Nom et prénom du coordinateur / coordinator's name	**LAFORCADE Pierre**		
Acronyme / Acronym	**GRAPHIT**		
Titre de la proposition de projet	Élaboration et instrumentation de langages pédagogiques graphiques centrés sur le métier des plate-formes de formation et dirigés vers les besoins des praticiens		
Proposal title	Specification of **GRAPHI**cal Visual Instructional Design Languages centered on LMS languages and directed towards **T**eachers-designers needs and practices		
Comité d'évaluation / Evaluation committee			
Type de recherche / Type of research	✙ Recherche Fondamentale / Basic Research ☐ Recherche Industrielle / Industrial Research ☐ Développement Expérimental / Experimental Development		
Aide totale demandée / Grant requested	157 568,32 €	**Durée de la proposition de projet / Proposal duration**	42 mois

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1. RÉSUME DE LA PROPOSITION DE PROJET / PROPOSAL ABSTRACT

This research project context is about teachers-designers using Learning Management Systems within their academic organizations. Despite all instructional design propositions, the operationalization of learning scenarios into an LMS is still an issue. These practitioners also ask for appropriate tools helping them in understand the underlying "way of thinking and designing" of their LMS. We aim at supporting practitioners to overcome these LMS' obstacles in order to help them in focusing on the design of learning situations. Current proposals rely on a same underlying idea about evolving existent LMS by large add-ons (editors or runtime engines) and new semantics. On the contrary, we suggest to exploit this implicit language in order to allow the elaboration of some external, well-suited and dedicated authoring tools. The main idea of this project is to provide teachers-designers with some graphical *Visual Instructional Design Languages*, and their dedicated editors, taking into account their practices and needs, while ensuring that produced models will be operationalized without major semantics losses into the targeted LMS. We originally propose to develop VIDLs on top of the LMS internal language in order to insure the binding issue and the semantics mapping. To this aim, we will identify and formalize the LMS implicit instructional design language. By only extending LMS with a dedicated communication API, binding issues will be addressed. We propose then to target teachers-designers instructional design needs and practices, capturing into analysis&design patterns,. by developing VIDLs designed on top of the LMSs languages by some *Model-Driven Engineering* and *Domain-Specific Modeling techniques* and tools. The main issue will consist in the proposition of techniques for specifying meta-models both based on the LMS semantics and directed towards the practitioners' one.

2. CONTEXTE, POSITIONNEMENT ET OBJECTIFS DE LA PROPOSITION / CONTEXT, POSITIONNING AND OBJECTIVES OF THE PROPOSAL

2.1. CONTEXTE DE LA PROPOSITION DE PROJET / CONTEXT OF THE PROPOSAL

Since now several decades, *Technology-Enhanced-Learning* (TEL) is an important research thematic and topic introduced in the major multidisciplinary international conferences about intelligent systems, cognitive science for education and training applications (AIED, ITS,...). This growing important topic also have its own dedicated international conferences (ICALT, ECTEL, CSEDU...) as well as French ones (EIAH, TICE).
As mentioned by the ECTEL'10 call for papers, "*the last decade has seen significant investment in terms of effort and resources (time, people, money) in innovating education and training. The time has come to make the bold step from small scale innovation research and -development to larger scale implementation and evaluation. The time has come to show the world*

(government, industry, general population) that we have matured to the stage that sustainable learning and learning practices – both in schools and in industry – can be achieved based upon our work. What not long ago was seen and experienced as a novel technology (Internet and WWW) has become for much of the populace mundane and commonplace (Web 2.0 and social software). What not long ago was expensive and exotic (computers and broadband computer networks) is now inexpensive and ordinary (netbooks and omnipresent wireless). And what in the past was proprietary and inaccessible (information and learning materials) is now generic and open (open educational resources)".

We agree with these statements. Many research productions (models, languages, TEL-environments, etc.) have been produced within confined research contexts and have to be re-thinked, re-designed and adapted to a larger community of practitioners that are daily surrounded of TEL needs and environments but with not enough help for appropriating them. Furthermore, new approaches are required for TEL design, implementation, and use to improve the understanding and communication of educational needs among all stakeholders, ranging from researchers, learners, tutors, educational organizations, companies, TEL industry, and policy makers.

Although TEL is a synergy of multiple disciplines, ranging from Computer Science, Education, Psychology, Cognitive Science, and Social Science, we want to particularly focus on applying and adapting Computer Science solutions for providing practitioners with some customized instructional design solutions.

Indeed, nowadays, *Technology-Enhanced-Learning* environments like the *Open Distant Learning* (ODL) Platforms or *Learning Management System* (LMS), are widely used and are not restricted to intensive and distant learning. Most of academic organizations provide teachers with some similar platforms. Teachers can then use them for improving or completing their face-to-face courses by some additional activities from simple resources access to scheduled communication or online assessments.

In our research context we are particularly interested by practitioners playing both roles of teachers and designers when using LMS within their academic organizations. Becoming experts of their organization distant platform is the only way they have in order to improve their instructional design skills.

During the last years many languages and tools have been designed in order to provide support to the instructional design actors (designers, TEL experts, practitioners, etc.): *Educational Modeling Languages* (EML) [4] for the specification of learning scenarios ensuring interoperability and reusing purposes, dedicated authoring-tools and execution engines / 'players', web educational systems from hypermedia environments to ODL platforms, various techniques and frameworks for operationalizing learning scenarios or other educational models, *Visual Instructional Design Languages* (VIDL) [3] providing diagrammatic notations facilitating communication and thinking for practitioners, etc.

Despite all these potential support, the operationalization of learning scenarios has not reached a mature level for providing e-learning actors with some all-in-one or automatic solutions. They have at their disposal a lot of EMLs/VIDLs and authoring-tools but the operationalization of the produced models within TEL-environments is still an issue and an obstacle to overcome.

Considering the practitioners we are interested about, these tools are also not relevant for them because of their face-to-face teaching/learning culture. The use of instructional design languages and tools from some research projects is too far

from their needs: they ask for appropriate tool (to their personal practices in terms of pedagogy, didactics, HMI...) soundly and user-friendly, those help them in abstracting the LMS they have to use. Without these specific tools practitioners continue to directly use and handle platforms for setting up the pedagogical situations they designed in their mind. There are no support (nor human nor software products) able to help them in expliciting, defining and then specifying their learning situations *before* setting-up it on the LMS. For now, they have to understand the underlying “way of thinking and designing” of these platforms; their implicit *domain-language* which is mainly composed of hidden pedagogical choices, and by so, pedagogical limits or, at least, orientations. They also have to appropriate the various screens and form-based interfaces (*Human-Machine-Interfaces*), to abstract some low-level details to think about the global design of the courses they are setting up, etc.
The global context of our project concerns this point. We aim at helping practitioners to overcome these LMS' obstacles in order to better use and apprehend them, and by extension, to improve the design of learning situations on these specific environments. Because of the lack of adapted solutions, current languages and tools are not available to support practitioners. This issue is firstly social. All academic organizations provide to their teachers some specific TEL-environment that they have often to appropriate by themselves. Flexible and adaptable instructional design tools are an answer to these practitioners needs. Some communities of practices have to be identified, organized and tooled with appropriate and relevant tools. As an example, Le Maine University provides teachers with a MOODLE-based LMS (called UMTice). Appropriated tools and languages for UMTice will help to improve the instructional design skill of practitioners, help them in handling the LMS, and then help them in setting-up better adapted learning situations for improving students' results.

2.2. ÉTAT DE L'ART ET POSITION DE LA PROPOSITION DE PROJET / STATE OF THE ART AND POSITIONNING OF THE PROPOSAL

Facing these issues we have already led a study about current international and national propositions. Most of current approaches aiming at facilitating the design of courses by teachers-designers are focusing on two aspects: the specification of learning scenarios and their binding into a target LMS. The intervention of platform experts is no more indispensable but these approaches require an infrastructure for interacting with the platform and for taking in charge the automatic creation and configuration of the working spaces, as well as the activity performance, starting from a formalized description of the targeted learning situation. Such approaches then require a 'domain language', allowing modeling the learning activities, as well as a 'binding' technique to be machine-readable. These languages have to provide the means of selecting existing Learning Objects and services, and have to manage them according a given learning activity description (the pedagogical scenario). These approaches also require some techniques and tools to support the 'operationalization' step consisting in bridging the gap between the formalized learning situations and their concrete setting-up into dedicated learning environments.

Some all-in-one delivering infrastructures and *Visual Instructional Design Languages* for practitioners, specified and built together (e.g. the LDL language and the LDI runtime infrastructure dedicated to play LDL scenarios [1]) tackle both instructional design and binding activity within a common artifact. Some new products mixing LMS and CMS (Content Management System) also provide all-in-one solution for supporting authoring and delivering activities (for example the Thinking Cap products suits [5]). Nevertheless these solutions cannot help to improve the instructional design by practitioners on non-adapted existent LMS. Also, they are still focusing on a specific instructional design expertise that end-users will have to acquire in order to appropriately use the LMS. They are not directed towards teachers-designers practices and cannot be adapted to them.
Another solution we met is the LAMS approach [11]. At first LAMS was an integrated system for authoring, running and monitoring Learning Designs. The success of its graphical authoring environment leads to some integration into some LMS. But the main inconvenience of LAMS is that it does not focused on activities and resources provided by the LMS language and do not exploit the LMS internal semantics, services and facilities for delivering the visual scenario previously specified: a new runtime engine, dedicated to LAMS semantics is integrated to the LMS. Practitioners have to choose between a usual course and a LAMS one, and cannot mixed both of them. This approach tackles the need of a user-friendly authoring tool but the binding issue is avoided by extending the LMS semantics and delivering abilities rather than exploiting them.
Except these approaches none of the current instructional design propositions concerns direct implementation or operationalization of practitioners-centered learning scenarios on some existent LMS or direct transformations towards equivalent scenarios conformed to some LMS centered languages. Most of practitioners-centered *Educational Modeling Languages* provided these last years are specific *Visual Instructional Design Languages* [3] focusing on supporting imagination, creative thinking, communication, etc. but they do not tackle binding and LMS operationalization issues.
The COLLAGE proposition [2] is interesting because the collaborative design patterns proposed to practitioners have been specified and developed on top of the IMS-LD standard [9]: semantics about concepts/relations transformations have been taken into account when building the patterns; these patterns are so fully-compatible with IMS-LD. The operationalization of COLLAGE models then tackles the problem of operationalizing IMS-LD models. Unfortunately, existing LMSs are still not compatible with this standard [6]. Although CopperCore [6] can be used as an IMS-LD runtime engine, such complex tool is, as far as we know, rarely used or integrated to LMSs.
Moreover, the scenarios specified by Collage, or other editor dedicated to specific EMLs (IMS-LD, LDL, etc.) or VIDLs (E²ML, coUML, PALO, CPM, etc.) do not focus on LMSs languages (ie. the LMSs learning paradigms and features). Also, most of research works that deal with the exportation or transcription of learning scenarios have highlighted the semantic learning design gap that appears when considering learning scenarios concepts and platforms features [7-8]. Such scenarios transcriptions lead to some losses of information from the source scenario or to some incomplete information into the platform transcription (lack of sufficient information from the source model to specify the platform elements at the required level). This conceptual gap between two learning design languages is inherent to the transformation process when both languages have

been elaborated with no reciprocal relations. It is not relevant to produce complex tools to resolve these design and binding issues. Teachers will decline any tools or approaches that are not able to facilitate the course design on their LMS. It seems that current research propositions have not yet reached a level of maturity such as pedagogical engineers or teachers-designers may naturally implement theirs scenarios [10].

Current proposals rely on a same underlying idea about evolving existent LMS by large add-ons (editors or runtime engines) in order to integrate learning design standards or improving the design. Their common position is to evolve the internal learning design logic with some new semantics in order to bridge the gap between them. We do not aim to add new semantics to the domain specific model embedded into the LMS. **We suggest to exploit it in order to build LMS-centered *Visual Instructional Design Languages* (VIDLs), and dedicated *external* authoring tools well-suited for practitioners. The main focus of this project submission is to develop VIDLs directed towards teachers-designers needs and practices but built on top of the LMS internal language in order to insure the operationalization or binding issue.** Before dealing with this ambitious approach, two steps are necessaries: (1) being able to **formalize and expose the LMS internal semantics** about instructional design as a specific import/export format; It will allow the elaboration and development of external but well-suited learning design tools for practitioners; and (2) being able to **formalize and categorize the teachers-designers best practices** and needs.

With regard to the first step, we have already realized some practical experimentations [14]. Indeed, we conducted In 2008 a re-engineering experiment about a specific existent TEL system: the *Apprenticeship Electronic Booklet* (AEB). The aim of this work was to extend its functionalities while improving its ownership and its use. We realized a re-engineering guided by models, in the way that the functional model identified from the multi-role system has been crystallized under the form of a domain meta-model. This functional meta-model was then used as a basis for the development of the external editor. The *Domain Specific Modeling* tools we put into practice made it possible to exploit this meta-model to guide and generate most of the final code for the editor. We have then been able to propose a graphical and external, from the existent Tel system, booklets configuration editor communicating with the system thanks to a dedicated API developed and integrated to the AEB system. First end-users feedbacks highlighted the added-value of the external graphical editor. It sketched the idea that it is possible to offer more user-friendly and soundly computer artifacts when development is freed from the technological choices related to the initial design of the TEL system considered. In consequence, we started in September 2009 a new research thesis work following the *Domain Specific Modeling* approach about a similar re-engineering activity but focusing on *Learning Management Systems* (LMSs). This work aims to help designers in specifying the structural definition, as a first step, for a learning unit in accordance to the Moodle platform. We aim to provide teacher–designers with an external and graphical editor to structure successive prototypes of learning structures. This shall facilitate communication and understanding while ensuring that the resulting scenarios will be compatible with the Moodle LMS. A

dedicated Moodle module will be provided which handles the import of these graphically designed scenarios. If accepted, this JCJC submission will benefit from results of this research work. These results will partially correspond to the first layer of graphical languages we aim to develop directly on top of the LMS languages to explicit.

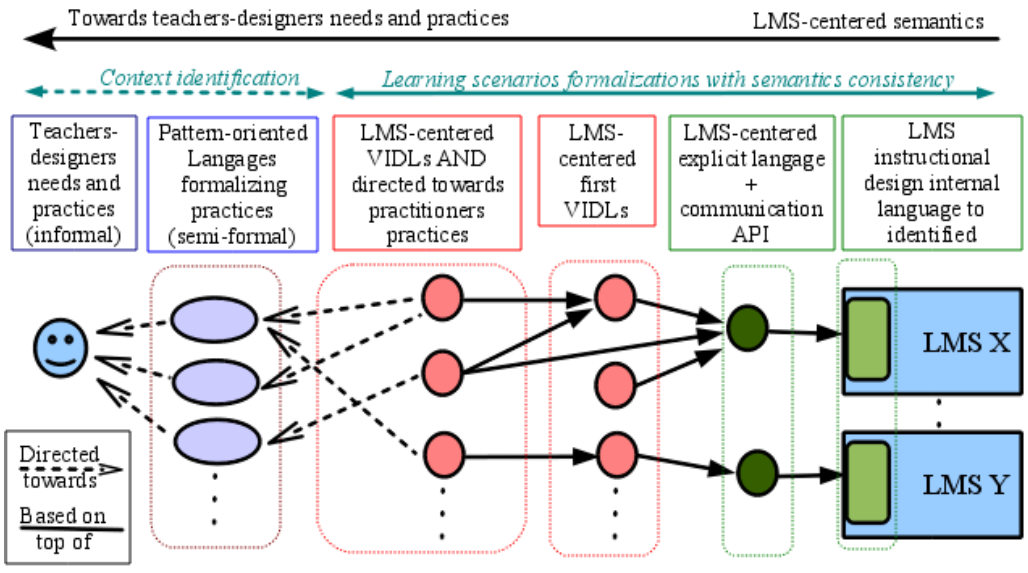
With regard to the second required step, another thesis is starting now (January 2011) about the identification, the co-construction and the explicitation of instructional design practices from different communities of practices using LMSs as complementary means to realize blended learning. This research work also aims at providing these communities with some first-level languages and tools for helping them in defining, at a high abstraction level, the context of the future learning scenarios they would like to deliver using an LMS. An analysis&design patterns language orientation is considered because this approach is well-suited in educational design researches as it is sensitive to complexity and context-dependence [19]. Another important point of this work is focusing on the identification and definition of the underlying process guiding the elicitation of practitioners context for their instructional design needs (objectives, competences, disciplines, learning methods, activities, resources, etc.). Methods and techniques from the Requirements Engineering domain will be studied and applied. This JCJC project will partially benefit from results of this research work; some planned tasks activities will be in relation to this just engaged work.

Concerning our *Visual Instructional Design Languages* (VIDLs) and *Model Driven Engineering* / *Domain Specific Modeling* orientations, this can be justified because of our past experimentations about the elaboration of VIDLs following a DSM methodological approach and about testing some DSM tools from the Eclipse Modeling Project [15]. These tools have been experimented within several projects of different scopes and following practitioners centered viewpoints [16] as well as TEL-centered ones (the AEB research work [14]). The lesson learned about building VIDLs with a DSM approach and tooling have been recently published in a journal [12]. Experiences about transformation models (according to a Model Driven Engineering) between learning scenarios, semantics losses and semantics have also been studied and tested on various case studies and instructional design languages [18;13;7].

2.3. OBJECTIFS ET CARACTÈRE AMBITIEUX ET/OU NOVATEUR DE LA PROPOSITION DE PROJET / OBJECTIVES, ORIGINALITY AND/ OR NOVELTY OF THE PROPOSAL

The main idea of this JCJC submission is to provide teachers-designers with some dedicated means and tools (languages and editors) taking into account their practices and needs, while ensuring that produced models will be operationalized without semantics losses into the targeted *Learning Management System* (LMS) concerned by the community of practitioners. In our mind the languages and dedicated editors are centered on LMSs (binding or operationalization objective and LMS expressiveness objective) but directed towards practitioners' needs (needs and practices identification and formalization objective, and instructional design expressiveness objective).

First of all, our original position and approach consist in assuming that the LMS implicit instructional design language could be identified, formalized and exposed as a self-compliant standard for external tools aiming to communicate with the LMS. By only extending LMS with a dedicated communication API, or import/export interface, binding issues will be addressed (right green parts of the next figure). We propose at the same time to focus, at the opposite way of the instructional design cycle (left parts of the figure), on the teachers-designers needs and practices. The objective concerns their identifications and formalizations by the use of analysis&design pattern-oriented languages.
In a second time, we propose to specify and build VIDLs directly on top of the LMS instructional design language. We think about several VIDLs for a same LMS because two languages can share a same *abstract syntax*, ie. the one identified for the LMS, by providing different *concrete syntaxes* (the visual and graphical notations). This objective is represented by the right-center part of the next figure. Then, we propose to target teachers-designers instructional design needs and practices by developing other VIDLs directly on-top of the LMSs languages or on-top of the very first LMSs-centered VIDLs. The idea is that, in both cases, all VIDLs are by construction centered on the LMS language previously formalized. These layers of VIDLs are the core subject of our proposal (left-center part of the figure). In contrast to current instructional design languages translations that all meet semantics losses and binding issues, we propose to study and experiment some techniques, tools and other means for elaborating top-VIDLs on underlying bottom-ones with syntaxes and semantics relations ensuring that translations will not raises major semantics losses.



The previous figure illustrates the different layers of research work we propose to deal with. This figure is not centered on the underlying practitioners' cycle we propose to support by our future dedicated tools. Briefly, teachers-designers will have at their disposal a pattern-oriented environment that will guide them (by forms-based questions and patterns personalizations for example) in expliciting their learning design context and needs. This tool will end by a customization of some well-suited patterns and by indicators about the most appropriate VIDL(s)

to use to start the learning design of the pedagogical situations. They thus specify the learning scenario thanks to the graphical editors dedicated to the VIDL they choose. Then, they generate an LMS-based machine-readable model of their design. They use the communication API of the LMS they target to use and import the model. Finally, they directly use the LMS to finalize low-level or technical required informations in order to concretely finish and use the LMS part of the learning situation (adding Learning Objects, enroll concrete students, etc.). We also propose to develop our graphical editors and communication APIs in order to allow teachers-designers in using them for adapting the situations they already have imported (round-tripping learning design activity).

Our approach is novel by originally focusing on the LMS semantics and on the proposition of graphical VIDLs that will take into account an automatic translation with no semantics losses and then tackling the binding issue (not tackled by the current approaches centered on the IMS-LD standard or centered on practitioners' language). According to our studies, there are no other solutions or approaches that proposes both a LMS-centered position and an external position from these LMSs to provide some graphical tools. Also, most of instructional design cycles tackles the learning scenarios transformations as transformations from practitioners languages to standard or LMS languages without considering designing constraints and relations between them [20;13]. It always results some semantics losses or lack of informations that prevent the concrete use of these tools by real communities of practices. Our approach intends to propose an original focus on LMS and their pedagogical semantics in order to propose languages that take into account this delimited expressiveness. The idea to design and build visual and graphical languages and notations is a first step about user-friendliness for practitioners appropriations. The idea to build the VIDLs and graphical editors outside to the LMSs is a solution to surpass the intrinsic limits of the considered platforms: technological limits of their underlying programming languages and architecture, HMI restrictions, etc.

From a methodological point of view we propose to follow several Software Engineering domains because of our past an current studies and results highlighting the relevance of these approaches. A *Model-Driven Engineering* (MDE) approach will be used as a theoretical and practical frame for the formalization of the VIDLs, their relations, and the underlying models transformations between the different languages. A more specific *Domain-Specific Modeling* (DSM) approach and tooling will be applied for the elaboration and design of the graphical dimension of these VIDLs and for the assistance for building dedicated authoring-environments. We also propose to focus on Design patterns and Patterns languages to formalize the identified practices and needs of the concerned teachers-designers.

These are briefly the global objectives we aim at deal with according to our methodological choices:

1. To assure binding or operationalization into the targeted LMS for the learning scenarios that will be produced by the VIDLs dedicated editors;
2. To identify and formalize the LMS implicit pedagogical language;

3. To identify and formalize needs and practices from the teachers-designers of the UMtice community with some engineering requirements techniques and patterns-oriented languages;
4. To propose concrete first VIDLs (and dedicated editors) built on top of the explicit and formalized LMS language with some DSM techniques;
5. To propose concrete second VIDLs (and dedicated editors) built on top of the first-layer VIDLs or also directly related to the explicit and formalized LMS language;
6. To propose models transformations with no semantics losses from a top VIDL-based learning scenario to a new one conformed to a bottom VIDL or directly in conformance with the LMS language;
7. To guide practitioners, with the help of design-patterns in conformance with the identified language, to contextualize and sketch the learning situation they are interested in, in order to choose the most appropriate VIDL to use for specifying their learning scenarios.

From our past and current research works in relation to this proposal we have highlighted the following issues we will have to tackle and/or overcome in order to reach our objectives (some of them are in relation to our MDE/DSM methodological approach, other ones are in linked to validation issues).

- limits of the meta-modeling (for formalizing the abstract syntaxes of VIDLs) and visual notations (for the concrete syntaxes of VIDLs) expressiveness when they are built on top of the expressiveness of the LMS internal semantics;
- limits of the automatic translation of models from one VIDL to another one with no semantic losses about informations to bind to the LMS;
- limits of relations possibilities and expressiveness between two VIDLs;
- added-value for a teacher-designer to have at his disposal some external editors from the LMS even if they favor designing/reflexion/collaboration;
- limits of using context-sensitive design-patterns to help and guide teachers-designers in choosing the most relevant VIDLs according to their needs;
- investment cost, programming effort required when following a DSM approach and tooling;
- expertise level required for practitioners handling our future editors and tools;
- user-friendliness, appropriation, uses and other validation aspects of propositions by the targeted communities.

The main scientific result expected is about the proposition of MDE methods and techniques allowing to design meta-models on top of other ones while guiding the specification of their semantics relationships into meta-models transformation rules. Indeed, this point is at the intersection of MDE and instructional design domains, and has never been addressed or tackled, as proposed, by other research works. Also, the elaboration of VIDLs with some DSM techniques and tools is a concrete approach very promising and interesting for the VIDLs community. Indeed, one rarely tackled point of research works about VIDLs is the machine-readability and exploitation of specified models. Nevertheless we really think that the targeted objectives are reachable given our current results and the ANR support we ask for.

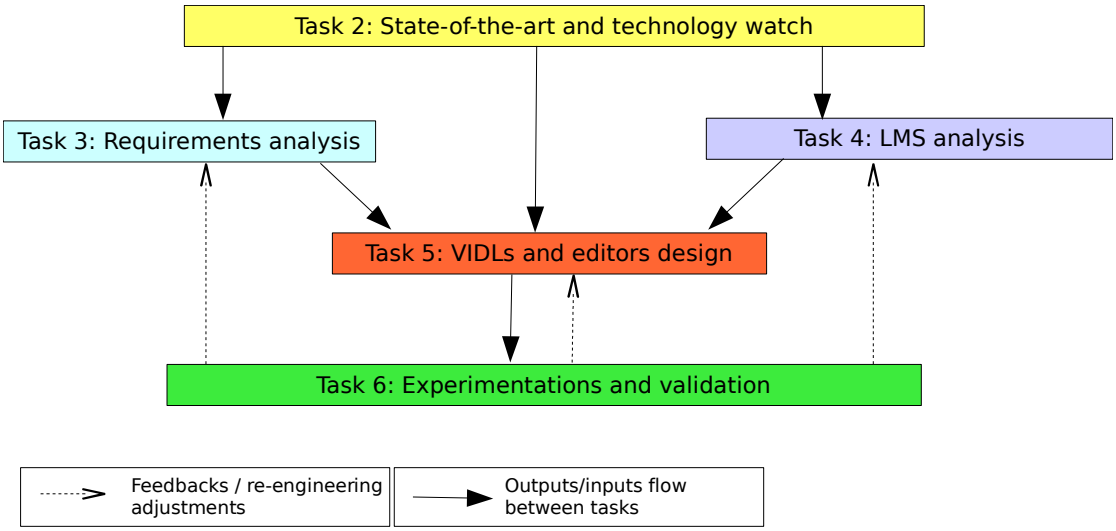
The most important expected product can be considered as the specific instructional design tooling we aim to produce. It will embeds several graphical editors, a design-pattern oriented authoring-tool, and some transformation rules and services included to the VIDLs editors to automatize the learning scenarios translations, and a communication API for operationalizing the learning situations.

The focus on the elaboration of these *Visual Instructional Design Languages* (VIDLs) is one of the central thematic points we aim to develop as a future expertise. Another central points for which we aim to improve our expertise concerns the *Model Driven Engineering* and *Domain Specific Modeling* techniques and tools. Although this JCJC proposition relies on past and present research works and results we hope that its acceptance will allow us to tackle issues identified by the VIDL community (notation systems for instructional design, Visual design applications and editing/authoring tools, Computational modeling in VIDLs, Pattern-based visual instructional design, Meta-models for VIDLs, etc.) and will let us propose some original contributions. Also, although this JCJC proposition shares some thematics and research topics already dealt within our Lab team, it stands out by its strong position centered on LMSs (a specific TEL-environment), its original "*from-LMS-to-practitioners*" approach, its strong VIDL object-of-study, and its large use of software engineering methods, and techniques as methodological tools to apply.

3. PROGRAMME SCIENTIFIQUE ET TECHNIQUE, ORGANISATION DE LA PROPOSITION DE PROJET / SCIENTIFIC AND TECHNICAL PROGRAMME, PROPOSAL ORGANISATION

3.1. PROGRAMME SCIENTIFIQUE ET STRUCTURATION DE LA PROPOSITION DE PROJET/ SCIENTIFIC PROGRAMME, PROPOSAL STRUCTURE

We propose to explain our global scientific plan by the next figure.



The proposed research can be divided into 5 main parts corresponding to tasks 2 to 6 (the task 1 is the project management).
The task 2 gathers the state-of-the-art studies and technology watch strategies required by the other tasks.
The task 3 is about the identification and formalization of teachers-designers needs and practices from different communities of practices and with a specific focus to different pedagogical approaches. It tackles the objectives 3 and 6 defined within the previous section.
The task 4 is about the identification and formalization of LMSs internal languages about instructional design as well as the proposition of a binding/operationalization solutions. Objectives 1 and 2 will be tackled here.
The task 5 is about the elaboration and specification of VIDLs and dedicated editors. These VIDLs will be designed following MDE and DSM techniques in order to be related to and built on top of an LMS language or other LMS-centered VIDLs. Transformation techniques and tools will be developed within this task. Thus, objectives 4 and 5 will be tackled.
The task 6 gathers the experimentations works to conduct with some practitioners in order to test, verify and validate the propositions from tasks 3, 4 and 5.
The plain arrows indicate that a task offers some outputs results as inputs for the targeted task. We thus draw that analysis and propositions activities from tasks 3, 4 and 5 will use the state-of-the-art results from task 2. Also, the central task 5 will use the design-patterns resulting from task 3 as an input. The same task 5 will exploit LMSs languages formalizations from task 4. Then, tools / editors / binding module from tasks 3, 4 and 5 will be tested within the task 6. These arrows also highlights the tasks dependencies (by considering the inverse arrows directions).
The dashed arrows precise feedbacks or other qualitative/quantitative results from experimentations that will impact some tasks (3, 4 and 5), potentially requiring some modifications on the propositions (methods, models...) as well as requiring re-engineering activities in order to improve the tooling (user-friendliness, concrete syntaxes adjustments, etc.).

It is also important to remind that results from an already engaged (second year) thesis should provide the task 2 and 4 with some first results about a specific LMS. Also, another thesis currently starting (January 2011) should produce during the second year of this JCJC project, if accepted, some research reports and first results about the analysis&design patterns-oriented formalization for teachers-designers practices (tasks 2 and 3). The task 5 is the core part of this JCJC project because of its original position centered on LMS languages to provide some practitioners-directed VIDLs. The largest expected efforts and results (in terms of studies, original propositions, tooling, valorisation) will relies on the research activity of this task.

3.2. DESCRIPTION DES TRAVAUX PAR TÂCHE / DESCRIPTION BY TASK

3.2.1 TÂCHE 1 / TASK 1 : PROJECT MANAGEMENT

OBJECTIVES/SUCCESS CRITERION

This task will essentially consist in organizing the exchanges and consultations between the various participants involved, as well as in following the research activities in order to insure the respect of the deadlines and the deliverables productions

PARTICIPANT

P.Laforcade

DETAILED DESCRIPTION

- It will be provided to participants a project management web application (eg. the *Redmine* application).
- Regular meetings will be organized (and more important for each milestone) for fostering communication and exchange between partners. Annual and semi annual activity reports will be produced.
- A particular attention will be focused on the advance of the project and the calendar respect by identifying risks and piloting the integration and the articulation of the different tasks.
- Scientific disseminations will be proposed during the project realization, involving the various participants.

DELIVERABLES

- D1.1: the project management web application. This should be operational at M1.
- D1.2: Milestones reports

METHODOLOGICAL ASPECTS / TECHNICAL CHOICES

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RISKS / OTHER SOLUTION

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3.2.2 TÂCHE 2 / TASK 2: STATE-OF-THE-ART AND TECHNOLOGY WATCH

OBJECTIVES/SUCCESS CRITERION

This task gathers the state-of-the-art studies and technology watch strategies required by the other tasks

PARTICIPANTS

P.Laforcade (PL), L. Oubahssi (LO), C. Piau-Toffolon (CPT), Post-Doc, J.-P. Clayer (JPC), C. Choquet (CC)

DETAILED DESCRIPTION AND PARTICIPANTS CONTRIBUTIONS

- State-of-the-art of current Requirements Engineering methods, techniques and tools in the Software Engineering domains as well as their existent applications in the TEL area (CPT, JPC)
- Study of existing community of practices of teachers-designers using a same LMS (at *minima* 2) (LO, CPT, JPC)
- Study of some existent pedagogical approaches (at *minima* 2) (CPT, PL)
- State-of-the-art about current patterns-oriented formalizations for capturing practitioners needs and practices within TEL-environments (CPT, JPC, CC)
- Study of the functional, technical and others aspects (HMI, Databases...) from different LMSs (at *minima* 4), and technology watch of their evolutions, with a specific focus on instructional design facets (LO)
- State-of-the-art of current VIDLs and current graphical editors for instructional design purposes (PL, PostDoc)
- Study of MDE/DSM techniques and tools about models transformation, metamodel weaving and composition, templates, aspects (PL, PostDoc)

DELIVERABLES

- D2.1: Report about Requirements Engineering means and their applications to TEL domains
- D2.2: Report on LMS-centered communities of practices
- D2.3: Report on some detailed pedagogical approaches
- D2.4: Report on patterns-oriented TEL propositions
- D2.5: Report on instructional design LMS aspects and comparisons
- D2.6: Report on VIDLs and graphical editors
- D2.7: Report on MDE and DSM techniques& tools relevant for our purposes

METHODOLOGICAL ASPECTS / TECHNICAL CHOICES

According to our context position and methodological choices, this task will focus on requirements engineering, patterns-oriented languages, LMS, MDE and DSM orientations, and about VIDLs as specific Educational modeling languages.

RISKS / OTHER SOLUTION

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3.2.3 TÂCHE 3 / TASK 3 : REQUIREMENTS ANALYSIS

OBJECTIVES/SUCCESS CRITERION

This task is teachers-designers centered. Its main aim is to identify and formalize teachers-designers practices and needs with some analysis&design patterns. Requirements engineering methods and techniques could be applied to this aim. A dedicated tool for helping practitioners, at a reusing time, in expliciting their requirements about learning designs aspects, included the choice of an LMS, will be developed. The same tooling will also help them by selecting the most well-suited and relevant pattern(s) to choose the most appropriate VIDL in order to start the design of the learning scenarios.

PARTICIPANTS

C. Piau-Toffolon (CPT), J-P. Clayer (JPC), C. Choquet (CC)

DETAILED DESCRIPTION AND PARTICIPANTS CONTRIBUTIONS

- Elaboration and formalization of analysis&design patterns for capturing the teachers-designers practices founded on the studies results from task 2 (CPT, JPC, CC)
- Proposition of a process/method guiding practitioners in defining their context by helping them in selecting the most relevant pattern(s) and thus in choosing the most well-suited VIDL(s) (CPT, CC)
- Tooling (specification and development) of this method in a dedicated tool for requirements explicitation (JPC)

DELIVERABLES

- D3.1: Proposition of a pattern-oriented language for formalizing various contexts (targeted LMS, pedagogical approaches,...) and capturing teachers-designers practices
- D3.2: A patterns-oriented method for guiding practitioners in defining and contextualize their needs and requirements.
- D3.3: A dedicated tool for contextualizing practitioners needs

METHODOLOGICAL ASPECTS

- Requirements engineering method to capture teachers-designers practices
- Patterns-oriented languages for formalizing practices at a language level (reusability)
- Analysis&design-patterns orientation for the definition of first practitioners needs, at a model level, for the instructional designs they aim to specify later with an appropriate VIDL.

RISKS / OTHER SOLUTION

- Difficulty to identify various contexts for practitioners' needs and practices (didactics, pedagogical theories, publics...)
- Limits of using context-sensitive design-patterns to help and guide teachers-designers in choosing the most relevant VIDLs according to their needs

3.2.4 TÂCHE 4 / TASK 4: TEL-ENVIRONMENT ANALYSIS

OBJECTIVES/SUCCESS CRITERION

This task deals with the Identification and formalization of LMS instructional design languages as well as the development of binding solutions for insuring that future learning-scenarios formalized in conformance to the language to identify will be operationalize without semantics losses into the LMSs internal structures (databases for examples).

PARTICIPANTS:

L. Oubahssi (LO), P.Laforcade (PL), Engineer, S. Iksal (SI)

DETAILED DESCRIPTION AND PARTICIPANTS CONTRIBUTIONS:

- Identification of LMSs implicit instructional design language, in relation to the analysis of the study results from task 2 (LO)
- Explicitation of these LMSs languages and formalization with XML-oriented concrete notations (LO, PL, SI)
- Design and development of communication APIs and screen interfaces / modules for importing/exporting XML-based learning scenarios in conformance to the identified LMS languages + technical considerations about round-tripped uses of the import/export facilities for learning situations adaptations (LO, PL, Engineer, SI)

DELIVERABLES

- D4.1: Report on the LMSs languages identified (several formalisms, schema, figures, diagrams are expected to illustrate this identification).
- D4.2: Report on the LMSs languages propositions of formal representations.
- D4.3: Specification and architecture of various binding solutions for each targeted LMS.
- D4.4: Communication modules and interfaces for import/export facilities to existent LMSs considered, with respect to successive adaptation considerations from practitioners uses of the solution.

METHODOLOGICAL ASPECTS / TECHNICAL CHOICES

The previous task activities and deliverables should focus on several LMS or TEL-environments (at *minima* 4).

RISKS

- The development of the communication APIs and the formalization of the LMS instructional design language could be strongly inter-dependent: a formalization with no consideration about how binding will be implemented could induce some implementation obstacles, conversely, focusing on the binding issues could strongly reduce the formalizations possibilities and readability.

3.2.5 TÂCHE 5 / TASK 5: IDENTIFICATION, ELABORATION AND TOOLING OF VIDLS ON TOP OF LMS-CENTERED INSTRUCTIONAL DESIGN LANGUAGE

OBJECTIVES/SUCCESS CRITERION

This task is the core task of the submission. It is directed towards teachers-designers needs and practices (task 3 dependence) and centered on the LMS language and binding issues (dependence to task 4).
By analyzing related studies and state-of-the-art results (dependence with task 2) this task objectives consist in elaborating and specifying VIDLs and their dedicated editors. These VIDLs will be designed following MDE and DSM techniques in order to be related to and built on top of LMSs languages or other LMS-centered VIDLs. Transformation techniques and tools will be developed within this task with respect to the objective of semantics preservation.

DETAILED DESCRIPTION AND PARTICIPANTS CONTRIBUTIONS:

P. Laforcade (PL), PostDoc, Engineer, C. Piau-Toffolon (CPT), L. Oubahssi (LO)

DETAILED DESCRIPTION:

- Specification of first VIDLs directly designed on top of the LMSs languages from task 4 (PL, PostDoc).
- Development of dedicated graphical editors to these first layer of VIDLs, with some DSM techniques and tooling (PL, PostDoc, Engineer).
- Analysis of meta-modeling techniques (in relation to the related study from task 2) and proposition of an appropriated solution for our VIDL application domain (PL, PostDoc).
- Specification and development of dedicated models / techniques / methods / (eventually tools) helping researchers in building VIDLs on top of other ones with some new semantics in relation to patterns identified within task 3 (PL, PostDoc, CPT, LO)
- Elaboration of a second layer of VIDLs and dedicated graphical editors (PL, PostDoc, Engineer)
- Specification and implementation of techniques / services for the automatic transformation of VIDLs models (from the second layer) towards models conformed to VIDLs of the first layer, with respect to our semantics preservation objective (PL, PostDoc, Engineer)

DELIVERABLES

- D5.1: Specifications of some VIDLs built on top of the LMSs languages
- D5.2: Graphical editors of first-level VIDLs
- D5.3: Report on models/techniques/methods proposed to the main issue about specifying metamodels on top of other ones with an explicit formalization of added semantics and its relation to the former one.
- D5.4: Specifications of some VIDLs built on top of the previous VIDLs
- D5.5: Graphical editors of second-level VIDLs
- D5.6: Specifications of techniques and concrete transformation rules for models transformation between two VIDLs.

METHODOLOGICAL ASPECTS / TECHNICAL CHOICES

- Model-Driven Engineering and Domain Specific Modeling techniques and tools will be largely used, with respect to our project methodological choices and position.

RISKS

- Limits of the meta-modeling (for formalizing the abstract syntaxes of VIDLs) and visual notations (for the concrete syntaxes of VIDLs) expressiveness when they are built on top of the expressiveness of the LMS internal semantics;
- Limits of the automatic translation of models from one VIDL to another one with no semantic losses about informations to bind to the LMS;
- Limits of relations possibilities and expressiveness between two VIDLs;
- Investment cost, programming effort required when following a DSM approach and tooling.

3.2.6 TÂCHE 6 / TASK 6: EXPERIMENTATION AND VALIDATION

OBJECTIVES/SUCCESS CRITERION

This task gathers the experimentations of produced propositions (concrete tools and methods) from tasks 3, 4 and 5. Its objective is to conduct experimentations with the studied communities of practices in order to realize some verification and validation activities within an ecological context composed of the targeted end-users. Interviews, surveys, supervision of end-users' activities, etc. will be used to conduct these experimentations.
Experiments results and feedbacks will be analyzed in order to impact and serve as an input for the re-engineering of tasks 3, 4 and 5 activities. Some very first experimentations should be planned in relation to the first productions of prototype from the three tasks. More important experimentations will concern the final versions of produced artifacts and will be conducted with some wider communities.

PARTICIPANTS

C. Piau-Toffolon (CPT), Research Master on Information and Communication (Msc), P. Laforcade (PL), L. Oubahssi (LO)

DETAILED DESCRIPTION AND PARTICIPANTS CONTRIBUTIONS

- Evaluate the effectiveness of the appropriation of the tools and methods by end-users (teachers-designers) (CPT, Msc, PL)
- Testing the specification of learning scenarios according to each VIDL and survey the users' activities (PL, Msc)
- Testing the operationalization of produced models on the related LMSs and survey the users' activities (LO, Msc)
- Measuring the user-friendliness of the VIDLs graphical notation as well as their semantics (Msc, PL)
- Identify the added value of the tools (CPT, Msc)
- Analyze these data and feedbacks in order to produce relevant indicators and informations as inputs for the tasks 3, 4 and 5 (CPT, LO, PL)

DELIVERABLES

- D6.1: Experimentation reports (plans, results and analysis of D3.2 & D3.3)
- D6.2: Experimentation reports (plans, results and analysis of D4.4)
- D6.3: Experimentation reports (plans, results and analysis of D5.1, D5.2, D5.4 & D5.5)

METHODOLOGICAL ASPECTS / TECHNICAL CHOICES

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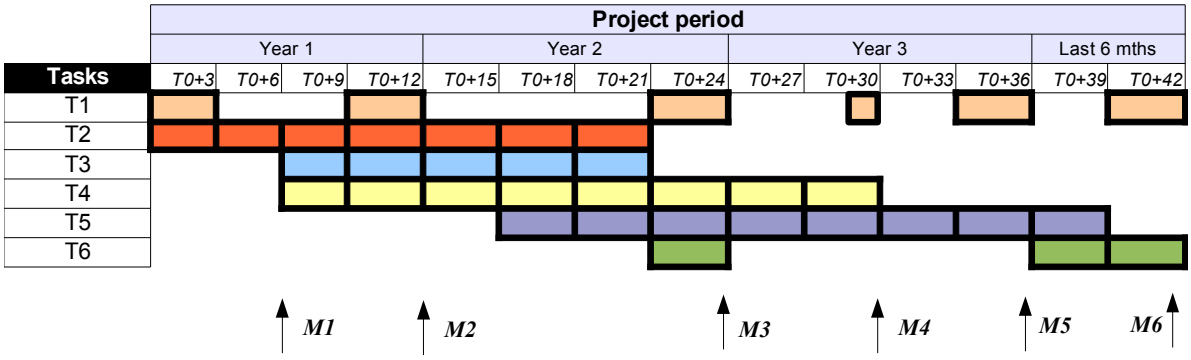
RISKS

- Expertise level required for practitioners handling our future editors and tools;
- Weak user-friendliness, appropriation, and uses detected for the proposed tools.

3.3. CALENDRIER DES TÂCHES, LIVRABLES ET JALONS / TASKS SCHEDULE, DELIVERABLES AND MILESTONES

The dependences between the six tasks have been presented and illustrated within the previous schema. We present now a task schedule showing the tasks activities according to the time line of the project (42 months).



We have identified, for now, 6 important milestones.
M1 corresponds to the starting of the PostDoc contract. State-of-the-art studies requiring his participation will start.
M2 is the end of the first year. Most of state-of-the-art studies will have started and some reports will be already provided. Also, tasks 3 and 4 will be well-engaged because of the expected results from research works currently engaged (January 2011). This is the first key-milestone to analyze the good project commitment.
Similarly, M3 corresponds to the end of the project second year and the starting of the engineer contract. Most of specifications and first prototypes should be produced at this time in order to early benefit and exploit the engineer-time.
M4 corresponds to the end of the postdoc contract (24 months). At this time, MDE and DSM studies and propositions should be ended.
M5 corresponds to the end of the engineer contract (12 months). At this time, Dedicated VIDLs editors, LMS communication APIs should be ended. The Information and communication Master student will start his placement at this time in order to focus on the validation experimentations.
M6 corresponds to the end of the project.
Meetings from task 1 organizations will take place at each of these milestones.

The next table gathers the deliverables from the detailed tasks and adds the information about their production deadline.

	Label	*Kind*	*Date*
D1.1	The project management web application	Report	T0+1
D1.2	Milestones reports	Report	T0+12, T0+24, T0+30, T0+36, T0+42
D2.1	Report about Requirements Engineering means and their applications to TEL domains	Report	T0+3
D2.2	Report on LMS-centered communities of practices	Report	T0+6
D2.3	Report on some detailed pedagogical approaches	Report	T0+6
D2.4	Report on patterns-oriented TEL propositions	Report	T0+3
D2.5	Report on instructional design LMS aspects and comparisons	Report	T0+3
D2.6	Report on VIDLs and graphical editors	Report	T0+3
D2.7	Report on MDE and DSM techniques& tools	Report	T0+6
D3.1	Proposition of a pattern-oriented language for formalizing various contexts and capturing teachers-designers practices	Report	T0+12
D3.2	A patterns-oriented method for guiding practitioners in defining and contextualize their needs and requirements.	Report	T0+12
D3.3	A dedicated tool for contextualizing practitioners needs	Computer-artefact	T0+21
D4.1	Report on the LMSs languages identified	Report	T0+18
D4.2	Report on the LMSs languages propositions of representations	Report	T0+18
D4.3	Specification and architecture of various binding solutions	Report	T0+21
D4.4	Communication modules and interfaces for import/export facilities to existent LMSs considered	Computer-artefact	T0+24
D5.1	Specifications of some VIDLs built on top of the LMSs languages	Report	T0+30
D5.2	Graphical editors of first-level VIDLs	Computer-artefact	T0+18
D5.3	Report on models/techniques/methods for specifying metamodels on top of other ones with an explicit formalization of added semantics	Report	T0+24
D5.4	Specifications of some VIDLs built on top of the previous VIDLs	Report	T0+24
D5.5	Graphical editors of second-level VIDLs	Computer-artefact	T0+36
D5.6	Specifications of techniques and concrete transformation rules for models transformation between two VIDLs.	Report	T0+24
D6.1	Experimentation reports (plans, results and analysis of D3.2 & D3.3)	Report	T0+24
D6.2	Experimentation reports (plans, results and analysis of D4.4)	Report	T0+42
D6.3	Experimentation reports (plans, results and analysis of D5.1, D5.2, D5.4 & D5.5)	Report	T0+42

4. STRATÉGIE DE VALORISATION, DE PROTECTION ET D'EXPLOITATION DES RÉSULTATS / DISSEMINATION AND EXPLOITATION OF RESULTS, INTELLECTUAL PROPERTY

The valorisation may address (1) the elaborated processes/techniques/models and (2) the tools. The first ones will be disseminated to the scientific community by the way of publications in conferences and journals (a possible valorisation will be studied according to the results).

Concerning the tools, we plan to valorize them by participating to some dedicated LMSs community of practices meetings (eg. the french MOODLEMOOT community about the MOODLE LMS with annual meetings: http://moodlemoot2010.utt.fr/) by presenting papers, demonstrations, etc. Because of the concrete separation we aim to propose between the LMS communication APIs and the VIDLs/graphical editors, we think that LMS communities will appreciate our APIs in order to exploit them with other external tools (for interoperability purposes for example).
We plan to disseminate our results in the TEL community to valorize these results (via open source contributions with GNU GPL or CeCiLL licenses).

We may also propose to organize a workshop or another conference satellite event in order to gather the scientific community in relation to our project topics. This will allow the confrontation of our main results from this project with other similar international research works.

Concerning the intellectual property we will apply the usual rules for academic members.

5. DESCRIPTION DU PARTENARIAT / CONSORTIUM DESCRIPTION

5.1. DESCRIPTION, ADÉQUATION ET COMPLÉMENTARITÉ DES PARTICIPANTS / PARTNERS DESCRIPTION AND RELEVANCE, COMPLEMENTARITY

All the participants to this project belong to the LIUM which is one of the two main French labs (with Grenoble) in Technology Enhanced Learning. It has a long experience in developing computer-based learning environments ans is computer-science oriented. LIUM approach is based on going from the scenario to the design/adaptation of the platform and the track analysis. A specific group has been created in 2002 composed of 9 lecturers/researchers at present time (under the lead of C. Choquet), to explore a software engineering approach of TEL development and re-engineering.
Members of this group strongly involved within this JCJC submission (>25%) hold a specific expertise in software engineering for TEL systems (P. Laforcade, L. Oubahssi, C. Toffolon). P. Laforcade is specialist in MDE (he holds a PhD in this area and has been recruited as a MDE specialist by the LIUM). L. Oubahssi

provides the competencies in TEL platforms and their operationalization. C. Toffolon provides competencies in software engineering process and requirement engineering.
C. Choquet provides the competencies related to the scenarios dimension. He has been involved in national and international programs and holds a strong expertise in TEL . S. Iksal holds a web semantic basis and has developed a strong expertise in XML technologies.
C. Choquet and P. Laforcade has co-supervised a PhD doctorant working on observation needs analysis and process (defended in December 2010). This work led to the proposal of a conceptual model and a tool PROToN which permits to define and track observation needs during a learning session. Another PhD is going on supervised by P. Laforcade, L. Oubahssi and C. Choquet (start in September 2009). This work is in relation to the identification and formalization objectives of this submission. A former PhD work supervised by C. Toffolon has permitted to propose a project based collaborative learning meta-model and a transformation tool. This tool transforms a PBCL scenario proposed by practitioners (teachers) into a PBCL scenario which can be play on a target platform (Moodle for the moment).
These preliminary works about DSM, models transformations, LMS analysis, etc. give a common and complementary experience to the involved participants which cover all the research topics of this project. Some aspects and hypothesis of the project has been already proved and validated by prototype tools and publications in international conferences and journals. A new PhD is beginning this year (January 2011) some research works in relation to one of the tasks of this submission (about analysis&design patterns elicitation for teachers-designers best practices).

5.2. QUALIFICATION DU COORDINATEUR DE LA PROPOSITION DE PROJET/ QUALIFICATION OF THE PROPOSAL COORDINATOR

Pierre Laforcade is Associate Professor of Computer Science at the University du Maine (Le Mans, France). He holds a PhD degree in Computer Science about UML meta-modeling for the specification and design of Problem-Based Learning situations. He supervised 2 PhD Students (one defended in 2010 and one in progress since September 2009), 2 Master students (one scientific Master in 2006 and one Master pro focusing on DSM development in 2010), and an Engineer (3 months in 2010). Pierre Laforcade was also involved in a regional research project called “Miles” during 2 years. This project has involved several laboratories and teams.
Pierre Laforcade headed the Computer Science department of the Laval technological institute during 3 years (from December 2007 to December 2010). This administrative responsibility led him to manage people and many administrative and pedagogical projects.

5.3. QUALIFICATION, RÔLE ET IMPLICATION DES PARTICIPANTS / QUALIFICATION AND CONTRIBUTION OF EACH PARTNER

	Nom / Name	Prénom / First name	Emploi actuel / Position	Discipline / Field of research	Personne .mois* / PM	Rôle/Responsabilité dans la proposition de projet/ Contribution to the proposal 4 lignes max
Coordinateur/responsable	LAFORCADE	Pierre	MCF	Instructional design, TEL environments, MDE, DSM	31,5	Elaboration of VIDLs and dedicated editors, studies about MDE/DSM transformations and tools
Autres membres	OUBAHSSI	Lahcen	MCF	LMS re-engineering, standards	17,5	Identification and formalization of LMS languages, development of communication APIs
	PIAU-TOFFOLON	Claudine	MCF	Requirements engineering, Design patterns, Collaborative work	17,5	Identification and formalization of teachers-designers best practices with patterns-oriented languages
	CLAYER	Jean-Pierre	PhD. student	Design pattern, practices analysis	6	Identification and formalization of best practices, development of a pattern-oriented authoring tool
	CHOQUET	Christophe	PR	Usage analysis, TEL re-engineering, adaptation	3,5	Analysis of reports and studies about patterns-oriented formalizations for TEL
	IKSAL	Sébastien	MCF	Web semantic	3	Formalization of LMS internal languages, XML bindings

* à renseigner par rapport à la durée totale du projet

6. JUSTIFICATION SCIENTIFIQUE DES MOYENS DEMANDÉS / SCIENTIFIC JUSTIFICATION OF REQUESTED RESSOURCES

1. Équipement / Equipment

We will provide all computers (excepted for Postdoc student and engineer), servers, network infrastructure and software necessaries for achieving tasks in the project. It will provide video materials required for the evaluation experimentations of task 5. It will also undertake the maintenance of these materials and all the required support.
We just ask for 4 000 € in order to buy two laptops for PostDoc Student and Engineer required.

2. Personnel / Staff

We assume one PhD student during 24 months, partially involved in the project.
We have the following requests:
- a 24 months post doctoral support (which could fall into two 12 months supports). He will mainly participate on the MDE/DSM/VIDLs studies and analysis in order to propose some solutions about the main project objective: specifying

and developing VIDLs on top of the LMSs languages while preserving original semantics of models during the LMS binding.
- an engineer in Software Engineering during 12 months. This engineer will help us to develop the various graphical editors dedicated to our specified VIDLs. This development requires an intensive specification effort and a good expertise of DSM techniques (like the EMG/GMF/ATL frameworks from the Eclipse Modeling Project). This engineer will be mainly involved in the tasks 4 and 5. Nevertheless he will be potentially involved into smaller development activities of task 4 about the communication APIs. He will help us to achieve the computing verification of our results, and will be a support during the first experimentations. He will also prepare the open source diffusion of our results.
- an Information and communication Research Master student: he will be mainly involved into the last 6 months activities about the experimentations with end-users (task 6).

3. *Prestation de service externe / Subcontracting*

No specific request .

4. *Missions / Travel*

We plan to submit at least 2 communications in international conferences and 1 communication in national ones by year of the project. These publications will involve the 3 permanents, the PhD. Student and the PostDoc.

Estimated cost (rounded to 3 years): 3* (2*1000+1*700) = 9 000€.

5. *Dépenses justifiées sur une procédure de facturation interne / Costs justified by internal invoicies*

No specific request .

6. *Autres dépenses de fonctionnement / Other expenses*

Furniture : 300€
Experimentations expenses with the various teachers-designers communities of practices: traveling expenses, beta-tests organization, reception expenses, etc.: 700€
Estimated cost : 1000€

7. ANNEXES / ANNEXES

7.1. RÉFÉRENCES BIBLIOGRAPHIQUES / REFERENCES

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7.2. BIOGRAPHIES / CV, RESUME

P. LAFORCADE Date of birth: 14 August 1978

- Associate professor at the LIUM laboratory
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- ***Academic Curriculum Vitae***
  - Ph.D. in December 2004 (University of Pau, France) about UML Modeling and Meta-Modeling for Problem-Based Learning situations
  - Associate-Professor at the University of Le Maine (France, LIUM) since September 2005
- ***Research Interests***
  - Educational Modeling Languages and Visual Instructional Design Languages
  - Technology-Enhanced Learning (TEL) systems
  - Model-Driven Engineering and Domain-Specific Modeling
  - Modeling, meta-modeling, models transformations
- ***Main responsabilities***
  - Study supervisor of the Computer Science Department (University Institute of Laval) from 2005 to 2007, and from 2011
  - Head of the department from 2007 to 2010
  - Co-supervisor of Ph.D thesis : B. Zendagui (Sept 2006-Dec 2010), A. Abedmouleh (Sept 2009-).
- ***Recent publications in relation to the project***
  - Laforcade P., 2010. A Domain-Specific Modeling approach for supporting the specification of Visual Instructional Design Languages and the building of dedicated editors. *Journal of Visual Languages & Computing,* Volume 21, Issue 6, 20 December 2010, Pages 347-358 Special Issue on Visual Instructional Design Languages.
  - Laforcade P., 2007. Visualization of learning scenarios with UML4LD, *Journal of Learning Design* 2 (2) 31–42.
  - Oubahssi, L., Laforcad, P., and Cottier, P., 2010. Re-engineering of the Apprenticeship Electronic Booklet: Adaptation to the new users requirements. In The 10th IEEE International Conference on Advanced Learning Technologies ICALT2010. Sousse, Tunisia.
  - Laforcade, P., Zendagui, B., Barré, V., 2008. A Domain-Specific-Modeling Approach to Support Scenarios-Based Instructional Design, In: ECTEL'08, Sept. 16-19, Maastricht (The Netherlands).
  - Laforcade P., T. Nodenot, C. Choquet, P.-A. Caron, 2007. MDE and MDA applied to the modelling and deployment of TEL systems: promises, challenges and issues, in: Proceedings of the Architecture Solutions for e-Learning Systems.

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- ***Academic degrees***
  - 1989 Master degree in Econometrics and Quantitative Economics (Université Paris 1-Panthéon-Sorbonne - France)
  - 1991: Master degree in Computer Science (Paris-Dauphine University - France)
  - 1996: Ph.D. In Computer Science (Paris-Dauphine University - France)
- ***Professional carrer path***
  - 1989-1999 : Temporary Instructor and Assistant Professor in Mathematics and Computer Science
  - 1999-2005 : Associate Professor in Computer Science (University of Littoral-France)
  - Since 2005 : Associate Professor in Computer Science (University of Le Maine - France)
- ***Topics of interest and professional experience***
  - Software Engineering (Requirements Engineering, Model-Driven Engineering and Domain-Specific Modeling)
  - Technology-Enhanced Learning (TEL) systems
- ***Recent publications in relation to the project***
  - Abdallah F., Toffolon C, Warin B. :"*Models transformation to implement a Project-Based Collaborative Learning (PBCL) Scenario : Moodle case study*", The 8th IEEE International Conference on Advanced Learning Technologies (**ICALT 08**) , Santander, Cantabria, Spain, July 1-5, 2008, pp. 639-643.
  - Abdallah F., Toffolon C, Warin B. :"*Assistance to Project-Based Learning SUPPORT: from Learning Models to Platforms*", Conference IADIS Multi Conference on Computer Science and Information Systems - e-Learning (**MCCSIS-EL'07**) , Lisbonne, Portugal, 6-8 juillet 2007, Vol. 1, pp. 244-251.
  - Talon B. , Toffolon C. , Warin W. : "*Accompagner les projets en milieu universitaire: Présentation d'une méthodologie d'encadrement de projets collaboratifs assistée par le Web*", 4ème Colloque Questions de pédagogies dans l'enseignement supérieur - Les pédagogies actives : Enjeux et Conditions. UCLouvain, Louvain-la-Neuve, 24-26 janvier 2007, www.colloque-pedagogie.org
  - Toffolon C., "*Learning Management System Scenario-Based Engineering*", The 5th European Conference on E-Learning, University of Winchester, UK, 11-12 September 2006, pp. 397-406

L. Oubahssi Date of birth: 01 June 1971

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Academic degrees

- 2001: Master degree in Applied Computer Science & Mathematics to Human Sciences (University of Paris Descartes – Paris)
- 2005: PhD in computer science (University of Paris Descartes – Paris)

Professional career path

- 2002-2005: Junior Engineer in computer science for the company A6 (Evry France)
- Since 2006: Associate Professor in computer science (Le Maine University)

Research Interests

- Technology-Enhanced Learning (TEL) systems
- E-learning Platforms Architecture, and E-learning platforms Reengineering
- Modeling, meta-modeling, models transformations
- Standards and & Interoperability
- Educational Modeling Languages

Main responsabilities

- Study supervisor of the Computer Science Department (University Institute of Laval) from 2007 to 2010
- Head of the department from December 2010
- Co-supervisor of Ph.D thesis : A. Abedmouleh (Sept 2009-).

Significant publications

- Oubahssi L, Laforcade P, Cottier P . Re-engineering of the Apprenticeship Electronic Booklet : Adaptation to new users requirements. ICALT2010, Sousse(Tunisia), 5-7 Juillet 2010 2010 .
- Laforcade P, Oubahssi L, Cottier P . Re-engineering of Technology Enhanced Learning systems: the case of the Apprenticeship Electronic Booklet. CSEDU 2010, Valencia(Spain), 7-10 April 2010 2010.
- Oubahssi L, Grandbastien M . E-learning systems reengineering: Functional specifications and component based architecture. , coord. : Claus Pahl In Architecture Solutions for E-Learning Systems, edited by IGI Publishers, isbn : 978-159904633-4, p.175-194, 2007.
- Oubahssi L, Grandbastien M . Can Learning Object Metadata stand as Learning Resource Models for iLMS?. ICALT07, Niigata(Japan), July 18-20, 2007 2007.
- Oubahssi L, Grandbastien M . From learner information packages to student models: Which continuum?. Intelligent Tutoring Systems, Jhongli(Taiwan), p.288-297, 26-30 juin 2006 2006

7.3. IMPLICATION DES PERSONNES DANS D'AUTRES CONTRATS / STAFF INVOLVMENT IN OTHER CONTRACTS

None of participants of this project submission are currently involved into other projects or contracts.