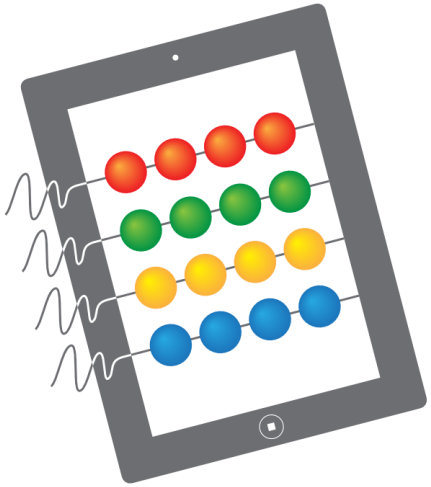
FP7 ICT STREP Project



LEARN PAD

Deliverable D9.5

Technology-oriented Learn PAd whitepaper

First version

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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

1.1. Why Learn PAd?

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.

1.2. What is Learn PAd?

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

1.3. Who will benefit Learn PAd?

Learn PAd is designed with and for the Public Administration. Civil Servants from these Public Administrations implements processes everyday: they must be aware of any evolution or any new process.

1.4. When will Learn PAd exist?

Learn PAd is a European Union funded project and started on 1st February 2014. It's a two and half years long project so it will end on 31st August 2016. In the meantime, a first prototype has been evaluated by Regione Marche Administration (Italy) on 10th November 2015. A second release of the platform will be release on 15th April 2016.

1.5. What is in this white paper?

This white paper will present the technical solutions that have been merged together to meet the requirements of this Learn PAd platform. In the next section, you'll meet with the Learn PAd platform. In the last section, you'll meet the partners that participate in the elaboration of this Learn PAd platform.

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2 Learn PAd platform: solutions and technologies

This section will present the Learn PAd platform through two different points of view: a logical view and a technical view. The logical view present the usage of the platform in a typical scenario (see Section 2.1). The technical view present the components of the platform and how they connect to each other.

2.1. Logical view

The Figure 2.1 show the global workflow happening inside the Learn PAd platform. The Modeling Environment component [1] is the place where the models are designed. Then they are verified by the Model Verification component [2] before being transformed by the Transformations component [3] in different kinds of representations:

- wiki pages for the Collaborative Workspace component [4]
- ontologies for the Ontology Recommender component [5]
- Business Process BPMN 2.0 files for the Simulation Environment component [6]

Eventually, Collaborative Workspace is checking the content co-created by Civil Servants by sending them to the Content Analysis component [7].

In the following section, you'll find a more detailed description of all the components.

2.1.1. Modeling Environment

Technology Adoxx, MagicDraw

Description 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 output format.

The output 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

2.1.2. 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).

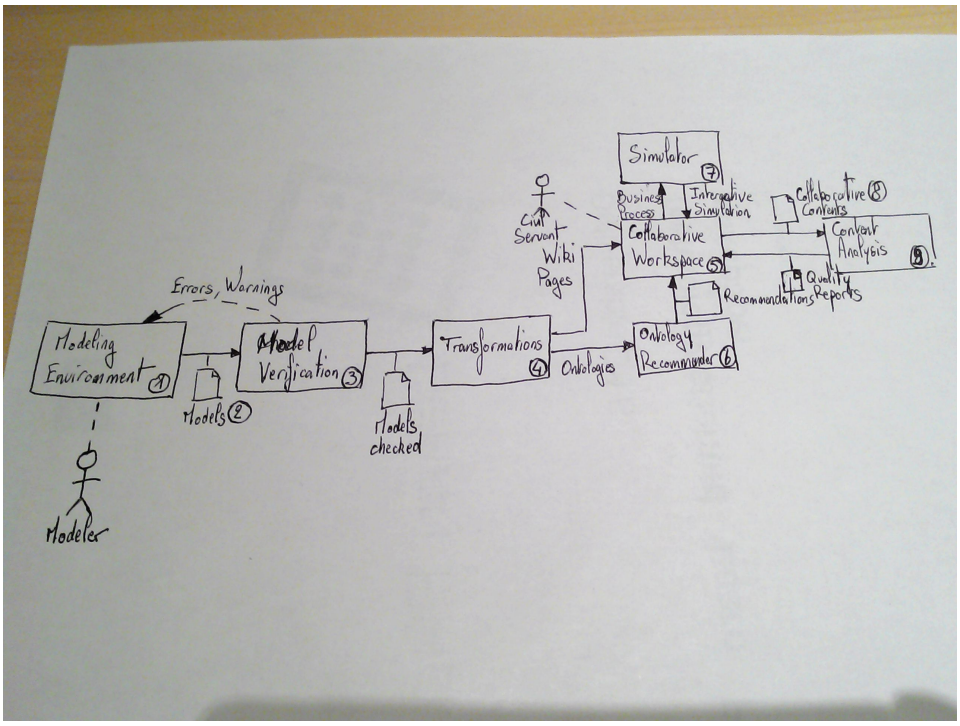


Figure 2.1: Flow view of the Learn PAd platform
TODO: draw a line between transformation and Simulator to transfer Business Process then remove the one between CW and SIM
TODO: Change name of Simulator to Simulation Environment
TODO: Remove the number (2) and update other numbers accordingly
TODO: Remove the number (8) and update other numbers accordingly

2.1.3. 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.

2.1.4. 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

2.1.5. 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 2.1.6:

- *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

2.1.6. 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.

2.1.7. 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.

2.2. 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 2.2).

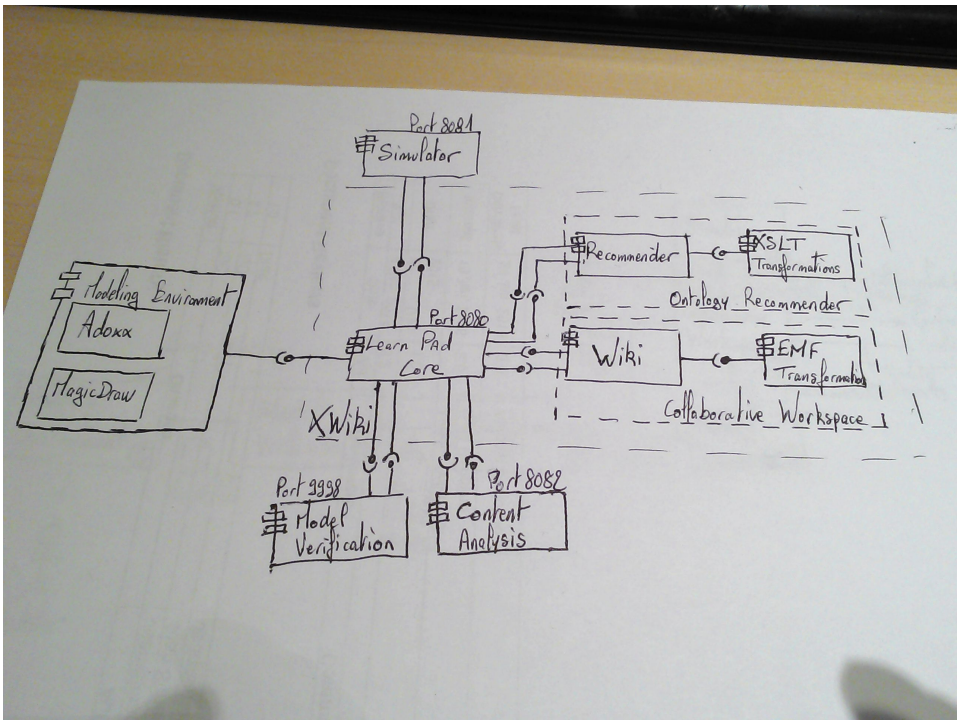


Figure 2.2: Component view of the Learn PAd platform

2.2.1. 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.

2.2.2. 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]
- Images map [format:HTML-Map]
- Business Process models [format:BPMN2.0]

2.2.3. 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.

2.2.4. 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.

2.2.5. 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)

2.2.6. 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.

2.2.7. 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.

3 About partners

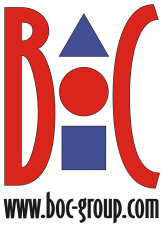
3.1. Consiglio Nazionale delle Ricerche

Leading partner of the Learn PAd project, CNR is an Italian Public Research Institute. It's the expert in automatic semantic analysis (for the Content Analysis component).

http://www.cnr.it

3.2. BOC Asset Management GmbH

Based in Austria, it's a leading company in Modeling. It's providing the software Adoxx for the Modeling Environment component.



http://www.boc-group.com

3.3. Linagora Grand Sud Ouest SA

Linagora is an open-source company, based in France. It's providing technologies and knowledge about execution and simulation of Business Processes.

http://www.linagora.com

3.4. No Magic Europe UAB

Based in Lithuania, it's a leading company in Modeling. It's providing the software MagicDraw for the Modeling Environment component.

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http://www.nomagic.com

3.5. Regione Marche

Italian Public Administration of the Marche region, it's providing expertise on processes in Public Administration.

http://www.regione.marche.it

3.6. Fachhochschule Nordwestschweiz

Swiss University with expertise on ontologies. It's working on the recommendation engine.

http://www.fhnw.ch

3.7. Università degli Studi di Camerino

This Italian University is having expertise in Business Process. It's working on formal verification of processes.

http://www.unicam.it

3.8. Università degli Studi dell'Aquila

This Italian University is having expertise in models (transformations, comparisons, historic, etc.) and in the related technologies (EMF, ATL, Acceleo, EMFCompare, etc.).

http://www.univaq.it

3.9. XWiki SAS

French open-source company, which is developing XWiki software. It's providing XWiki as the base of the Learn PAd platform and expertise about collaboration and knowledge management.

http://www.xwiki.com