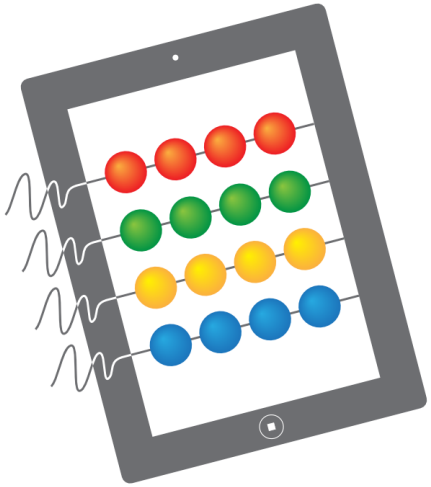
FP7 ICT STREP Project



LEARN PAD

Deliverable D9.5

Technology-oriented Learn PAd whitepaper

First version

http://www.learnpad.eu

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Abstract

Provides a technology oriented overview of Learn PAd that is targeted to readers from research and software vendor communities with a goal to build interest in adopting Learn PAd concepts in further research and integrating technological components in external e-learning, modelling and middleware software applications.

Keyword List

platform, white paper

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1 E-Learning and Knowledge Management of processes in Public Administration

In modern society public administrations (PAs) are undergoing a transformation of their perceived role from controllers to proactive service providers, and are under pressure to constantly improve their service quality while coping with quickly changing context (changes in law and regulations, societal globalization, fast technology evolution) and decreasing budgets. Civil servants are challenged to understand and put in action latest procedures and rules within tight time constraints.

Learn PAd is an innovative holistic e-learning platform for PAs that enables process-driven learning and fosters cooperation and knowledge-sharing. Learn PAd technical innovation is based on four pillars:

1) a new concept of model-based e-learning (both process and knowledge)
2) open and collaborative e-learning content management
3) automatic, learner-specific and collaborative content quality assessment
4) automatic model-driven simulation-based learning and testing

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2 Public Administration is already using it

State-of-the-art about existing technologies on these topics. Half a page/a page.

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3 Needed features for adoption in Public Administration

What are the problems of existing tools and what Learn PAd is trying to address.

- new-comers
- learning of processes
- centralization of the documentation
- continuous and collaborative maintenance of the knowledge

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4 Learn PAd platform: solutions and technologies

In order to present the platform, we'll go through 2 different kind of views: a logical one and a technical view. The logical view will show the flow of what Learn PAd platform is doing (see Section 4.1. The technical view will present what are the components of the Learn PAd platform and how they connect to each other.

4.1. Flow view

To present Learn PAd platform, let's start with a simplified view of the flow of the Learn PAd platform with Figure 4.1.

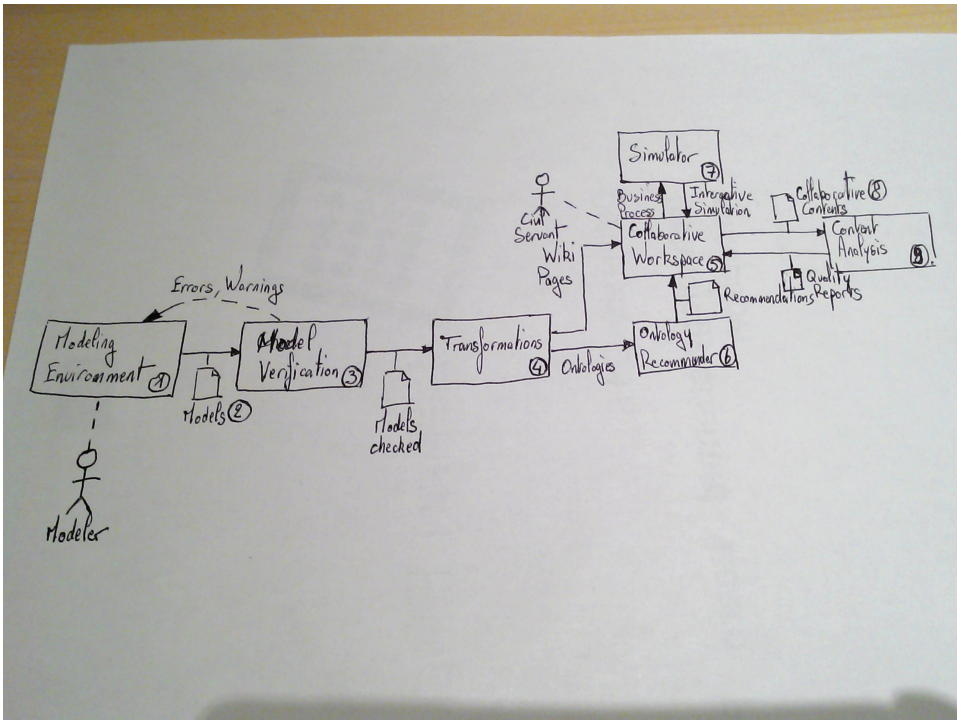

Figure 4.1: Flow view of the Learn PAd platform
TODO: draw a line between transformation and Simulator to transfer Business Process then remove the one between CW and SIM
TODO: Remove the number (2) and update other numbers accordingly
TODO: Remove the number (8) and update other numbers accordingly

4.1.1. Modeling Environment

Technology Adoxx, MagicDraw

Description This is the first entry point of the platform. In the Modeling Environment, the Modeler is describing and documenting the models. Any modeling tool could be plugged on the Learn PAd platform as long as its providing the correct input format.

The input format contains a few things:

- A set of models which are woven together
- Clickable images of the models (images and maps)
- Business Process models as one BPMN (standard format) file

4.1.2. Model Verification

Technology PetriNET

Description Before importing the models, the Learn PAd platform will run a list of verifications on the models. These are formal verifications to avoid importation of models that are not executable or that contains activities that are not reachable (these are only 2 examples).

4.1.3. Transformations

Technology EMF, ATL, Acceleo, XSL-T

Description Once the model has been validated, it can be imported into the Learn PAd platform. 3 components will need these models for different purposes.

First of all, the Collaborative Workspace will display these models into a wiki for the Civil Servants. These transformations are done using Modeling Transformations tools like EMF (to represent models), ATL (to convert models) and Acceleo (to serialize EMF representations of models).

On the second hand, the Ontology Recommender has to build an ontology of the models in order to propose recommendations. The transformations technology used here is XML-specific: XSL-Transformations.

Finally, the Simulator will simulate Business Process. It's using the Activiti Engine which is able to run simulation on Business Process serialized as BPMN standard format.

4.1.4. Collaborative Workspace

Technology Wiki

Description The Collaborative Workspace is the User Interface entry point for Civil Servants. It's in the Collaborative Workspace they will consult, browse, learn about new or existing processes.

Civil Servants are able to collaborate into this workspace by providing additionnal documentation, help to fix inconsistent, incomplete or wrong models

4.1.5. Ontology Recommender

Technology ArchiMate, ArchiMEO, RDF

Description The Ontology Recommender will create an ontology based on the models that are pushed to him. This ontology will produce different kind of recommendations to the Civil Servant as they browse the wiki and use the simulation (see Section 4.1.6:

- *Experts* they could talk to to get more details on the activity
- *Similar Cases* which are similar processes to the one currently consulted or simulated
- *Learning Materials* which are related multimedias that can help to understand the activity

4.1.6. Simulator

Technology Activiti, BPMN

Description On the Simulator, Civil Servants will be able to interactively simulate a process, playing each activity of it and validate each step. It's a learning tool so the Simulator will give feedback about the expected values. Multiple Civil Servants may interact on a common simulation too. In any case, gamification mechanisms will keep this exercise motivating for Civil Servants.

4.1.7. Content Analysis

Technology Gate

Description In the Collaborative Workspace, the Civil Servants will be able to co-edit new documents that will complete the processes' documentation. These documents will be beneficial for every other Civil Servant. Therefore, Content Analysis is in charge of keeping a minimum level of quality for these documents. It will run semantic analysis on the produced documents in order to spot vagueness or incomplete information in the texts.

4.2. Component view

The component view will show which are the real existing components and how they are connected to each other into the Learn PAd platform (see Figure 4.2).

4.2.1. Learn PAd Core

Learn PAd platform has been designed as modular as possible. Everything is plugged onto this Learn PAd Core. In order to be independent as much as possible from the technologies used in each component, each component is communicating with the Learn PAd Core with REST APIs.

This component is developed inside the XWiki software. This means that storage is shared with all components that are part of XWiki. However, it communicates with all the components with REST which make it a replaceable component.

4.2.2. Modeling Environment

This component is not part of Learn PAd platform. Learn PAd platform is a server providing a list of features and services: it's always on. However, the Modeling Environment could be desktop application that is launched, used, then stopped. It a necessary component to the Learn PAd flow but it's not always on. That's the reason why its talking to Learn PAd Core Platform but never the other way around.

The format they will push toward the Learn PAd platform is a ZIP archive, called `lpzip` which contains:

- Set of models [format:XML/Adoxx or XML/MagicDraw]
- Images [format: BMP, JPG, PNG, SVG]

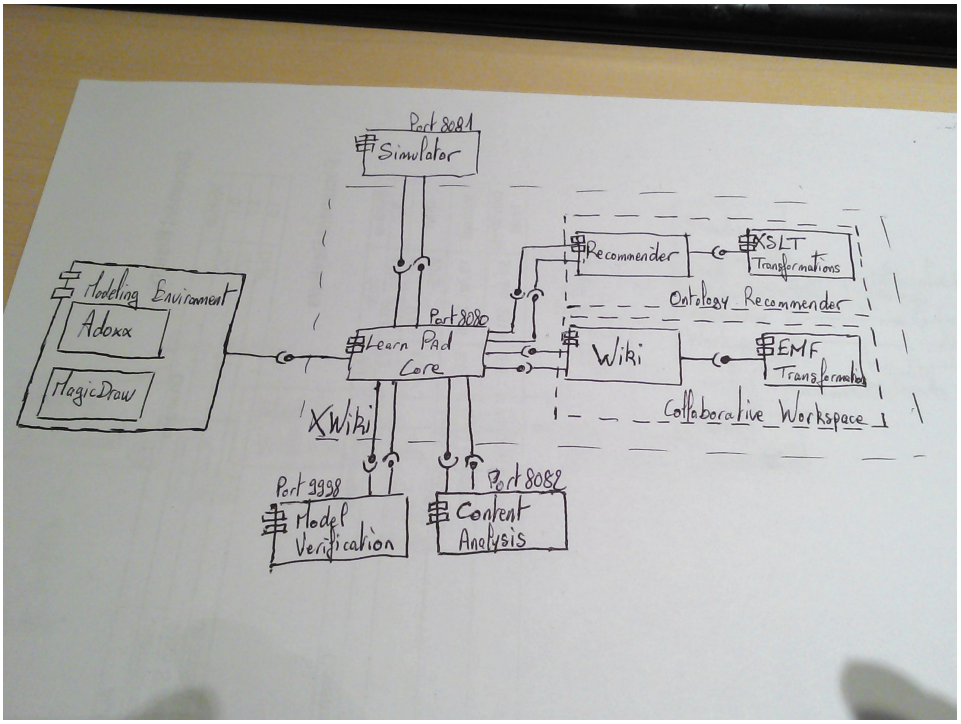

Figure 4.2: Component view of the Learn PAd platform

- Images map [format:HTML-Map]
- Business Process models [format:BPMN2.0]

4.2.3. Collaborative Workspace

The Collaborative Workspace is divided into 2 main components. Since the Learn PAd Core is not doing any transformation on the files (Learn PAd Core is more like a router), the Collaborative Workspace is getting raw files. Therefore, the Wiki component is getting raw models from the Learn PAd Core, then use a EMF Transformation component to transform models into wiki pages, before importing them.

Wiki

The Wiki component is the most important part of the Collaborative Workspace. It's the Graphical User Interface for Civil Servants where models will be displayed. It contains modeling data, stored with a generic format, and an application capable of displaying these datas.

Wiki component will get models, ask for transformation, and import the resulting wiki pages from the transformation.

EMF Transformation

This transformation module is using EMF technologies to operate transformations on models. Each meta-model is represented as an Ecore module (Adoxx, MagicDraw, XWiki). Then, a transformation language, ATL, transform them from an Ecore A (Adoxx or MagicDraw) to an Ecore B (XWiki). Finally, Acceleo is serializing the Ecore to wiki pages which are returned to the Wiki.

4.2.4. Ontology Recommender

For the same reasons than the Collaborative Workspace, the Ontology Recommender is getting raw files from Learn PAd Core. Therefore, the main component Recommender is getting these files, sending them to the XSL-T Transformations component which return back ontologies of the models.

Recommender

The Recommender component is using an ontology to organize the information of the models. The ontology is expressed as a RDF format. This component will be able to make recommendations to a Civil Servants as he browse a model or play a simulation. Contextual information will be used to get the best possible recommendations, for example:

- Who is the current Civil Servant?
- What is the Civil Servant is currently looking at?
- In case of simulation, what are the data already filled by the Civil Servant?

XSL-T Transformations

This component is transforming models into ontologies. The technology used is XML specific, and very efficient as parsing XML files to transform them into other serialization, RDF ontologies in this case.

4.2.5. Simulator

The Simulator is using Activiti Engine to play simulations of Business Processes. Activiti Engine is using BPMN standard format which are already stored in the Learn PAd Core.

The Simulator component is also generating Graphical User Interface for the Civil Servant. However, these GUI are embedded inside the Wiki for 2 reasons:

- Reduce the number of entry points for the Civil Servants
- Display recommendations during the simulation (UI for recommendation already exists in the Wiki)

4.2.6. Model Verification

The Model Verification is in charge of verifying consistency of models. It runs multiple tests on models in order to identify different kind of errors. The Modeling Environment is able to ask Learn PAd Core for these errors in order to show them to the modelers.

4.2.7. Content Analysis

The Content Analysis runs semantic analysis on free text collaboratively created by Civil Servants in the Wiki. It returns annotations on the text with the following information:

- Start and End of the piece of concerned text
- The type of error (among a list of categories)

The annotations are then displayed in the Wiki, providing a workflow to a Civil Servant for a throrough review of each of these.

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5 Partners

List of partners with a small paragraph that explain domain of expertise.