

Business Process Oriented Learning: A Collaborative Approach of Organisational Learning

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ABSTRACT

Process Oriented Training and Learning can be applied in two different approaches: (a) processes describing the methodology of training and learning as well as (b) processes describing the organizational context that need to be learned. This paper intrudes the results of the EU project Learn PAd that developed prototypes of modelling tools enabling business processes for learning and training. Flexibility of business processes have been introduced with case management and knowledge artefacts of PROMOTE had been integrated to provide a complete modelling environment fulfilling the identified 101 requirements for the modelling language. The local deployment and the Web-based deployment of the developed prototypes are introduced and the development space that enables collaborative participation of the development and improvement of the prototypes on ADOxx.org is introduced.

CCS Concepts

• Applied computing~Collaborative learning

Keywords

Meta Modelling; Modelling Method Development; Process-Oriented Learning

1. INTRODUCTION

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that are integrated via a Web-based collaboration platform for learning purpose is introduced and some guidelines for the change towards process-oriented learning are highlighted.

Focus of this paper is the business process model, by discussing requirements of the modelling language, required tool support for collaborative learning, knowledge maturity scorecards as assessment framework and integration for flexible case management.

Public results are introduced as form of proof of concept evaluation from the adoxx.org community [3].

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2. APPLICATION SCENARIOS

The following five application scenarios are identified [4].

2.1 Individual training

Individual training is intended to support novices. The assessment of trainings enables much better insights into training demands.

The education of new employees is time consuming, as new employee typically lacks the organizational context. Hence many questions or knowledge gaps are not caused by a concrete task, but are the result of fundamentally missing baseline knowledge of the organization.

In order to support individual training, different learning goals for different skill profiles are defined, so that a learner can continuously improve their own skills through executing the business process.

Learn PAd merges the training and working environments in a business process oriented manner, so that changes to business processes affect both the working environment for the daily tasks and the corresponding training environment.

2.2 Organizational evolution

Organizational evolution presents workforce training requirements following internal and external change factors. Similar to individual training, this process-oriented approach can also be applied to the development of the whole workforce within an organization.

In order to organizationally evolve the business process, learning goals need to define which part of the business process is to be changed, and – by involving skill profiles of team members – analyze how certain skill profiles are to be educated.

In addition to changes in the sequence of a particular process, knowledge of existing business processes can also change. Here the situation is different to individual training as users are very familiar with the process and usually claim that they know exactly what to do. The challenge is therefore to increase sensibility to minor, but important, changes.

2.3 Business process support and reflection

Performance reflection enables clear insights into the actual execution of administrative processes.

By using business processes and their explanatory documents as learning objects forces the public administration to critically reflect the current way of working and enables the detection of error prone parts.

In order to support the performance and reflect on the current business processes, learning goals are defined that indicate which part of the business process needs to be improved.

An honest reflection on business process performance is usually very difficult as employees ideally need to critically reflect on

their daily business within a so-called “failure-culture” in the organization – a culture that appreciates the identification of failures instead of pseudo-blaming some responsible actors.

Even in the case where an organization has a well-established “failure-culture”, performance analysis needs a guiding structure. Business processes are an ideal candidate for such a structure as they enable a step-by-step analysis of daily operations that in total must result in an efficient sequence of activities that achieve organizational goals.

2.4 Process optimization and improvement

Process optimization and improvements are closely linked to performance support and reflection, which rely on the existing competencies of team members.

In order to support continuous improvement and optimization of a business process, learning goals can be used to identify the organizational learning objectives and identify the corresponding measures.

In this scenario the team members use the learning platform as a communication and collaboration portal. Continuous optimization and improvement can therefore lead to an evolution of the business process.

The intention is to use business process based collaborative learning not only for the initial identification of improvements, but also to use those improved processes when performing the aforementioned organizational learning scenario.

2.5 Citizens transparency

This use case is not a traditional training scenario where the staff of a Public Administration is educated and trained, but is an add-on use case with the aim of addressing the citizen that interacts with the Public Administration.

In order to increase transparency for citizens, learning goals are defined that address either the reduction of misunderstandings, incorrect submitted documents or increase appreciation.

Under such special conditions the collaborative, process-oriented training platform can be provided to citizens who interact with the administration.

Of course the process will not be represented in detail, but on a higher abstraction to only point out the relevant decisions for the citizens, as well as only including high level information.

3. MODEL BASED APPROACHES

Applying model-driven design for a particular domain such as e-Learning requires basic observation of domain under observation to create a classification on different model-driven design approaches [1].

To ensure wide applicability of model-driven approaches, system boundaries include related domains and sub-domains of e-Learning [5] such as but not limited to (a) e-Learning, (b) e-Learning 2.0, (c) e-Training, (d) distance education, (e) virtual campus, (f) virtual classroom, (g) Web in class, (h) blended learning, (i) mobile learning or (j) technology enhanced learning.

3.1 Modelling Language Taxonomy

A set of model-driven approaches that are applied in e-Learning structured according to the classification of the e-Learning domain results in Figure 1.

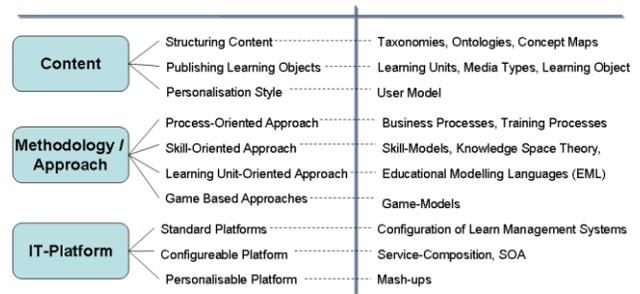


Figure 1 Some Model-driven approaches applied for e-Learning [1]

(1) Model-driven design for content supports the structure of the content, the context, the identification of learning objects, the meta data of reusable learning object repositories or meta information in order to realize personalization.

(2) Model-driven design for methodology and approaches supports processes of different learning paths or courses, individual learner’s paths, skills-oriented approaches, learning unit-oriented approaches or game based approaches for learning.

(3) Model-driven design for IT-Platforms deal with configuration and orchestration of a set of technology for the realisation of e-Learning approaches. Here different levels of configurations can be observed ranging from standard solutions, configurable or orchestrated IT-Platforms till personalize able IT-Platforms.

Using model-driven design for content requires easy human interpretation of models to better browse, search, classify or understand learning units.

3.2 Modelling Language Requirements

In the following the requirements for the modelling language that had been collected – using a collaborative requirement analysis – are listed. Although this list requires additional explanation of each requirement, it is listed here to indicate the basis on which the modelling language had been developed.

For a detailed description of all listed requirements, please refer to D1.1 [6]. and D1.2 [7] of Learn PAd, as they describe the way the requirements had been achieved, list and explain all 365 requirement and observe, which of the 101 requirements related to the modelling language had been targeted and which had been rejected.

The following list in alphabetical order the indicated modelling language requirement names and if it is targeted:

- BP and Content Integration- Targeted
- BP-Model and Contents Iterative Refinement- Partially Targeted
- BP-Model Hierarchical View Derivation- Partially Targeted
- BP-Model Navigation- Targeted
- BP-Model: Feedback on Quality- Targeted
- BP-Modelling Combining Structured and Unstructured Processes- Targeted
- BP-Modelling in Graphical Notation- Partially Targeted
- BP-Modelling Method: BPMN and CMMN- Targeted
- BP-Modelling Method: BPMN usage- Targeted
- BP-Modelling Processing: Automated Validation Check- Partially Targeted
- BP-Modelling Processing: Critical Path Specification- Partially Targeted

- BP-Modelling Processing: Performance monitoring- Targeted
- BP-Modelling Processing: Readiness for Execution- Partially Targeted
- BP-Modelling Processing: Simplified Graphical Representation- Partially Targeted
- BP-Modelling Processing: Track Changes- Partially Targeted
- BP-Modelling Standards- Targeted
- BP-Models: Content references-Targeted
- BP-Models: Different views- Targeted
- BP-Models: Global and Local Views- Partially Targeted
- BP-Models: Role Projection- Targeted
- Business Process Model in Multiple Abstraction Levels- Targeted
- Business Process Model Integration with Business Rules and Motivation, Data and Roles- Targeted
- Business Process Models in Multiple Levels of Detail- Partially Targeted
- Change Reasons Log- Partially Targeted
- Collaboration Mechanisms- Not Targeted
- Content - Semantic Search- Partially Targeted
- Content Document Modelling-Targeted
- Content Governance Based on User Permissions- Partially Targeted
- Content Pattern Mining- Not Targeted
- Content Role Based Views- Partially Targeted
- Content Types- Partially Targeted
- Custom Business Process Metamodel Extensions- Targeted
- Distinction Between Read-Only and Editable Content- Targeted
- Expert Feedback and Knowledge Harvesting- Partially Targeted
- Expert Roster- Partially Targeted
- Expert to Domain Classification- Partially Targeted
- Information Access Authorization Based on Roles and Permissions- Partially Targeted
- KPI-Model: Learning Assessment- Partially Targeted
- KPI-Models to assess Model-Quality- Partially Targeted
- KPI-Models: Quality Metrics- Partially Targeted
- KPI-Models: Scorecard- Partially Targeted
- KPI-Models: Subjective and objective- Targeted
- Learner Profiles- Partially Targeted
- Learners Knowledge Assessment- Partially Targeted
- Learning Categories- Partially Targeted
- Learning Experience Profiling- Targeted
- Learning Goals for Process Model- Targeted
- LearnPAD Meta Model: formalization- Targeted
- Meta Model Evolution- Targeted
- Model Re-use- Partially Targeted
- Process Pattern Mining- Partially Targeted
- Questionnaires for Knowledge Assessment- Partially Targeted
- Roles and Expert Levels- Targeted
- Roles and Profile- Not Targeted
- Roles and Profile- Partially Targeted
- Simplified Graphical Notation- Partially Targeted
- Track Changes: Models- Partially Targeted

Those requirements have been implemented into the modelling language of Learn PAD.

4. MECHANISMS AND ALGORITHMS

The modelling language has been developed following the meta model based approach and is described in detail in D3.2 [8].

Mechanisms and algorithms implement the model value by processing the models and by introducing features for modelling. Some relevant features and their implementation are introduced.

4.1 People Oriented View

Business process models belong to the family of concept models, hence they consist of a graphical representation of concepts, which are often unintuitive to agents from public administration or to citizens. In order to ease the interpretation of business processes, so-called people oriented view has been introduced that enables the switch from a business process in traditional graphical notation to a new graphical notation, where icons graphically describe the nature of the activity. Hence, instead of “blue boxes”, an iconic representation of the action that is described is presented as shown in Figure 2.

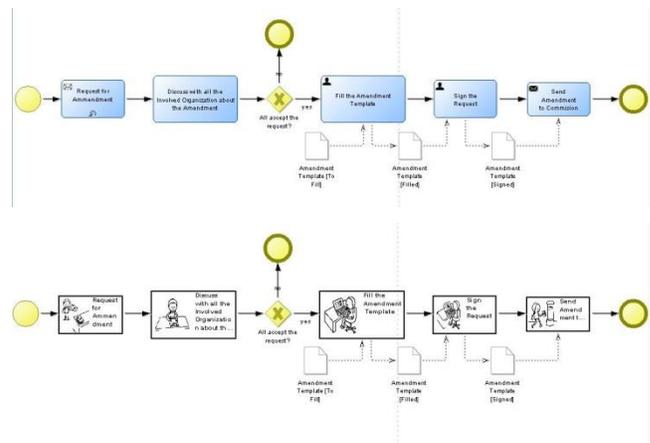


Figure 2 Standard and People-like View of a business process

This is achieved, by a so-called semantic lifting of each concept, hence the relation of a model object with an ontological description. A list of explanatory graphical icons is also annotated to the same ontological description. Hence, when switching into the people-like view, the images that are annotated with the model object are included in the new graphical description.

Current set of graphical description is based on the artefact types in the BPMN 2.0 specification. As the approach is open, other graphics can be included.

A detailed instruction of this feature is described in the Learn PAD development space in ADOxx.org.

4.2 Semantic Lifting of Business Processes

Semantic lifting is a form of a loose coupled model weaving , where concepts of a business process – e.g. a task – is semantically lifted. This semantic lift is implemented by annotating the concept with an ontological concept. Hence, each object in a business process model can optionally be annotated with an ontology concept [9].

There are different forms of semantic lifting, hence three cases that explain the different nature of semantic lifting are explained.

First, the direct lifting within the model is a simple copy / paste of the ontology URI into a generic or specially adapted attribute of the business process object. In this form, no changes in the

modelling languages are necessary, but the usability is low and error prone is high.

The import ontological concept into the modelling tool and the selection of the semantic concepts within one modelling tool – e.g. via the former introduced pointer concept the so-called INTERRREF – has the benefit that all concepts are safely managed in one repository and in one tool. As concept modelling and semantic have differences in the tool handling, it is likely that the ontology is maintained in the separate tool, which raises redundancies, requires replications and raises challenges in maintaining objects in the concept model repository. Therefore this approach is not applicable if the ontology changes, but is required to stay stable.

The third approach is the invocation of an ontology management system out of the modelling environment. Hence, each model object of a business process, can access an interface of an ontology management system and can select one of the concepts, which are then stored in form of the URI in a special annotation attribute.

Finally it has to be mentioned that there are many combinations of the introduced approaches, where the second and third approach is combined to realize also complex scenarios and use the second approach as a pre-selection of stable part and the third approach for the identification of the concrete concept.

A discussion on the different implementations in more detail as well as the necessary development tools can be downloaded from the Learn PAd development space form ADOxx.org[10].

4.3 Business Processes in Collaboration Portals

The graphical representations of business processes is used to simply the introduction of the business process tasks and link the corresponding description and attached document to the graphical representation. Although this form of process documentation is widely known and applied, the use within collaboration portals raises new challenges.

The simple export of graphical representations and model information is typically performed via Web-enabled APIs. In the ADOxx case in form of Web-Services that deliver the (a) table of content, (b) model image, (c) model information and (d) model image map to enable click-able interaction in the Browser.

While user interface technology improves – e.g. Ext JS – the interaction possibilities improve. Former file based interaction, or static Web-API approaches are now exchanged by the attempt to continuously interact with a WIKI portal or realize Widgets that run within different Web-user interfaces.

Traditional Web-Service interaction and creation of WIKI pages can be downloaded from the Learn Pad development space from the ADOxx.org community [11]. The mentioned Widget interaction is currently under development.

5. CONCLUSION AND OUTLOOK

Process Oriented Training and Learning supports two approaches, one where process models are used to describe the teaching and one, where process model are used to describe the organizational context and content.

In Learn PAd the latter approach is applied for civil servants, therefore five application scenarios: (a) individual training, (b) organizational evolution, (c) support and reflection, (d) process optimization and improvements as well as (e) citizens transparency.

In a collaborative requirement collection, about 360 requirements had been selected; from which 101 have influence on the modelling method. Based on the high level reference model for knowledge based systems, two different deployments are currently developed.

The standalone prototype can be downloaded and installed locally, whereas the Web-based prototype can be accessed without installation and used like a SaaS.

Outlook is the integration of the modelling tool into the legacy application, and to interact with a training design tool – like ECAAD – in order to apply a full design oriented learning and training approach.

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