). We have modeled the CLFPs good practices as workflow processes using Business Process Model and Notation. These processes can then be orchestrated by a workflow engine to manage learners' activities.

The *ThirdSpace* platform relies on the REST architecture of the Web 2.0 for the integration of personal services with the workflow engine (Figure 3) so as to publish and monitor activities in PLEs.
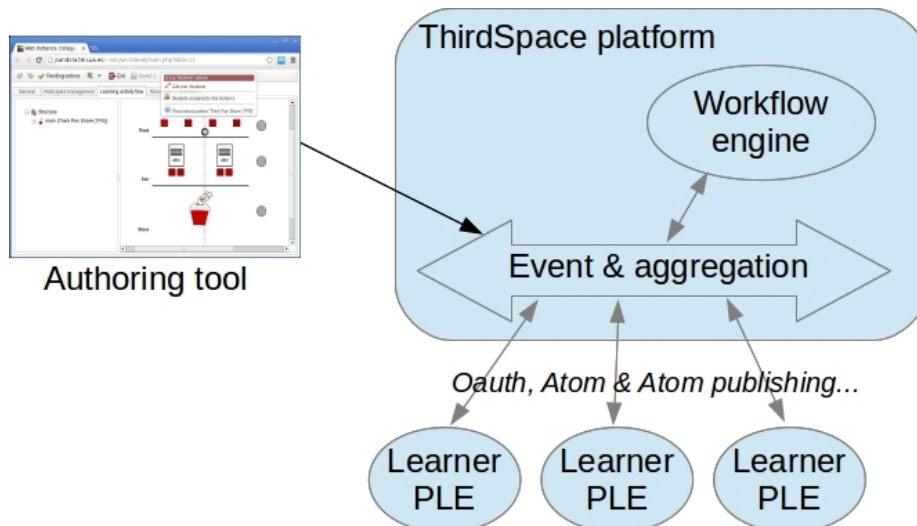

Figure 2: ThirdSpace architecture.

4. USE CASE

We will use the *Think Pair Share* (TPS) pattern as a use case. This pattern organises the activity into three phases to have learners produce a shared view/artefact on a topic or problem. The three phases are :
- *Think* is an individual phase where each learner has to reflect and elaborate on an topic or problem.
- The *Pair* phase let learners confront their production. This confrontation should help learners build a more thorough understanding of the topic/problem and provide a better solution.
- Finally, the *Share* phase gathers all learners to build a consensus based on previous discussions and productions.

This pattern defines the activities as well as the grouping of the learners during each phase. It could be used in classroom, within the LMS or as we think within the learners' PLEs. In the latter case, instead of providing a collaboration tool, we will rather rely on the learners' blogs. Using this tool means that we will have to publish the activities on the learners' blogs and let them perform those activities as blog posts or comments.

Considering the teacher's point of view, she will have to select the *TPS* pattern in Web Collage and customize it to the intended topic and to select the learners and pairing. The deployment of the learning script in *ThirdSpace* involves exporting the design from Web Collage (activity flow, learners), thus triggering the instantiation of a new process in the workflow engine.
From the learners' point of view, they will have to provide information about their personal services and grant access to *ThirdSpace* so that it can publish information. Then, they will see activities published on their PLE services.

Figures 3 to 5 illustrate the operation of *ThirdSpace* on the first activity (*Think*) of the *TPS* pattern deployed by a teacher in *ThirdSpace*. The instantiation of the process will make the first activity available for the

learners associated to that instance. *ThirdSpace* polls the workflow engine regularly on behalf of the learners. When an activity is available, its description is retrieved and published on the learner's blog (figure 3).

Figure 3: Publication of the activity on the learner's blog.

The user can then perform the activity by providing a response to the initial question through a comment (figure 4). The blog provides atom feed for posts but also for comments. By polling the learner's blog comment feed, *ThirdSpace* is able to monitor the completion of the activity.
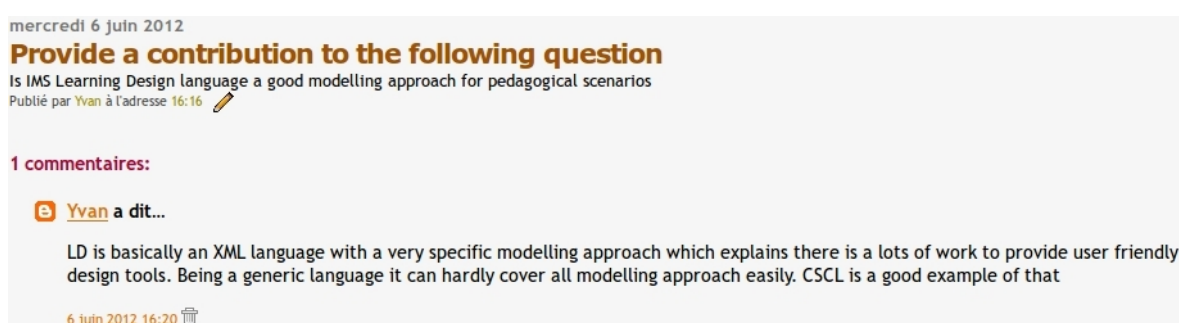

Figure 4: Activity done as a comment to the published activity.

Upon completion of the activity, *ThirdSpace* will complete the activity in the workflow engine and post a message on Twitter to support awareness (figure 5).
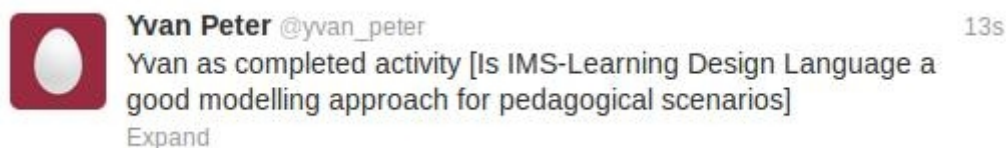

Figure 5: Activity completion posted on Twitter.

When the *Think* activity has been done by all learners, the first phase of the pattern will be done and the workflow engine will make the *Pair* activity available.

5. CONCLUSIONS

Our work seeks to enable the structured approach of formal learning in the scope of learners' PLEs. Towards this end, collaborative learning best practices are proposed to teachers through the WebCollage authoring tool. The resulting scripts are modelled and orchestrated automatically by a workflow engine. The *ThirdSpace* platform then allows the publication and monitoring of the learning activities in learners' PLEs.

Our work does not address the elaboration of the PLE itself. On the institutional side, we provide sound pedagogical design while helping to cope with the tutoring work with the automatic orchestration of activities and awareness features. On the learner side, one can use personal learning services and social networks.

Learning activities become available in the chosen services and learners are aware of other learners progress. This provide an awareness of activities and a kind of scaffolding for the learning activities that may help sustain learners' motivation (de-la-Fuente-Valentin et al., 2013).
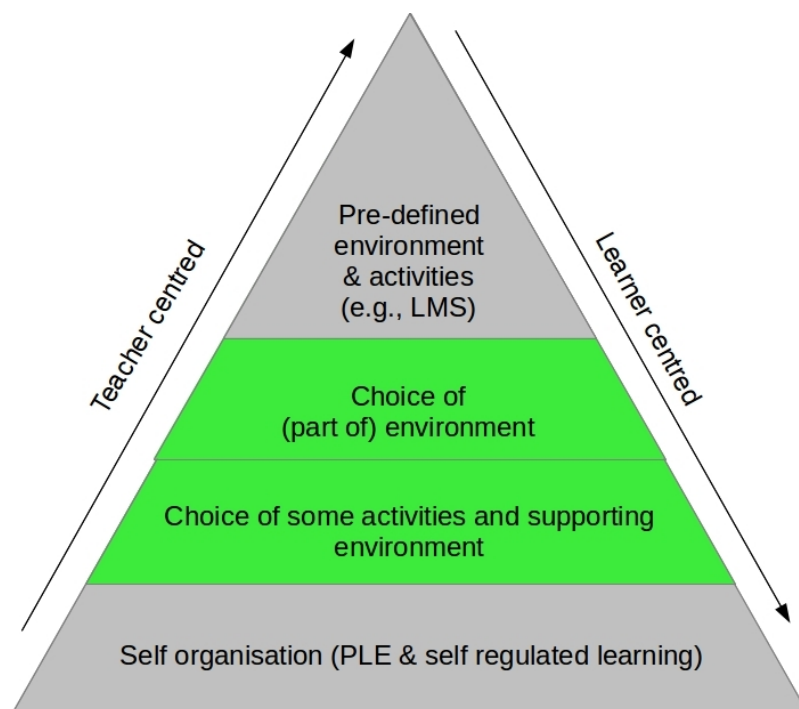

Figure 6: Teacher vs. learner centred.

Integrating formal learning and Personal Learning Environments requires to find the right balance between the necessary structuring of the learning environment (either in terms of resources, services or activities) and a user-centred environment which also encompasses personal activities, relationships and informal learning goals. This balance falls into the middle part of figure 6 where lies our work and most of the works presented in section 2. They seek to provide an integration environment that lays the ground for extension and personalisation with more personal services and networks.

However, as mentioned among others by Chatterjee & Mirza, 2012 or Dabbagh & Kitsantas, 2012, learners may not have the digital skills necessary to effectively customize their learning environment to provide a useful learning support and experience. Hence, we will have to take that into account in our work. One direction may be to recommend tools that have good affordance for the tasks at hand to help learners organise their environment.

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