



Deliverable 6.4

Interim Exploitation and Sustainability Plan

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Abstract:	<p>The exploitation plan reports the consortium's strategy towards exploiting the project's results. It includes an analysis of the relevant market and current conditions, existing competitors versus own positioning, potential users and collaborators as well as opportunities and barriers at EU level and Member State level.</p> <p>The exploitation and sustainability plan is constructed and documented in two phases. This initial report provides a preliminary outline of the exploitation and sustainability plan for after project end including relevant exploitation/sustainability models, partners' involvement in future exploitation activities, plans for promotion and</p>
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	valorisation, solutions to potential financial or IPR/licensing issues encountered, etc.
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Consortium

	<i>Role</i>	<i>Name</i>	<i>Short Name</i>	<i>Country</i>
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2.	Technology enhanced learning expert	Open University of the Netherlands	OUNL	Netherlands
3.	PBL expert	Aalborg University	AAU	Denmark
4.	Semantic and Learning analytics expert	University of Alcala	UAH	Spain
5.	IT partner	BOC	BOC	Austria

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V1	29/06/2017	BOC, UOM	Final version ready for submission

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List of Abbreviations

The following table presents the acronyms used in the deliverable in alphabetical order.

<i>Abbreviation</i>	<i>Description</i>
LA	Learning Analytics
LD	Learning Design
PBL	Problem Based Learning

Executive Summary

This deliverable presents preliminary results of the work performed by the consortium on exploitation and sustainability plans as outlined in the project description. The objective of this work is to establish a well-defined approach how results from the projects are transformed and composed from project results/exploitation items to innovative solutions that are applicable on the market of learning technology and service providers.

As a sustainability methodology an open innovation approach is applied that enables an involvement of external communities of practice (concept, content, technology) to pick-up results independent of technological readiness or maturity and contribute to the development effort beyond the scope of the project.

From an exploitation and commercialisation background an initial step has been performed to identified individual strategies and related exploitation items, categorize them and trigger the discussion on required transformation. Based on these results, the exploitation work is further refined in the upcoming and final deliverable to set the exploitation ideas in the context of a consortium wide view and provide indications on how the solution as a whole can be sustained.

1 Introduction

This deliverable presents preliminary results of the work performed by the consortium on exploitation and sustainability plans as outlined in the project description. Based on the findings in the technical and application workpackages, an initial exploitation and sustainability collection has been outlined and defined. This analysis was performed using the individual interests of the partners in project results as a starting point, further refined and categorized initially based on the project objective and target audiences. This means that the exploitation strategies is defined bottom-up, starting with a formalization on an individual level, enhanced by consortium-wide discussions and the establishment of a common description framework.

Based on this results, the exploitation work is further refined in the upcoming and final deliverable to set the exploitation ideas in the context of a consortium wide view and provide indications on how the solution as a whole can be sustained.

1.1 Scope

The scope of the deliverable is to establish an initial plan on exploitation and sustainability efforts in the project. The approach selected starts from the individual partner plans and elevates them into a coherent consortium-wide instrument.

1.2 Audience

The deliverable is targeted to report on plans for exploitation and sustainability after the conclusion of the project. The target audience are the involved partners and the enactment of their strategies to sustain project results.

1.3 Structure

The structure of the document in its preliminary version is as follows: Section 2 discusses the methodology on how the plan has been established. It introduces the approach to develop innovation and exploitation items from project results and defines a framework for interaction among the owning parties. Section 3 provides insight in the individual plans as retrieved from all partners, before concluding in section 4.

2 Exploitation Strategy: Project Result to Innovation Item

This section introduces the bottom-up methodology introduced to transform project results continuously to exploitable innovation items. This approach takes results from the project work as input, aligns with the strategies of partners and the consortium as a whole and triggers the required transformation process.

2.1 PBL3.0 Exploitation and Sustainability Planning Methodology

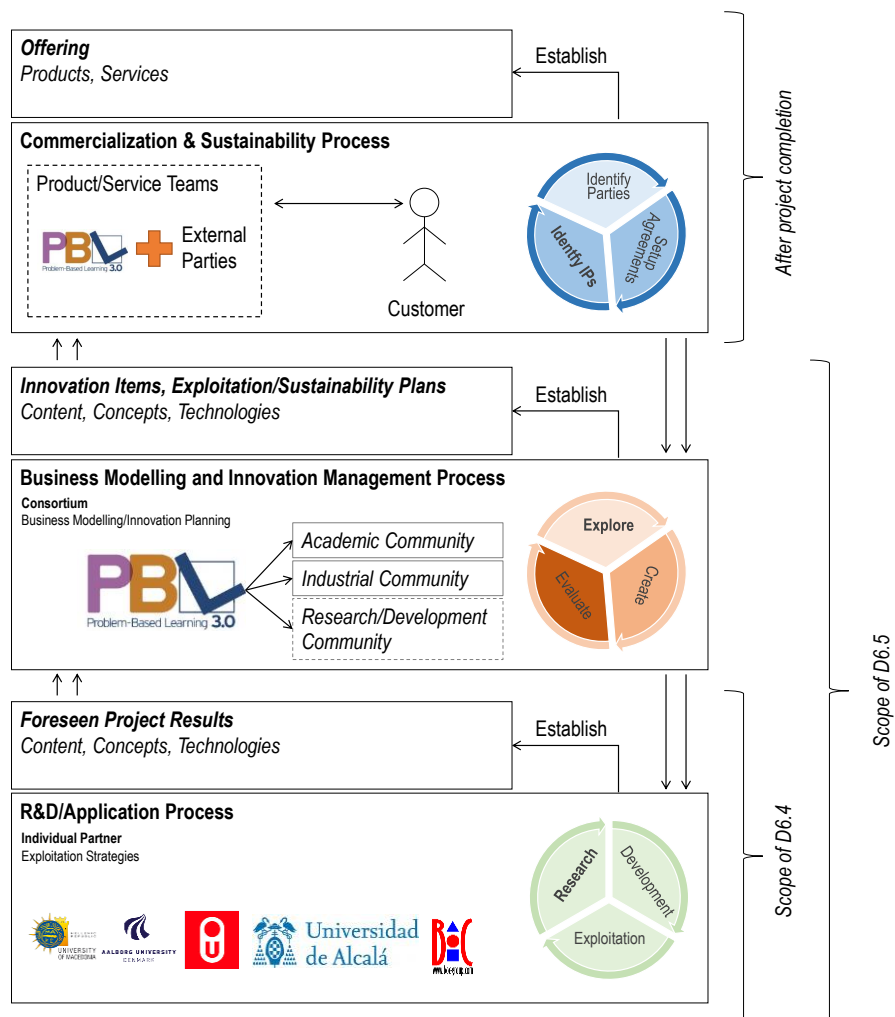


Figure 1 PBL3.0 Exploitation and Sustainability Planning Methodology

Figure 1 defines the methodology and framework for exploitation and sustainability planning in PBL 3.0. The methodology is based on the work performed in [1], refined and set into the context of innovation and research projects in [2]. The approach is established for digital services and transformation and is deemed appropriate for the purpose of the project. The above methodology has been adapted to consider a) the project plan/logic as well as specific aspects in the consortium related to exploitation and sustainability aspects.

As a bottom-up approach, the different levels of the methodology are briefly introduced below:

R&D/Application Process	
Process Phases	<p>The phases in this process cover the project work with a focus on exploitation of project results. The outcome of this process is a set of exploitation items applicable in the context of the project objectives.</p> <p>Research: Transformation and evolution of existing knowledge of partners and combination.</p> <p>Development: Realization phase of exploitation items as concepts, content and technology.</p> <p>Exploitation/Application: Usage of project results in the application cases/pilots and evaluation results. The results are assessed from a maturity and technology readiness background.</p>
Outcomes	<p>Exploitation items as project results (e.g. deliverables, prototypes, concept papers, publications). These project results are produced through the collaboration of partners and formally made available as deliverables. The results are realized in accordance with individual exploitation strategies and assessments by partners.</p>
Involved Partners	<p>All project partners, organized in WPs and tasks according to the project plan</p>

Table 1 Methodology: R&D/Application Process

The initial phase as introduced above represents the actual project work, planned in accordance with the project objectives.

Business Modelling and Innovation Management Process	
Process Phases	<p>The phases in this process cover the transformation steps of project results/exploitation items to innovation items. The phases defined cover these transformation from an organizational background, exploring different options on exploitation of results and their applicability beyond the scope of PBL3.0</p> <p>Explore: the exploration phase aims to understand which results are exploitable. The consortium aims to understand the type of configuration and combination required to establish an innovation items and their impact on the market and target audience.</p>

	<p>Create: business modelling and sustainability planning is covered in this phase. The resulting plans are input for assessment and evaluation.</p> <p>Evaluate: Evaluation of business and sustainability plans through investigation into the market and competition structure.</p>
Outcomes	Business Models and Sustainability plans are established, evaluated by experienced project team members and compared to existing market trends.
Involved Partners	Consortium-wide exploitation team

Table 2 Methodology: Business Modelling and Innovation Management Process

The second level covers the required transformation from project results to innovation items. Each item identified is analysed and evaluated. The work in this phase is performed in the upcoming period of the project through dedicated exploitation sessions in a consortium-wide setting.

Commercialization & Sustainability Process	
Process Phases	<p>The phases in this process aim to define the structure of applicable innovation items and their composition. The core aspect is to identify relevant intellectual property structure and find agreements to be used during actual project based on PBL 3.0 results.</p> <p>Identify IPs: define the relevant IPR structure for products (which partner owns what, what kind of dependencies need to be considered) and license agreements</p> <p>Identify Parties: identify relevant parties that need to be involved in case of commercial activities</p> <p>Setup Agreements: structure collaboration agreements for products and services made available</p>
Outcomes	The outcome of this level are commercializable products and services that cover needs of customers in the field.
Involved Partners	Partners of the project consortium and external parties

Table 3 Methodology: Business Modelling and Innovation Management Process

The top level aims to enact the sustainability and exploitation plans. This level is out of scope of the work performed and documented in D6.4 and D6.5.

2.2 PBL 3.0 Value Proposition and Target Audience

As output from the bottom level of the methodology defined above, the following items have been derived based on individual partner plans, interest and expertise. Project results as exploitation items are categorized in 3 dimensions: a) content, understood as an externalization of knowledge, b) concept as methods, approaches and techniques and c) technology as software artifacts configured and developed in PBL3.0.

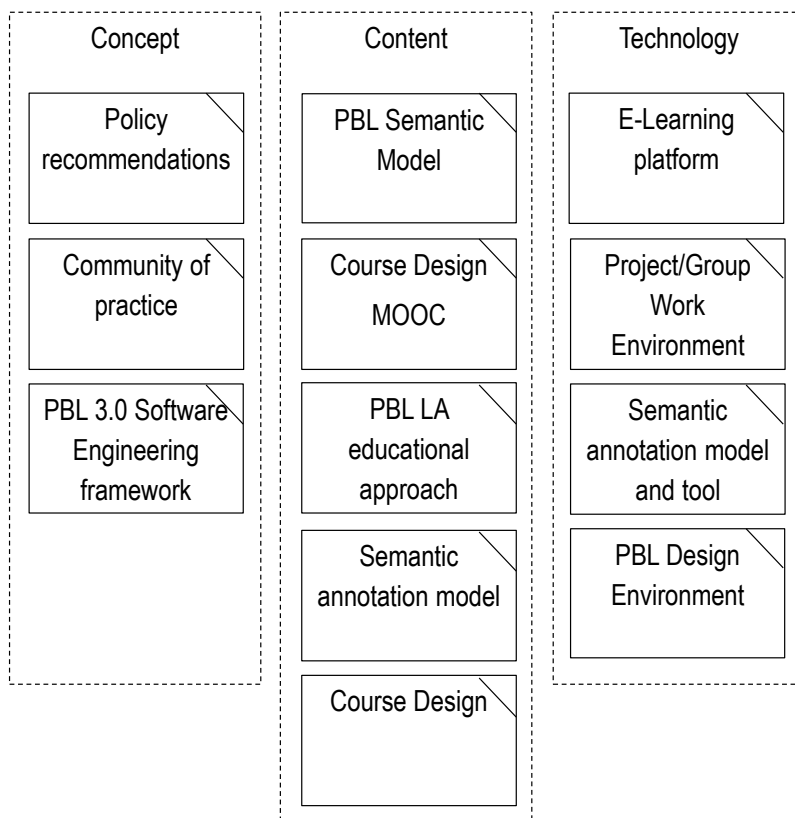


Figure 2 PBL3.0 Exploitation Items

Figure 2 shows the exploitation items graphically, assigned to the specified categories. 12 items have been defined that cover the results established in the technical and application work packages.

In a next step, these items are evaluated for composition in service and product offering having the target audience and stakeholders in mind. The outcomes aim to contribute to the needs of the following, learning and teaching related communities and stakeholders:

- **Commercial Learning Service Providers:** parties that commercially offer learning or pedagogical support services to private and public sector entities. The PBL3.0 results need to be transformed into services that satisfy needs by these stakeholders. This transformation is mainly a transformation of available results into stable, productive elements as well as a meaningful composition of concepts, content and technological results.

- **Academic and Teaching Community:** the academic and teaching community is attracted by specific elements that showcase the applicability of problem/project-based learning in everyday classroom situation. The concepts developed and pilots performed act as best practices in establishing innovative technological solutions.
- **Research and Development Community:** The research and development community is involved to allow for a sustainability of results independent of technological readiness and maturity. Following an open innovation approach, interested parties can get involved as developers of technologies and concepts using PBL3.0 results as a baseline.

3 Individual Exploitation Plans

During the reporting period, a concise picture of the innovative results to be achieved by the project has been established, resulting in individual exploitation plans with the opportunities each partner wants to explore. These plans have been collected, using individual partner input through offline interviews using a questionnaire form. The proposed template that was circulated around partners can be found below. Finally, these individual partner plans are made available to all partners for alignment of strategies and review/refinement purposes during the upcoming period. The individual plans are subject to change as new insights and ideas arise how to apply results along the line of innovative solutions maturing.

Each partner has developed detailed plans for exploitation. These single plans includes information on:

- (i) partner profile;
- (ii) motivation to participate in the project and commitment;
- (iii) means to achieve the objectives;
- (iv) opportunity related to exploitable assets;
- (v) exploitable assets and results;
- (vi) Rationale

Over the course of the project the partners have identified potential opportunities to exploit the results of the project. Naturally this is shaped primarily by the focus of the organizations involved.

3.1 Individual Exploitation Plan: University of Macedonia

University of Macedonia, Greece <http://www.uom.gr/>

Editor(s):	Konstantinos Tarabanis
Date of plan:	09/06/2017

3.1.1 Partner Profile

The University of Macedonia (UOM) of Economic and Social Sciences was established in 1948 and currently has 8 departments, 7 departmental and 3 interdepartmental postgraduate programmes. It has a long record in research and educational activities including participation in European programmes such as Erasmus-ECTS, Alfa, ADAPT, Leonardo, Tempus, Med-Campus, Continuing Education Program and Jean Monnet.

Combining the scientific fields of Business Administration and Information Technology, the Information Systems Laboratory operates as a part of the Business Administration Department of

UOM and is directed by Prof. Konstantinos Tarabanis. The laboratory's areas of expertise vary and include:

- Conceptual and domain modelling.
- Open Data and Linked Data
- The Use of Web 2.0 and semantic technologies in eLearning and eGovernment.
- E-Learning Systems and their role in the educational process.

During the last years the laboratory has supervised PhD thesis and Masters dissertations in the area of learning and ICT. It has also implemented relevant projects through the Research Committee of UOM including:

- “#ASK: Augmenting Social talk – #ask” (2015-2018)
- “ODEdu: Innovative Open Data Education and Training based on PBL and Learning Analytics” (2016 – 2018)
- "RBDICT: Regional Business Development through the Use of Information and Communication Technologies" (2011-2013).
- LLP KA3 Multilateral project. “EATrain2: Innovative Enterprise Architecture Education and Training Based on Web 2.0 Technologies” (2009-2010).
- "Postgraduate program in Information Systems for FYROM: Development of common educational activities - transfer of know-how" (2005-2008).

The same team is involved in / coordinates the following Horizon2020 and FP7 research projects:

- OpenGovIntelligence (2016-2019)
- OpenCube (2013-2015)
- Linked2Media (2011-2014)
- Linked2Safety (2011-2014)

3.1.2 Motivation and Commitment

In PBL3.0, UOM aims to enhance existing and future courses by applying a well-established and structured problem-based learning approach enriched with Learning Analytics and Learning Semantics. The courses in UOM are currently mostly delivered in a traditional offline setting, where lectures are delivered in classrooms by educators and students are assessed either with only a final test at the end of the semester or with limited assignments throughout the academic semester. Thus, UOM is committed to introduce the PBL3.0's new pedagogical and technical solutions to the institution's courses in order to contribute to students developing of skills that are essential in the modern age.

As a general overview of exploitation, UOM is interested in developing the following general exploitable results categories in both an educational/teaching and a research context:

- PBL3.0 educational approach
- Semantic annotation model and tool
- eLearning platform

The exploitable results can be used at the following main activities:

- Courses on a variety of topics (Open Data, Project Management, Systems Analysis and Design) at the undergraduate department of Applied Informatics of the University of Macedonia
- Courses on a variety of topics (IT Project management, Linked Data, Information Systems Analysis and Design) at the postgraduate programme in Information Systems of the University of Macedonia
- External programmes of the University of Macedonia

Further development / expansion / product integration/ customisation to the local needs may include:

- PBL_LA educational approach, semantic annotation model and tool: Relevant adaptations and improvements can be made in conjunction with other existing methodologies according to the experience acquired during the Greek pilot.
- Course design on e-learning platform. The course design will be re-shaped and populated to serve the needs of the courses taking place.
- Repository for learning objects. The learning objects could be updated in accordance with the courses' future needs

3.1.3 Means to Achieve the Objective

An overview of the main channels that UOM will use to exploit the aforementioned results is given below:

Teaching/Education channels:

- External Programmes
- University courses

External programmes: UOM organises educational programmes for external stakeholders in the context of lifelong learning and the development of skills. Programs on specialized issues are organised when sufficient external interest is secured. The programs bear a specific cost to participants

Research channels:

- Academic papers or conferences
- Further refinement in future research projects

The primary target groups consist of the University undergraduate and post graduate students as well as external programme students where the main marketing channels must focus. Other secondary target groups such as teaching staff and research groups will be approached by ad hoc and informal means, such as bilateral meetings or briefings.

The marketing mix is dependent upon the mode of availability of the exploitable items and material after the end of the project. UOM, as a public body, has predefined channels of publicity. Indicatively, the main vehicles are:

- Via UOM webpages (www.uom.gr, www.islab.uom.gr , departmental sites, news and events)
- UOM press –the internal publishing house of the University
- Posters available at the University premises
- Spill over via publications and conferences.

Estimation of users of the specific results:

In terms of users, an initial approximation is estimated as follows:

Education/Teaching target groups

- University teaching staff : cannot be estimated
- University Undergraduate programmes: 70-80 users annually (indicatively for courses)
- University Post graduate programmes : 30 users annually (indicatively for courses)
- University Specialized External Programmes: 15 users annually per programme
- Public or private organisations in collaboration with the University for educational purposes: cannot be estimated

Research Academia target groups mainly involve:

- Research groups within University of Macedonia (laboratories, PhD students groups, etc): 15 users (indicatively)
- Research groups in Greece and abroad collaborating with the University of Macedonia in the context of joint collaboration, joint educational initiatives or research projects: 10 users
- Conference audiences (ICT or governance-related): estimation not applicable
- Academic publication audiences (journals, books, etc): estimation not applicable

3.1.4 Exploitable Assets and Results

Describe the exploitable assets and results from the project as an overview and per item

ASSET	SHORT DESCRIPTION	HOW EXPLOITED
PBL_LA educational approach	Structured framework with guidelines on combining PBL steps with LA features	- Consult PBL_LA framework for course design, delivery and assessment
Semantic annotation model and tool	<ul style="list-style-type: none"> - Design model for annotations of learning objects based on the PBL strategy - Tool for automatic annotation of learning objects and publication of annotations as linked data 	<ul style="list-style-type: none"> - Annotate learning objects of UOM courses - Search tool for learning objects aiming to improve assessment and course delivery
UOM designed courses	<ul style="list-style-type: none"> - Courses designed on Moodle based on the PBL_LA framework with PBL and LA tools and content on Information Systems Analysis and Design 	<ul style="list-style-type: none"> - Apply courses on UOM's Information Systems Analysis and Design course
Elearning platform	<ul style="list-style-type: none"> - E-learning platform developed in Moodle with PBL and LA tools installed 	<ul style="list-style-type: none"> - Create new courses on various topics within the platform based on the PBL_LA framework and deliver them to UOM's students
Community of practice	<ul style="list-style-type: none"> - Online space for knowledge exchange on PBL, LA, and LS 	<ul style="list-style-type: none"> - Consult the community on topics of interest and exchange know-how and knowledge on improving courses for better equipped students

Table 4: Exploitable assets and results of UOM.

3.1.5 Rationale

In more specific terms, the items for exploitation can be considered as vertical aspects for providing a holistic approach on novel teaching aspects, i.e. identified PBL model steps and available LA and LS methods tools, course models and learning objects suitable for teaching to students (undergraduate and post graduate students). The PBL_LA framework will be used as a reference point for further research refinements (e.g. academic papers, conferences etc) and for educational activities, therefore acquainting students with participatory learning and providing a checklist against how key transversal skills students can be measured and validated. UOM is equally interested in utilising the eLearning platform for internal teaching use purposes (i.e. teaching within the University departments). The PBL_LA framework, the semantic annotation model, the course design and the repository of learning objects from the semantic annotation tool will be used for solely educational purposes, to underpin the learning processes. The University trials could be used as implementation

examples to display successful aspects to other interested parties. Last, the community of practice will serve as a reference point for continuous research and exchange of good practices for future adaptations and enrichment of the project’s results. All items may be reshaped, updated and customized in the future to reflect current needs and developments in the field. It is therefore inferred that exploitable items serve either educational/teaching purposes (internal university departments) or research purposes (further research, publications and conferences).

3.2 Individual Exploitation Plan: Open University of the Netherlands

Open University of the Netherlands, www.ou.nl

Editor(s):	Katerina Riviou, Christian Stracke
Date of plan:	25/05/2017

3.2.1 Partner Profile

The Open University of the Netherlands (OUNL) was founded in 1984 as the Dutch university for open distance education. Soon thereafter, the OUNL’s Educational Expertise Centre was commissioned by the Ministry of Education to provide an innovative stimulus to Dutch Higher Education by carrying out research and development work on technology enhanced learning. One of its results has been the development of an educational modelling language (EML), which in a slightly modified form was adopted by the IMS consortium as one of its specifications (IMS Learning Design). IMS LD is a language for modelling learning scenarios of any kind in machine readable, portable ways. The Open University of the Netherlands develops and provides open higher distance education and excellent international research. There is a special focus on the use of new ICTs and of innovative teaching and learning methods to provide effective, efficient, attractive and accessible lifelong learning facilities and education. The Open University of the Netherlands has 26,000 students and about 750 employees. The main campus is in Heerlen. Spread over the Netherlands there are 13 study centres and 3 support centres. There are also 6 study centres in Flanders.

The OUNL is the internationally recognised Dutch University for Online Learning and is ranked as Top No.1 among all Dutch universities in the national rankings by the ministry as well as by the students for best education and service since several years. Within the OUNL, the Welten Institute is the unique Research Institute for Learning, Teaching and Technology combining and integrating expertise in the learning sciences and technology-enhanced learning (TEL). The Welten Institute is among the leading international research institutes in TEL with highest reputation and the biggest one in Europe in this field, mainly through the TELI research group which focus is on learning and teaching innovations in TEL environments.

The mission of the Welten Institute is to improve learning and competence building at school, at work, at home and on the move by combining state-of-the-art knowledge in the learning sciences with the innovative power of new information and communication technologies.

The Welten Institute has chosen the approach of the ‘ecology of education’. This means that the institute is not only active in the field of theoretical scientific research but also collaborates with users and partners in developing and implementing scientifically sound learning environments and other forms of open and innovative education and didactics to achieve impact in the application.

The research activities take into account the complexity of education and the use of the rapidly developing technologies plays an important part in them. The underlying thought is that the contact between educational science and educational practice is of vital importance for good educational research and therefore for the improvement of learning quality. Nevertheless the Welten Institute imposes on itself very stringent scientific demands: the results of its scientific activities have to be validated, have to be susceptible to generalization and have to find their way into authoritative (national and international) publications and educational systems.

The Welten (research) programme combines expertise in the areas of open education and innovations, pedagogical scenarios for formal and informal learning, social media mash-ups (personal learning environments), social and situational awareness, usability, as well as expertise related to content authoring, content management, workplace learning and lifelong learning at large. In the past, the Welten Institute with its excellent research teams of around 90 researchers (thereof 60 professors and senior PhD researchers) has been an active coordinator and participant in numerous European and international research projects, also from FP5 to H2020 (e.g., Inspiring Science Education (ISE), Open Discovery Space (ODS), LinkedUP, LACE, Unfold, TENCompetence, LTfLL, GRAPPLE, idSPACE, Handover, PATIENT).

3.2.2 Motivation and Commitment

The Welten Institute has huge and long-term experiences in scientific research and related projects on school education and Higher Education focusing on innovations in the pedagogical design and technology-enhanced learning. Our main motivation to join the PBL 3.0 project was that PBL 3.0 targets the combination and integration of topics that are also our core fields in research and development: Problem-based learning, Learning analytics, and Learning Semantics. We strongly believe in the importance and impact of innovative education that takes the learners into the centre of all activities and that changes the role of the educators. Given the new digital age and changes in society by globalization and worldwide internet, social media and new demands, we address core competences and skills for self-regulated learning processes and strategies. Problem- and project-based learning are valuable approaches that we use in official study programmes as well as in our collaboration with external partners such as primary and secondary schools (e.g., the Niekée and Agora schools). Therefore we are very much interested in the project objectives and achievements to use them after project ending, too. We have committed us to contribute to PBL 3.0 with all our expertise and experiences and to develop innovative lessons and materials that could be used in a Massive Open Online Course (MOOC) context for broadest dissemination and scaling up. We want to achieve impact by targeting the needs of the potential learners and their diversity to provide tasks

and assignments to meet the need for competence-orientation, (online) collaboration and self-organized learning as it is planned and realized by PBL 3.0.

3.2.3 Means to Achieve the Objectives

The Open Education Research Group in the Welten Institute consists of about 15 persons that are involved in Research about Open Education with a strong focus on Massive Open Online Courses (MOOCs). The Welten Institute has established networks through participation in parallel EU-Projects (addressing core topics behind PBL 3.0 such as learning analytics) as well as through collaboration with other regional organisations: That allows collaborative developments and synergies with external partners, projects and organizations. Moreover, through dedicated dissemination channels and through social media presence PBL 3.0 outcomes can be disseminated and exploited in a wider network.

Visible opportunity

The interest of the Welten Institute on MOOCs is a unique opportunity to further expand the dissemination of the PBL 3.0 approach and principles beyond what has been included in the description of work: Thus, the design and provision of a PBL 3.0 Training Course as a MOOC is creating awareness and enables the pilot testing of the PBL 3.0 outcomes at a massive scale.

3.2.4 Exploitable Assets and Results

Integration of Problem-based learning with LA and LS enables an innovative technologically enhanced learning model and provides an interesting venue for research, particularly testing its boundaries by exploitation in a massive scale, through the utilisation of MOOCs.

ASSET	SHORT DESCRIPTION	HOW EXPLOITED
PBL Training Course (MOOC)	<ul style="list-style-type: none"> Designing, piloting and refining a massive course testing the design principles behind PBL3.0 in a massive scale Online environment, materials 	<ul style="list-style-type: none"> Use for professional development of teachers and other interested stakeholders
Policy recommendations	<ul style="list-style-type: none"> Forming and influencing policy around the use of PBL, LA and LS 	<ul style="list-style-type: none"> Interaction and influencing policy formulation

Table 5: Exploitable assets and results of OUNL

3.2.5 Rationale

The Exploitation path is threefold: first, the Welten Institute is strongly interested in Open Education, technology-enhanced learning and particularly in Massive Open Online Courses (MOOCs)

and competence building within the OUNL: Our core focus is on learning design and problem-based approaches scalable to the masses as well as how learning analytics and integration of semantics can be strengthened.

Secondly, we will distribute through the MOOC our project results and outcomes within the community and networks that OUNL has already established and is actively contributing to and participating in.

Third, we as the workpackage leader will coordinate and develop policy recommendations regarding the topics of the project together with all project partners and interested external stakeholders to facilitate the application and transfer of the PBL 3.0 outcomes also in official curricula and educational systems including schools, universities and lifelong learning.

3.3 Individual Exploitation Plan: Aalborg University

Aalborg University, Denmark www.aau.dk

Editor(s):	Evangelia Triantafyllou
Date of plan:	09/06/2017

3.3.1 Partner Profile

Aalborg University (AAU) in Denmark has a profile as a dynamic, interdisciplinary, and innovative research and educational institution oriented towards the surrounding world. AAU is characterised by combining a keen engagement in local, regional, and national issues with an active commitment to international collaboration. AAU is ranking amongst the best and most acknowledged international universities in the world – in the top 2% of the world’s 17,000 universities. More than 20.000 students are enrolled at AAU of whom approximately 20% are international students hailing from different countries around the world. The university employs approximately 2000 faculty and 800 administrative/technical staff.

The main teaching and study form at AAU is problem based learning (PBL) and project organised problem based learning (POPBL), teaching, research and innovation. The study programmes at Aalborg University are characterised by problem solving group work centred on authentic projects, often solved in collaboration with the industry. The PBL-based pedagogical model has become both nationally and internationally recognised by universities, researchers, and students as an advanced and efficient learning model. Thus, UNESCO has, in February 2007, placed its only Danish Chair in PBL at Aalborg University.

3.3.2 Motivation and Commitment

In this project, AAU participates with the Medialogy section at the Architecture, Design and Media Technology department, which has a proven and long experience regarding PBL implementation and hosts a highly successful educational program at bachelor, master and Ph.D. level. AAU aims at use

the PBL3.0 approach in order to better facilitate student learning paths in its PBL approach. The PBL3.0 approach can specifically better facilitate group project work, since project work and communication between groups and supervisors currently take place “offline”. The PBL3.0 approach will provide methods and tools to collect student data during project work and use this data in order to draw conclusions about student attainment and engagement. These conclusions can be used to improve teaching and learning at AAU.

In a wider context, the PBL3.0 approach can be integrated to the PBL Aalborg Model in order to enhance its pedagogical value by incorporating new technologies, like learning semantics and learning analytics. This integration can ensure that the AAU model for PBL remains a world acclaimed, radical pedagogical innovation and that AAU remains at the international forefront in developing PBL. This project can re-conceptualise how PBL could operate in new formats, based on the core principles of PBL, while exploring and developing new digital approaches that operate in and open up for new hybrid PBL learning models. An important goal of AAU is to have a high degree of global and local impact. This can be achieved within PBL3.0 by setting a research agenda for PBL in a digital age that will attract international attention as new directions for more student-centred learning is a global need.

3.3.3 Means to Achieve the Objectives

The research and innovation team consists of five persons. In June 2017, a new big project on the future of PBL in the digital era has launched at AAU and the PBL3.0 team aims not only at providing input to this project but also collaborating with the researchers participating in this project. Moreover, collaboration and development with other AAU researchers is also possible.

Visible opportunity: The unique selling point of AAU is its PBL model the implementation of the model at university level. We see therefore the market on PBL implementation incorporating the PBL3.0 approach as an interesting cross-selling element.

Exploitable assets and results: PBL3.0 enables a new PBL implementation incorporating novel technologies. The new implementation can be applied to guide and monitor semester project group work.

A PBL_LA learning environment for PBL Project Group Work– a new online environment, which incorporates LA and LS of the PBL3.0 approach.

3.3.4 Exploitable Assets and Results

Describe the exploitable assets and results from the project as an overview and per item

ASSET	SHORT DESCRIPTION	HOW EXPLOITED
PBL_LA learning	<ul style="list-style-type: none"> Implementation of an online environment to facilitate semester 	<ul style="list-style-type: none"> Use for improved student learning Use for internal structuring of

environment for PBL Project Group Work	PBL project group work <ul style="list-style-type: none"> • Online activities and material based on PBL 	semester project content
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Table 6: Exploitable assets and results of AAU

3.3.5 Rationale

The Exploitation path is twofold: first, the new environment for PBL project work will contribute to the improvement of student support by teachers, better structuring of group work, and better communication between students and teachers. Therefore, PBL3.0 will contribute to increased quality of service towards university students.

Second, this environment will provide teachers with student data but also teacher data, therefore contributing to teacher development and improved performance. This will strengthen AAU’s teaching.

3.4 Individual Exploitation Plan: University of Alcalá

University of Alcalá, Spain, www.uah.es

Editor(s):	Elena García Barriocanal
Date of plan:	9/6/2017

3.4.1 Partner Profile

The University of Alcalá, (UAH) whose origins date back to the year 1499, is currently one of the medium-sized Spanish universities, with 15 faculties – including the Polytechnic School– and more than twenty thousand students. It is located approximately 30km. outside of Madrid, in the city of Alcalá de Henares, named a World Heritage site by UNESCO in December 1998, in recognition of the fact that Alcalá was the first university town, planned as such, in the world. The Computer Science Department (CSD) is located at the Polytechnic School, created in 1989, it counts with a staff of more than sixty full time persons and is responsible for the B.Sc., M.Sc. and Ph.D. degrees in Computer Science.

The Information Engineering Research Unit (IERU) is an active research group that has produced a significant research activity in the fields on Semantic Web, learning technologies and Information Systems applications in the last 10 years. IERU has participated in several national funded projects related with learning technology including MAVSEL “Mining, analysis and visualization in e-learning” and SUMA, a industry-research cooperation advancing interoperability using MIT OKI standards. It has also lead FP6 project LUISA on Semantic Web Services for Learning Technology and participated in several EU projects related to digital education as the CIP PSP project OpenDiscoverySpace. The group is currently active in different application areas of analytics, especializing in machine learning

and Social Network Analysis (SNA). The group is also currently responsible for the postgraduate programs in Big Data and Analytics (Big Data, Data Science, Internet of Things and related).

3.4.2 Motivation and Commitment

In PBL 3.0, UAH aims at devising and testing a comprehensive approach to analytics for problem-based learning on-line or blended activities, and prototype and test that approach in a concrete course. This will not only benefit the users and the institution but will provide new insights and knowledge to transfer the innovation to other courses and programs and also to consulting and technology transfer activities that the group regularly conducts with institutions and companies.

The original motivation of UAH was that of bridging the area of semantic modelling and the area of learning analytics. Semantic modelling is concerned with providing data with a coherent and systematic interpretation, that may eventually enhance opportunities for automation, or in some cases, even for reasoning tasks. It essentially uses logics-based methods, typically the use of ontology languages that convey the conceptual terminology of the domain in a formal expression. On the other hand, analytics is concerned with finding patterns or models in data, which require as a precondition that the data is coherently presented to algorithms. It becomes apparent that both areas are required to provide a seamless interpretation of data for the purpose of benefitting students and institutions in a cycle of data analysis. The links between the two are basically connected by the metadata that describes learning activities and resources, and that provide comparability of data when in the context of learning analytics. The design of the framework crossing the semantics and analytics scope is critical to the mission of the group in R&D in the area of learning technology, and is a core element to leverage past research in the group. The group is committed to solve that particular gap and disseminate the solution to wider audiences, both academic and professional.

3.4.3 Means to Achieve the Objectives

UAH will prototype and test the framework in (arguably) the most problem-oriented course in Computer Science: Advanced Software Engineering, in which students are faced with a realistic development setting transporting them to the values and practices that will need to carry out in a professional context. This will serve as the demonstration and proof of concept on how problem-based, realistic activities can be deployed using the semantic models developed in PBL 3.0 in combination with open software systems that are close to professional practice. This will entail prototyping the different data transfer functions from modeling as done with the ADOxx PBL 3.0 tool to popular analytics environments as SciPy. That will end up with an assessment of the different elements required in the process, and the integration of tools necessary to achieve the final end.

Visible opportunity: UAH main strength is that of combining strong expertise both in learning technology and in analytics, bridging the knowledge needed in both areas of expertise to devise a comprehensive framework. The group is currently planning for a national-level program to apply

again the framework, with the collaboration of two of the main on-line Universities in Spain and Universities in Latin America.

3.4.4 Exploitable Assets and Results

Describe the exploitable assets and results from the project as an overview and per item

ASSET	SHORT DESCRIPTION	HOW EXPLOITED
PBL Semantic Model	<ul style="list-style-type: none"> Formalization of the PBL model of activities. Compatible with IMS LD 	<ul style="list-style-type: none"> Used in the annotation of activity models for learning activities. Provides the schema for the data used in learning analytics.
PBL 3.0 Software Engineering framework	<ul style="list-style-type: none"> Application of the PBL Semantic Model on Software Engineering tooling. 	<ul style="list-style-type: none"> Support for PBL approach to teaching software engineering practices. Basis for transferring similar approach to other domains and tools.

Table 7: Exploitable assets and results of UAH.

3.4.5 Rationale

The exploitation path can be summarized as follows:

- First, the approach will be devised, implemented and tested in the “Advanced Software Engineering” course.
- This will provide initial insights on the feasibility and pitfalls of the approach, and will be disseminated in a second stage internally in the University and externally through the academic community.
- Then, the approach will be made openly available to the community, and extensions to other courses that emphasize the mix of professional tools with a PBL methodology will be assessed.

3.5 Individual Exploitation Plan: BOC

BOC Asset Management GmbH, Austria www.boc-group.com

Editor(s):	Wilfrid Utz
Date of exploitation plan:	25/05/2017

3.5.1 Partner Profile

BOC is a software development house and a consultant in the field of IT-supported management approaches. The main business field and its origin is Business Process Management with the toolkit ADONIS[®]. Today BOC offers commercial modelling tools for strategy management (ADOScore[®]), business process management (ADONIS[®]), logistics (ADOlog[®]) and IT-infrastructure and IT-architecture management (ADOit[®]).

The BOC network consists of nine units; operational units are located in Vienna, Berlin, Madrid, Athens, Dublin, Warsaw and Winterthur, whereas the headquarters, software and research units are located in Vienna. In overall there are 180 employees that mainly act European wide. In 1995 BOC was created as a spin-off from the University of Vienna developing the Business Process Management System (BPMS) – paradigm together with the BPMS group of the University of Vienna. Since then BOC has a tight cooperation with the University of Vienna mainly in the field of business process engineering and knowledge engineering covering aspects such as modelling, meta-modelling, semantics, agents and knowledge management.

The core competence beside the consultant services is the development/ Implementation of modelling tools based upon BOC's ADOxx Meta-Modelling platform (accessible online at www.ADOxx.org). As the business process management toolkit ADONIS[®] was one of the first commercial toolkits built using meta-modelling concepts and technologies, BOC gained technological leadership in this market and recently published the open use platform ADOxx.org. Currently BOC gains global awareness as one of the first companies providing a meta modelling platform that can be used for developing modelling tools.

3.5.2 Motivation and Commitment:

In PBL 3.0 BOC aims to establish a problem-based approach for trainings and seminars currently offered within the ADOxx.org community. These trainings are currently run as hands-on workshop, a stronger focus on the individual expectations of participants, which are internal or external to the company, and digitalization of the training process is envision as an outcome. In addition, the innovative solution for technology enhanced learning ECAAD as a result of a community interaction is validated in PBL3.0. Following an Open Innovation approach firstly to gain global awareness in the domain of concept modelling, and secondly to influence the own product and service development with the help of the Open Innovation Community.

The Open Innovation is realized by providing a so-called Innovation Shop (ADOxx.org) that offers solutions to the research and education community in the area of concept modelling for free. Currently more than 2.500 interested stakeholders are regularly informed about results on ADOxx.org. About thirty research centers and universities are interacting with ADOxx.org, from which about fifteen institutions have a regular contact and seven committed to act as a laboratory, which is a tight interaction by building their own local community. More than 1.000 developers have downloaded ADOxx and develop their modelling tools in form of student work, research tasks,

teaching actions, projects or pre-commercial tool developing. Hence, first priority in BOCs participation in PBL 3.0, is to trigger the model-based technique for technology enhanced learning, and distribute the content and tool for free in the ADOxx.org research and education community.

The indirect goal is that a community can be created around the approach in PBL 3.0, which starts to feed-back ideas, requirements or partly solutions into the Open Innovation community. In that case, BOC benefits from those ideas that came from outside by filtering the ideas and forwarding a recommended set of ideas to the product manager.

3.5.3 Means to Achieve the Objectives

The innovation team consists of about ten persons that currently maintain the ADOxx.org Open Innovation community. Three to five parallel EU-Project enables the operation of such an Open Innovation community, by installing sub-communities per project domain and enable not only the collaborative development within a project, but more interestingly the collaborative development between projects and independent researchers.

The hand-over to the product development is performed in quarterly stand-up meetings with the product manager of BOC's products and dedicated service managers. In parallel regular announcement from social media presence about the solution developed are performed to create awareness in the community. Initial hand-over, cooperative development and presentation in front of the management board has already been provided.

Visible opportunity: BOC's unique selling point is the flexible adaptation of the approach and tool support for TEL. Hence, we see the market on learning design and management as an interesting cross-selling element of current product and service offerings.

3.5.4 Exploitable Assets and Results

Problem-based learning enables a novel training and seminar model for current offerings to customers and internal teams.

1. **PBL Design Environment** – this environment enables to create courses and collaborative learning spaces using conceptual models.
2. **PBL ADOxx.org Training Course** – the course designed and tested in the context of the process also represents a transition from on-site trainings to virtual learning collaboration in teams.

ASSET	SHORT DESCRIPTION	HOW EXPLOITED
PBL Design Environment	<ul style="list-style-type: none"> • Design Environment for PBL • Support PBL model (phases, steps) and repository of patterns/best 	<ul style="list-style-type: none"> • Tool and approach offered as an innovation item to the ADOxx.org community. • Application for internal structuring

	practices	of learning initiatives
PBL ADOxx.org Training Course	<ul style="list-style-type: none"> • Plugin-based extension techniques • Implementation of a PBL-based course to learn programming using ADOxx • Online environment, material 	<ul style="list-style-type: none"> • Use for community trainings (continuous) • Use for internal structuring of course content

Table 8: Exploitable assets and results of BOC.

3.5.5 Rationale

The Exploitation path is threefold: first, the Open Innovation community ADOxx.org is used for research and education community exploitation. This is performed with highest priority, in order to contribute to the TEL sub-community, distribute project results as tools and technologies. BOC is interested in gaining world-wide awareness in concept modelling, the aspects of PBL 3.0 are an interesting aspect in the community.

Second, the competence building within BOC with respect to learning design/problem-based approaches is strengthened.

Third, the product and service portfolio may be extended with one or more of the aforementioned possible exploitation assets or results.

This inclusion of innovation items into the production and service development line consists of different dimensions such as customer demand, profit, concept and technology support as well as the dynamic of the potential market.

4 Conclusion

The plans and strategies presented in this deliverable represent the preliminary results of the analysis conducted and revised in the initial reporting period of the project, intensified after the availability of results from the technical and application work packages. It comprises a view on the value of the project results, the main stakeholder description, the market conditions, the used methodology and the intentions of the consortium as a whole and individually to exploit the results of the project. The focus of this initial deliverable lies upon the methodology, its implication on the individual plans and impact on the exploitation and sustainability plans for the consortium as a whole.

In the upcoming period, these plans are used to guide the validation and revise/detail outcomes according to the methodology defined.

References

- [1] Dark House Innovation, *Digital Innovation Playbook. Das unverzichtbare Arbeitsbuch für Gründer, Macher und Manager*. Murmann Publishers GmbH; 2. edition (2 Sep 2016).
- [2] N. Efendioglu and R. Woitsch, "A Modelling Method for Digital Service Design und Intellectual Property Management towards Industry 4.0: CAXMan Case," presented at the 5th International Conference ICServ 2017, Vienna, Austria.