The Learn PAd Platform for Process Oriented Learning

http://www.learnpad.eu
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Summary

In modern knowledge society, the information and competences needed in the workplace are very complex and evolve dynamically. To keep pace with continuous innovation in society and technology, organizations are challenged to manage and improve their knowledge base, and workers need to readily acquire and apply the new knowledge while performing their tasks. The European Commission fosters research in technology-enhanced learning (TEL) solutions that support new, more effective learning experience by the exploitation of advances in Information and Communication Technology (ICT). This white paper reports on the innovative TEL solution proposed by the FP7 project Learn PAd. Learn PAd builds a holistic e-learning platform, which enables process-driven learning and fosters cooperation and knowledge sharing. Learn PAd has a specific focus on how this approach and e-learning platform can be applied by Public Administration (PA) organizations. Learn PAd is based on the key idea of expressing the operational knowledge as semi-formal models that describe business processes, organization structures, documents and other knowledge items in place at the Public Administration. The model-based approach enables formal verification of models and contents quality, reasoning and recommendations based on ontologies, traceability between processes and motivation items, etc. Learn PAd platform uses Wiki technology to enables its users to easily enhance the knowledge models with textual contents and provide feedback to modelers such as indications of unclear model-based knowledge items or suggestions for model improvements. In Learn PAd approach, working and learning are tightly intertwined, so that knowledge sharing among workers is enabled and promoted. Learn PAd is inspired by open source community principles and promote cooperation spirit by tracking users' contributions to the knowledge base and promoting leaders. The Learn PAd platform supports multiple learning paradigms: an informative learning approach based on enriched business process (BP) models, and a procedural learning approach based on simulation and monitoring (learning by doing).

This technical whitepaper focuses on introducing Learn PAd platform, its components and their implementation technologies. It targets technical readers, including IT departments of organizations wishing to adopt the solution, developers who want to integrate the platform with other existing frameworks or embed new components or functionality, and researchers interested to know about the Learn PAd original results and to pursue further research along same directions. We refer to the companion white paper titled "The Learn PAd Solution to Process Oriented Learning" for an overview of typical business scenarios in which the solution can be usefully adopted.

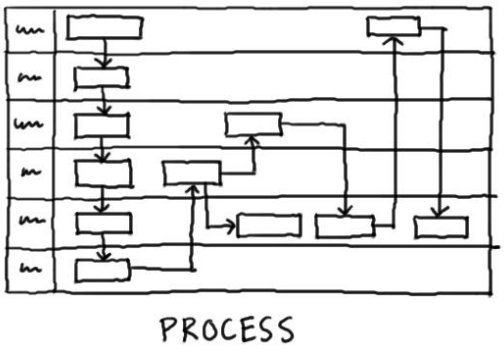
1 E-Learning and Knowledge Management in Public Administrations

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. The challenge is even more harsh if we consider that many public administrations are today undergoing profound re-organizations resulting in civil servants that need to be moved to different offices with changes in their assigned objectives and tasks to perform. Traditional approaches to training seems not adequate to the new context, and there is a urgent need for novel solutions to learning so to permit the emergence of more reactive organizations.

Looking for innovative solutions it is then important to consider which are possible approaches to knowledge organization, acquisition and sharing that can permit to speed up and improve the learning process, in particular when a public administration is considered. Nowadays complex organizations more and more resort to modeling in order to clarify and reason on the various aspects of the organization and its activities. In such respect interesting seems to be the possibility to fruitfully use such models in order to organize and relate the knowledge needed to operate in the organization. Information conveyed by Business Process diagrams, organizational diagrams, competence diagrams and others seems then a important resource to not waste when contents for learning need to be organized, related and made available.

On the other side it is important to consider that different people and different learning contexts generally ask for different learning paradigm, and that in any case it is important to support different learning paradigm starting from the same context. In particular to serve citizen requests the civil servants often have to activate processes that are almost impossible to fully learn and understand just using informative approaches to learning. Support to performative learning and case based learning seems instead rather important approaches to not ignore. At the same time making easier the access to expert colleagues and to information related to the specific characteristics of a citizen request while the civil servant is serving it, could be a quite effective way of making learning and the delivery of service

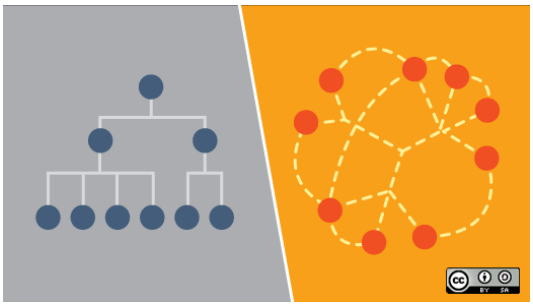


more effective. Indeed the availability of models could be fruitfully exploited also in this respect.

Finally it should not be forgotten that interaction and cooperation with colleagues is generally the most used, and often effective, strategy in order to solve issues emerging in daily work activities and then learn from the solution of real cases.

Following these lines of thought the Learn PAd project intended to define and develop a learning platform that could fruitfully take advantage of the reflections reported above.

1.2. What is Learn PAd?



In order to face the challeges mentioned above the Learn PAd EU research project conceived and developed an innovative holistic e-learning platform for PAs that enables model-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: learning of processes by Civil Servants is driven by contents organized according to models describing the various aspects of a complex organizations and of its employee. Several model kinds are used to convey information and organize knowledge for the learner. In particular the Learn PAd project refers to:

- Business process models represented using the Business Process Modeling Notation (BPMN v.2)
- Business Case Models represented using the Case Management Modeling Notation (CMMN)
- Objectives and plans of the organization represented using the Business Motivation Model (BMM)
- Organizational models
- Models to represent data to be managed by civil servants in perfoming their tasks
- Competency models to represent the competences of an employee
- KPI models to monitor the objectives of the organization and related learning activities

Interestingly the various models have been interrelated to permit a more meaningful browsing experience with respect to the information conveyed by each model;

2- open and collaborative e-learning content management: the platform provides a collaborative ecosystem in which contents can be collaboratively refined and improved by the workers. Civil servant can also actively participate to the improvement of the organization providing comments and feedbacks on the effectiveness of establilshed processes;

3- automatic, learner-specific and collaborative content quality assessment: every new models and content inserted in the platform is verified by automatic mechanisms to identify possible problems affecting their quality;

4- automatic model-driven simulation-based learning, and learn while doing support: The platform permits to involve civil servants in learning activities according to different learning paradigms. In particular simulation and case based learning mechanisms are available. The platform can also help civil servants while their are serving real requests from citizens.

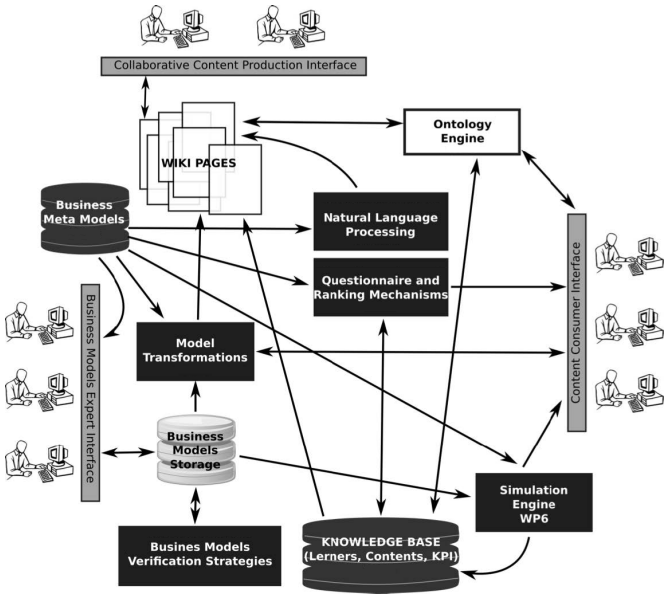
1.3. Who will benefit Learn PAd?

Learn PAd is designed with and for the Public Administration. Civil servants will be the main beneficiaries of the Learn PAd platform. In particular the platform permits to better organize and access learning contents needed by the civil servants to correclty perform their daily activities. In addition to its usage in learning sessions, being them carried on through the reading of contents or the usage of simulation functionality, the platform also supports the civil servant while he/she serves real requests. In particular it permits a more direct access to knowledge according to the specific request to be served, and it provides reference to expert colleagues that can help in the execution of an activity. The objective of the platform is to become the main access point to knowledge for the civil servant in any working situation, either being it serving a peculiar request in a well known process or entering a new role and new responsibilities.

As a side effect the whole PA adopting the Learn PAd solution could have benefits resulting from the introduction of a platform fostering the establishment of a collaborative working environment.

1.4. When will Learn PAd exist?

Learn PAd is a European Union funded research project and started on February 2014. It's a two and half years long project so it will end on August 2016. In the meantime, a first prototype has been evaluated by Regione Marche Administration (Italy) on November 2015. A second release of the platform will be available on April 2016. The final release is expected for April 2016. From there the core platform and constituting components will be also available on public repositories to permit further evolution by an open community.



1.5. What is in this white paper?

This white paper presents the technical solutions that have been merged together to meet the requirements of this Learn PAd platform. In the next chapters, you will meet with the Learn PAd platform. In particular Chapter 2 illustrates the functionalities provided by the platform and a logical process for the usage of the platform itself. Then Chapter 3 introduces the various components constituting the platform, and how they technically relate to each other. Successively in Chapter 4 you will find information to download and install the platform and its components. Finally Chapter 5 draws some conclusion, while Chapter 6 sums up the main information, and the communication channels of the project.

2 Learn PAd platform: how to use it?

In this section, we'll provide different use cases which will give an overview of Learn PAd Platform. These use cases are user-driven: you'll see Modeler use cases and Learner use cases. But first, let's explain what is the Learn PAd Platform and what are the kind of users that will use this Learn PAd Platform.

2.1. Overview of Learn PAd Platform

The Figure 2.1 shows 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 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.

2.2. Kind of users in Learn PAd Platform

Learn PAd platform has the goal to document processes in the Public Administration for Civil Servants to learn them. It means that the first users of the platform will be Civil Servants: they will learn or improve their existing knowledge about processes.

In the meantime, someone has to document these processes: the Modeler. Based on information of an experienced Civil Servant, the Modeler will translate the process into models that will be injected in the Learn PAd platform.

The two following sections will be about the typical use cases of a Modeler and of a Civil Servant, and more specifically, a Learner.

2.3. Modeler use cases

2.3.1. Modeling

The first task of the Modeler is to create and document a existing process from the Public Administration. Working on a Modeling tool, he will model Business Processes. But in Learn PAd, the Modeler brings a lot more than Business Process modeling. The Modeler will also complete Business Process model with: Organization Structure, Documents and Knowledge, Competencies, Case Management, KPI, Motivations.

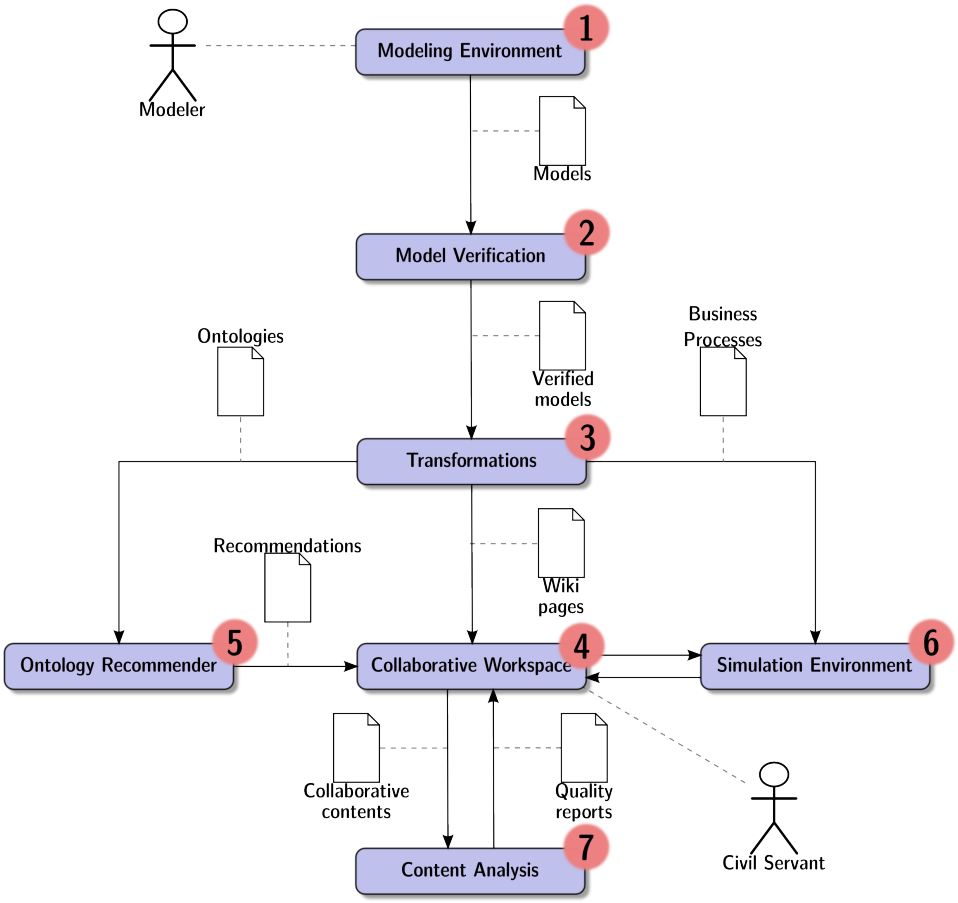


Figure 2.1: Flow view of the Learn PAd platform

Behind the scene The Modeler will work on the Modeling Environment component (see Section 3.2). In Learn PAd, two of these components have been tested: Adoxx from BOC, and MagicDraw from No Magic. Both these softwares have implemented specific meta-models for Business Process, Organization Structure, Documents and Knowledge, Competencies, Case Management, KPI, Motivations. On top of that, they also include a weaving meta-model that links all these meta-models together.

2.3.2. Publishing the models

Once the models has been finalized, the Modeler will publish them in order to make them accessible to the Learners.

Behind the scene Once the Modeler decide to publish the models, the Modeling Environment component (see Section 3.2) will push the models toward the Learn PAd Core Platform component (see Section 3.1). The Learn PAd Core Platform component (see Section 3.1) will have to check the models then import them into the other components (more details about these processes in the next sections).

2.3.3. Verification of the models

When the Modeler is publishing the models, the Learn PAd Platform may reject them because of errors. In fact, the Learn PAd Platform will run a list of automatic verifications to check the consistency of models.

Behind the scene In the Learn PAd Platform, a Model Verification component (see Section 3.7) is in charge of formal verifications of the models. It will provide help to the Modeler by spotting errors and providing warnings. Once Learn PAd Core Platform component (see Section 3.1) has check that models don't contain errors, it will pushed them towards other component of the Learn PAd Platform, mainly Collaborative Workspace component (see Section 3.3), Ontology Recommender component (see Section 3.5) and Simulation Environment component (see Section 3.6) (more details on these component in the following sections).

2.3.4. Resolve feedbacks

Civil Servants may spot inconsistencies in the models. In this case, they'll fill a feedback intended for the Modeler. When starting his modeling tool, the Modeler will see these feedbacks, he will either fix them or reject them, then publish the new model toward the Learn PAd Platform.

Behind the scene Civil Servants can fill a feedback from the Collaborative Workspace component (see Section 3.3). The Modeling Environment component (see Section 3.2) will ask feedback to the Learn PAd Core Platform component (see Section 3.1) which will gather them from the Collaborative Workspace component (see Section 3.3). Once the Modeler has modified and fixed the models, then the publish procedure will be the same as already described in Section 2.3.2. See also Section 2.4.5 for how Civil Servants are creating feedbacks in the Collaborative Workspace component (see Section 3.3).

2.4. Learner use cases

2.4.1. Discover a new process

At some point, a Learner will want to learn about a new process from the Public Administration. Once the Learner is logged onto the Learn PAd Platform, he'll see a list of the available processes on his dashboard. He'll be able to navigate through the process, going forward and backward in the series of activities of the process and all of the contextual information linked to this process.

Behind the scene The models are imported into the Collaborative Workspace component (see Section 3.3) which is wiki-based. When the Learn PAd Core Platform is pushing models towards the Collaborative Workspace component (see Section 3.3), the models are transformed into wiki pages by a Transformations component (see Section 3.4): each element of the model is becoming a structured wiki page. Once the models have been imported into the Collaborative Workspace component (see Section 3.3), the Learner can navigate through the models directly in the wiki.

2.4.2. Getting recommendations

In order to improve the learning experience of the Learner, the wiki will also display recommendations to the Learner as he browses through the models in the wiki. Recommendations could be about people to get help from, existing example that could help to understand the process, multimedia materials, etc.

Behind the scene In the Learn PAd Platform, the Ontology Recommender component (see Section 3.5) is able to give recommendations based on contextual information from the browsing of the Learner. For example, information about who he is and what he's looking at could be used to suggest colleagues that may help him on this particular activity of the learned process. In order to infer recommendations from the contextual informations, Ontology Recommender component (see Section 3.5) is transforming models into an ontology through a Transformations component (see Section 3.4).

2.4.3. Collaborate to the documentation

At some point, the Learner will get experience on the process and may point out the weaknesses of the documentation. Looking at a particular activity in the process, he'd like to complete with some pertinent information. He can create a new document which will be linked to this specific activity of the process, and write, based on his experience, new content that could help other Learners. Note that everybody is able to collaborate so the documentation of the Learn PAd Platform is not only tight to the Modeler but also to the collaboration of every Civil Servant in the Public Administration.

Behind the scene In the Collaborative Workspace component (see Section 3.3), each wiki page will display a possibility to create a collaborative content attached to this page. The collaborative content will create a new wiki page that will be editable by any Civil Servant willing to improve the documentation.

2.4.4. Reviewing collaborative content

Collaborative contents give the ability to Civil Servants to cooperate in the improvement of the documentation of the processes. Learn PAd Platform will execute automatic text verifications in order to improve the quality of the produces content. The results of these executions will be shown to an experienced Civil Servant who may improve the collaborative content accordingly or reject the propositions.

Behind the scene Learn PAd Platform provides a Content Analysis component (see Section 3.8) which is able to run semantic analysis on the textual content and detects text vagueness. A specific Graphical User Interface provide a review workflow inside the wiki, only available to Civil Servant experienced on the given process.

2.4.5. Formulate a feedback to Modelers

Even if Learners can improve documentation with these collaborative content (see previous section), it's also possible they think there is a mistake in the model and would like to contact the Modeler in order to fix it. Like collaborative content, each wiki page is providing the functionality to write a feedback

directly to the Modeler. Usually, these functionality will be restricted to any experienced Civil Servant on the concerned process.

Behind the scene Based on the role of the user, his experience of the process, he will or not be able to propose a feedback to Modelers. When the Modeler will start his modeling tool, the Modeling Environment component (see Section 3.2) will ask Learn PAd Core Platform about any new feedback to display to the Modeler.

2.4.6. Simulate a process

Learn PAd Platform provides a way to run a process which is very efficient way to learn. The Learner will be teached by simulating a process with simulated data; he'll be able to execute the activities of the process, do his own mistakes.

Behind the scene From the Collaborative Workspace component (see Section 3.3), the Learner will be able to access a simulation of the process. The process is simulated by the Simulation Environment component (see Section 3.6), which provides its own Graphical User Interface embedded into the wiki. The Simulation Environment component (see Section 3.6) uses documents and data in order to execute a full process. During the simulation, two things are happening:

- the context of the simulation (who, what is currently simulated, what are the data, etc.) is sent to the Ontology Recommender component (see Section 3.5) in order to provide real-time recommendations to the Leaner during the simulation
- the Learner will be monitored during the simulation (time of achievement, number of successes and errors, etc.) by the Monitoring Component which is part of the Simulation Environment component (see Section 3.6)

2.5. Demonstrators in the Learn PAd Project

European Project Budget Reporting (EPBR)

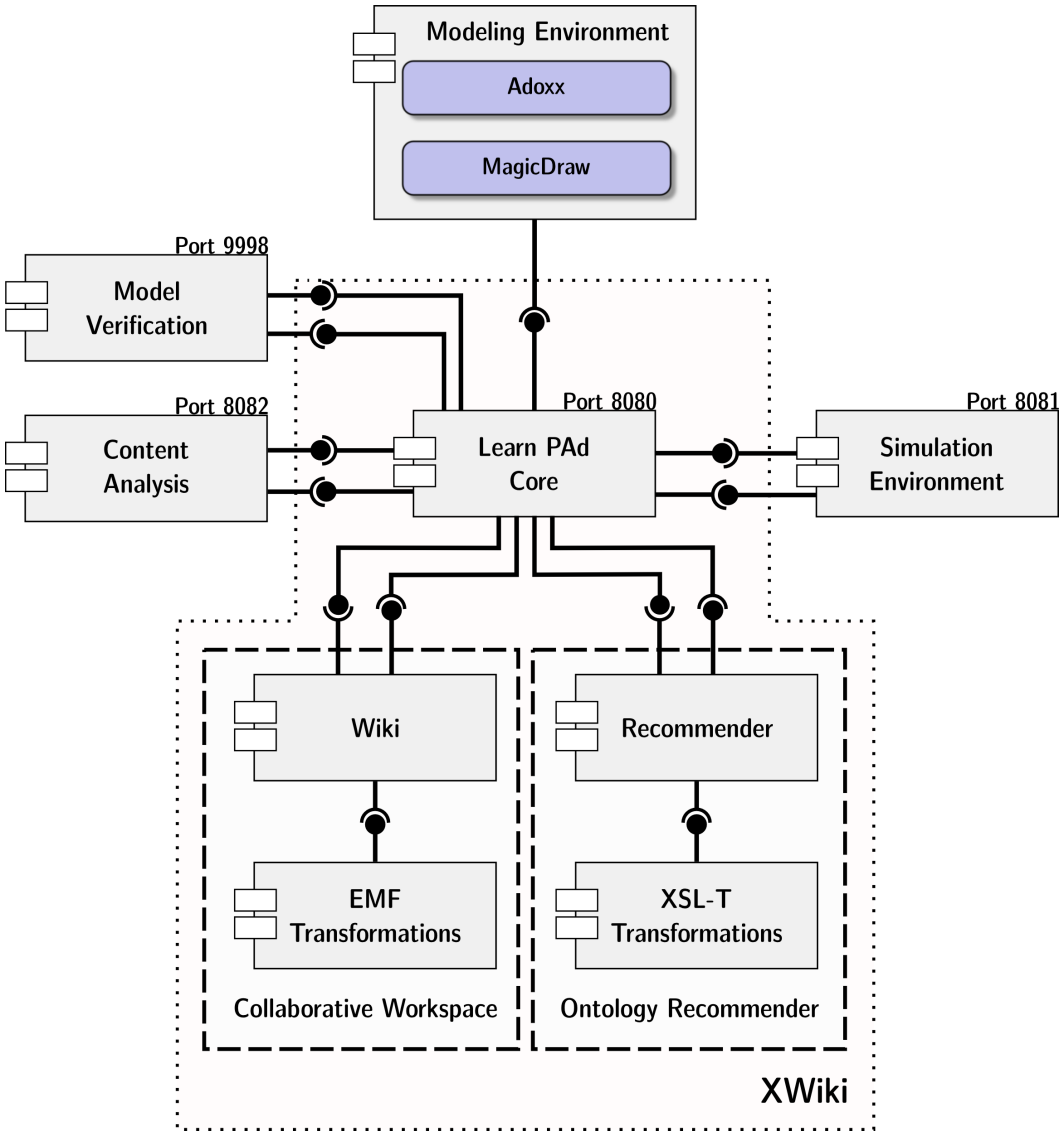
EPBR refers to the activities that a public research body has to put in place in order to manage the administrative procedures related to the participation to a European Research Project. It regards the definition of models and documentation for a business process that does not cross the border of a single organization. The EPBR demonstrator is developed and run within the Administrative Departments of the University of Camerino.

Sportello Unico Attività Produttive (SUAP)

SUAP refers to the activities that the Italian Public Administrations have to put in place in order to permit to entrepreneurs to set up a new company. It refers to a more complex interorganizational BP scenario involving many PAs. The SUAP demonstrator is developed and run with the contribution from Regione Marche.

3 Learn PAd platform: solutions and technologies

In the previous section, we explained what were the functionalities of the Learn PAd Platform and how the users were interacting with it. Several different components are implied in these processes. This section presents the different components of the Learn PAd platform. This component view shows which are the implemented components and how they are connected to each other into the Learn PAd platform.



3.1. Learn PAd Core

Description Learn PAd platform has been designed as modular as possible. Everything is plugged onto this Learn PAd Core component. 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 component 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.

Provided services

- Orchestrator for inter-component communications
- Storage system for the Learn PAd Platform[1]

Technologies

Java for platform server development

Jax-RS/Restlet Framework to implement REST services

Jax-B Framework to serialize Java class to XML

Component Manager XWiki library for a component-oriented architecture

Jetty Platform webserver

3.2. Modeling Environment

Description The Modeling Environment is the subsystem in which the *modeler* creates and modifies models based on the Learn PAd Modelling Method. The latter is used for configuring the functionalities/workspace provided to the *civil servants*. This subsystem is a stand-alone application that can run on an independent server/host; it is used for modeling but once used in principle could be shutdown. However, the Learn PAd Core component is assumed to be always online. Therefore, communication between these two components are always a one way communication: the Modeling Environment component sends or asks information to the Learn PAd Core component.

The format Modeling Environment component is pushing toward the Learn PAd platform is a ZIP archive (files `*.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:BPMN 2.0]

Provided services

- Modelling models of content for Civil Servants
- Modelling models for configuring Collaborative Workspace

[1] Note that each component may also have its own storage system.

- Importing / Exporting Model Content in different formats: ABL, BPMN DI, XML, Image (PNG, JPEG, Bitmap), Image Maps
- Enriching models with semantic lifting, using concepts defined in ontologies (in RDF format)
- Retrieving Feedbacks and Patches from Collaborative Workspace and updating Model Content accordingly
- Tracking Changes made by other modelers or caused by feedback and patches coming from Collaborative Workspace
- People-like-view to provide non-experts with a more intuitive representation of business process models
- Bar-display-view for a structured view for model content readers

Technologies

ADOxx® Development Platform using ALL language for realizing Learn PAd meta-model

ADOScript/JAVA/XSLT to develop model transformation mechanisms and algorithms, such as semantic lifting, transforming and exporting model sets into Core Platform, retrieving feedback and patches from Collaborative Workspace

3.3. Collaborative Workspace

Description The Collaborative Workspace is divided into two main components. Since the Learn PAd Core component is not doing any transformation on the files (Learn PAd Core component is more like a router), the Collaborative Workspace component is getting raw files. Therefore, the Wiki component is downloading the raw files from the Learn PAd Core component, then use an EMF Transformation component (see Section 3.4) to transform models into wiki pages.

The Wiki component is the most important part of the Collaborative Workspace component. The Graphical User Interface will display models. Wiki component will download models, ask for transformation, and import the resulting wiki pages from the transformation.

Provided services

- Graphical User Interface for Civil Servants
- Embedding simulation in the Graphical User Interface
- Provide widget for recommendations to the Civil Servants

Technologies

Velocity/Groovy Scripting languages for server-side rendering in the wiki

HTML5 Web technologies for interactive applications in the wiki

Bootstrap for client-side web interface design

Java for platform server development

3.4. Transformations

Description The models respectively, produced by the ADOxx, and Magic Draw Modelling Environment are transformed to the corresponding Wiki pages by means of techniques and tools provided by the Eclipse Modeling Framework (EMF). Such models, describe the same business process, and are not directly comparable due to the different standard representation. The artifacts are normalize by means of a transformational architecture which provide an Ecore representation for them and bridge the abstraction distance between the Learn Pad models and the wiki structures. The architecture performs several operations, among them:

- a model-to-model transformation
- a model-to-code transformation in order to produce the XWiki structure which are sent to the Wiki component.

Provided services

- Pre-processing of models for preparation to EMF parsing
- Transformation of models from one meta-model to another one
- Serialization of model

Technologies

EMF (Eclipse Modeling Framework) is a modeling framework and code generation facility for building tools and other applications based on a structured data model

ATL (Atlas Transformation Language) is a model-to-model transformation engine where a source model is translated into a target model Mb according to a transformation definition

Acceleo is a model-to-code transformation engine that produce the code according to a template-based rules

3.5. Ontology Recommender

Description The ontology recommender component provides a combined ontology representation of the Learn PAd meta models, models and their relationship. All models from the modelling environments can be transformed into instances of the platform independent meta models (LPIMM) represented by specific ontologies for BPMN, BMM, KPI's etc. With rules the associations to the conceptual models (LCIMM) are inferred and recommendations of experts, learning objects and learning material are provided in a context-sensitive and personalized manner. The integrated case based reasoning (CBR) component suggests similar cases to learn from past experiences.

Provided services

- Modelset transformations: A new set of models from the modelling environment is transformed and stored in the ontology as instances
- Context based expert recommendations (ex. performers most often executed a task, officers with same role in another organisation unit, etc.)
- Recommendation of learning material supporting learner to reach next level of competency (derived from learners acquired competencies and the required competencies given by the role or organisational targets)
- Retrieval of past cases and knowledge (experiences) to learn how to treat a similar new case

Technologies

RDF/RDFS/OWL Ontology languages used to model and represent knowledge of Learn PAd[2]

SPARQL W3C recommendation and query language for RDF applied to query the ontology for recommendations[3]

SPIN Inferencing rules language based on SPARQL and applied to inference associations from the imported models and the conceptual enterprise model[4]

ArchiMEO Extended enterprises ontology representing mainly the OMG Archimate enterprise architecture plus additional enterprise concepts

XSLT Used to transform model set exports from XML into instances of the platform independent meta model[5]

ICEBERG An ontology based CBR component with an annotation based configuration developed by the FHNW

3.6. Simulation Environment

Description The simulation framework provides the subsystem where learners can simulate Business Processes interactively and is used by one or multiple civil servant(s) in order to learn processes. It proposes a simulation platform providing a flexible and interoperable simulation environment with support for collaboration. The simulation engine supports both the software emulation of the involved parties, and the provisioning of dedicated means for gathering learners willing to train on the business process by interacting with other learners. The infrastructure also includes monitoring feature providing feedbacks for the evaluation of learners, business processes, and associated learning contents.

Provided services

- BPMN process simulation session management, in single-user, collaborative, or mixed modes
- graphical interface for interacting with a simulation session
- Automated tasks verification and validation
- Simulation sessions dynamic monitoring via events notifications

Technologies

Java for simulator server development

Activiti engine for BPMN execution

Jetty for simulator webserver

Resteasy for REST API creation and consumption

Jackson for object/json conversion between client and server

HTML5 for client-side web interface

[2] https://www.w3.org/TR/2004/REC-owl-ref-20040210/
[3] http://www.w3.org/TR/rdf-sparql-query/
[4] http://spinrdf.org/
[5] https://www.w3.org/TR/xslt20/

Bootstrap for client-side web interface design

JSON form for client-side form generation

Glimpse for monitoring messages processing

ActiveMQ for monitoring messages dispatch

3.7. Model Verification

Description The Model Verification component is in charge of verifying correctness of models with respect to relevant structural properties such as deadlock and livelock. The components applying well studied reachability analysis algorithms permits to assess the models also with respect to model related properties. In particular the component includes a plug-in based architecture that permit to add new properties according to different model domains. The component in case a issue on the model is identified returns back a clear description of the problem to be presented to the modeler.

Provided services

- Model verification service
- Verified properties extension

Technologies

JavaEE platform as base programming framework.

JAX-RS technology used to define the REST service interfaces

JAX-B Framework in order to manage XML input/output of the services

Grizzly server used to deploy the services

Apache common exec framework managing the execution of the external model checker LOLA

LOLA (Low Level PetriNet Analyser) model checker in order to perform formal verification of LTL/CTL properties over a petri net

3.8. Content Analysis

Description The Content Analysis component is a Web application with a REst interface, to analise natural language content according to six quality criteria (Correctness, Presentation Clarity, Completeness, Simplicity, Non Ambiguity and Content Clarity). Given a text, produced by civil servants and content managers, the component checks for language defects and, for each defect, returns the defective part of the text, together with a suggestion for improvement.

Provided services

- Detection of textual defects concerning Correctness, Presentation Clarity, Completeness, Simplicity, Non Ambiguity and Content Clarity
- Suggestion for defects removal

Technologies

LanguageTool a class library used to check the Correctness of a sentence, in terms of grammar.

GATE a class library implemented in Java for processing natural language. It is used to check Simplicity, Non Ambiguity and Content Clarity.

JSOUP a Java library for working with HTML. It is used to parse HTML Content for the Presentation Clarity and Completeness.

4 Working with the Learn PAd Platform

The Learn PAd Platform is structured as a collection of several abstract components whose interaction provides the functionality of the overall platform. The implementation of the Learn PAd Platform follows the principles of the Service Oriented Architecture; such principles foster different and independent development of implementations for any abstract component.

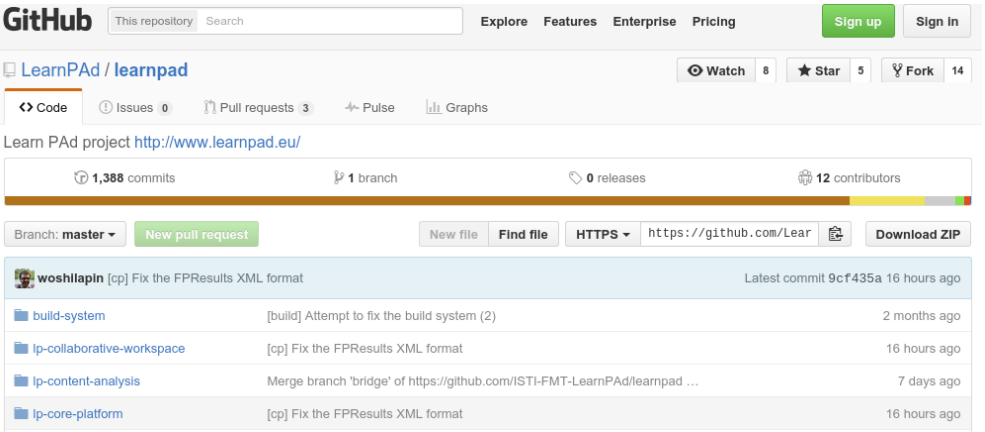
The Learn PAd project provides a reference implementation for the components presented in Chapter 2, and it distinguishes between two major types of software development projects:

- implementation of research findings on process-oriented and collaborative learning mainly in form of open source software development projects;
- implementation of research findings on process-oriented learning modelling and assessment mainly in form of configuration, adaptation, extensions and add-on implementation of existing commercial software solutions.

4.1. Open-Source Projects

All source code, configurations, and documentations concerning the implementation of the open-source reference implementations in the Learn PAd Platform reside in the public GitHub repository: `https://github.com/LearnPAd/`.

Users willing to adopt any of the open-source components in the platform can download the latest snapshot from GitHub at: `https://github.com/LearnPAd/learnpad/archive/master.zip`. Developers willing to contribute to any open-source component can get their own copy of the repository (known as `fork`) and propose new functionality or bug fixes using GitHub pull requests[1].



In the following it is reported how to get, to build, and to run the Learn PAd platform from the source files under a linux-like operating system.

Get the Sources and Build the Platform

The first action required is to locally clone the Learn PAd repository form GitHub:

[1] See `https://guides.github.com` for more information about forking and the GitHub workflow.

```
git clone https://github.com/LearnPAd/learnpad.git
```

The reference implementation for each open-source component in the Learn PAd Platform is released in an independent directory. The configuration file `.components` is responsible to enable and exchange possible alternative components implementation in the platform. The build of the platform can be triggered by running the build script in the root directory of the project.

```
./build
```

Run the Platform

After the build, an instance of the Learn PAd Platform will exist in the directory `lp-platform`. In order to launch it, the following command should be run from a terminal:

```
bash launch start
```

Once an instance of the Learn PAd platform is started, it will be accessible on your local machine at `http://localhost:8080`. The running instance of the platform can be stopped by launching command:

```
bash launch stop
```

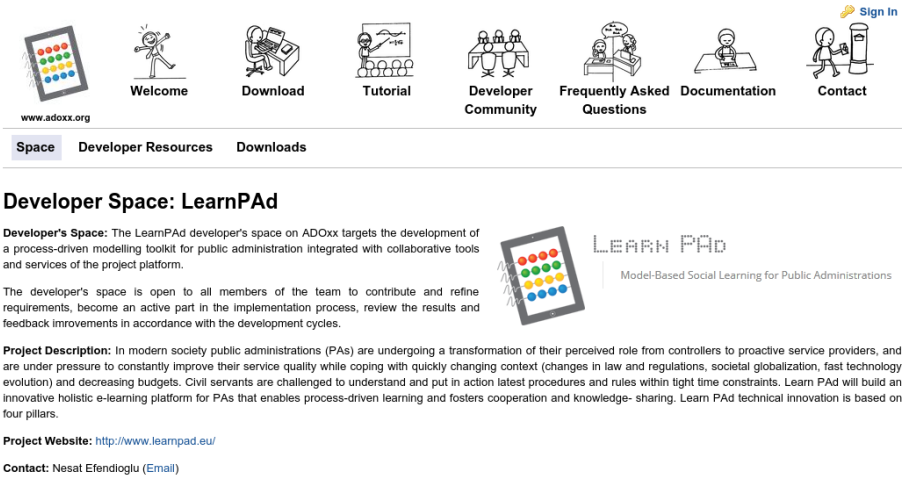
4.2. Closed-Source Projects

Closed-Source Projects include the development of new features, or configurations for existing and commercial Modelling Tools dealing with notations such as Business Process, Organizational Models, Learning Scorecard or all the other models types adopted in the Learn PAd project.

Closed-Source reference implementations of the components strongly depend on both the nature of the development environment, and the software platform they are build upon. The integration with the others components (either open-source or closed-source) take place by means of the implementation of public interfaces accessible *as-a-service* via REST.

4.2.1. The Learn PAd Modeling Environment based on ADOxx®

ADOxx is a commercial meta-modelling development and configuration platform for implementing modelling tools. The ADOxx technology has been used in order to to implement Learn PAd metamodel and its respective modelling environment.



Specifically, the Modelling Method Design Environment Tool enables modellers to design the architecture of a target modelling tools driven by the specification of the envisioned model types.

The Learn PAd Modelling Environment realizes both graphical and textual models for model-based social learning for public administration; and it has been build upon the Modelling Method Design Environment

Tool. Specifically the Learn PAd Modelling Environment provides a collection of model types (e.g. for business process oriented learning, individual training, organizational evolution, etc.) and it implements the Modeller Use Cases described in Section 2.3.

Besides their commercial version, for both the modelling toolkits an open-use version is offered to research, and academic communities. Specifically, the open-use version of Learn PAd Modelling Environment consists of fully implemented Learn PAd Modelling Language, Algorithms, and Modeller Scenarios; also it is fully interoperable with the Learn PAd Core Platform. The open-use versions can be downloaded from http://www.learnpad.eu/, or directly from the Learn PAd Developer Space on ADOxx.org at: https://www.adoxx.org/live/web/learnpad-developer-space/downloads

4.2.2. A DSL engine for MagicDraw® Customization

MagicDraw is a commercial UML modelling tool which includes a Domain Specific Language (DSL) engine supporting the creation of ad-hoc customizations.

The MagicDraw DSL customization engine is able to process user defined rules for DSL elements and to reflect them in both the MagicDraw GUI and the diagrams behaviour. Specifically the DSL engine relies on UML profiles extending the standard UML 2 in order to address specific problem domain.

The customization for Learn PAd is implemented as a UML profile which defines the concepts described in the Learn PAd metamodel. The Learn PAd profile enables MagicDraw as a modelling environment for the Learn PAd Platform.

The latest version of the Learn PAd profile for MagicDraw is available on:

http://www.learnpad.eu/

5 Conclusions

The Learn PAd project has paved the way to an innovative process-oriented approach to life-long learning in a modern knowledge society. The project introduced a Learn PAd platform, which operates on semi-formal models of business processes, organizational structures, documents, and other knowledge items and makes this knowledge available in Wiki pages that enable easy enhancement of textual contents and promote users' collaboration. The Learn PAd platform has been designed, implemented, and validated in two real-world scenarios from Public Administration (PA) domain, which is the focus of Learn PAd project. However, we believe that Learn PAd approach can be usefully applied in any complex organization, which relies on knowledge sharing and cooperation. An interesting future research direction could to be exploit Learn PAd approach and platform in other domains, and investigate their commonalities and differences with respect to the demonstrator scenarios explored in the project.

The challenge of implementing a holistic e-learning platform is huge and the version of the platform developed in research project is only the first step towards fully addressing this challenge. Given the limited time and resources available for the project, we were able to develop only a working prototype. The platform and its components need to be developed further to enhance capabilities, improve usability, and achieve appropriate level of maturity that is required by real-life applications in complex organizations both from PA and other domains. Therefore, the Learn PAd platform has been made available as open source software to enable its sustainability and evolution beyond the scope of Learn PAd project. The readers of the whitepaper are encouraged to download latest builds and source code from Learn PAd repository and join the team of Learn PAd development contributors.

Learn PAd aims to improve individual and collaborative processes and therefore improve overall organization's performance. To really appreciate the usefulness of the proposed approach, one needs to assess organizational learning along a long-term period, and measure improvements not only at individual and process levels but also on the organization level. We leave this as an open task to Learn PAd adopters.

6 The Learn PAd Project in a Nutshell

Fact Sheet

Project Acronym: Learn PAd
Project title: Model-Based Social Learning for Public Administrations
Grant agreement: 619583
Funded under: FP7-ICT (Funding scheme: Collaborative project)
Subprogramme: ICT-2013.8.2 - Technology-enhanced learning

Duration: 30 months
(from February 1, 2014 to July 31, 2016)
Total cost: 3.5 M€
(EC contribution: 2.6 M€)
Total effort: 388 PM

Learn PAd Contacts

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Project website: http://www.learnpad.eu (email: info@learnpad.eu)

Learn PAd Consortium

	CNR	Italy	Public Research Body	Project Coordinator, Formal verification, Monitoring and testing
	BoC	Austria	SME	Business Process Management
LINAGORA	Linagora	France	SME	Business Process Simulation
	NME	Lithuania	SME	Model-based Design
	Regione Marche	Italy	Public Administration	SUAP Demonstrator
n|w	FHNW	Switzerland	University	Information and Knowledge Management, Ontology
UNICAM	University of Camerino	Italy	University	Formal verification, EPM demonstrator
	University of L'Aquila	Italy	University	Metamodelling, MDE
XWIKI	XWIKI	France	SME	Architecture and Integration