



Language Technologies for Lifelong Learning

Language Technologies for Lifelong
Learning

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Table of Contents

Executive Summary.....	4
1 LTfLL Exploitation Strategy.....	5
1.1 Exploitable Results – What we can exploit.....	5
1.2 Relevant target user groups and markets – Who do we target	6
1.3 Main exploitation activities – How do we manage the exploitation of LTfLL outcomes?.....	9
2 The LTfLL Services and Side Outcomes.....	11
2.1 Learner Positioning Service (WP4.1)	11
2.1.1 Description.....	11
2.1.2 Motivation for exploitation.....	11
2.1.3 Pre-requisites of the service.....	12
2.1.4 Position in the market.....	12
2.1.5 Target groups for this service	13
2.2 Service for Monitoring Conceptual Development – CONSPECT (WP4.2)	15
2.2.1 Description.....	15
2.2.2 Motivation for exploitation.....	15
2.2.3 Pre-requisites of service	16
2.2.4 Position in the market.....	16
2.2.5 Target groups for this service	16
2.3 Chat & Forum Analysis and Feedback System – PolyCAFe (WP5.1).....	18
2.3.1 Description.....	18
2.3.2 Motivation for exploitation.....	18
2.3.3 Pre-requisites of the service.....	19
2.3.4 Position in the market.....	20
2.3.5 Target groups for this service	21
2.4 Online Synthesis Advisor – PenSum (WP5.2)	22
2.4.1 Description.....	22
2.4.2 Motivation for exploitation.....	22
2.4.3 Pre-requisites for exploitation.....	22
2.4.4 Position in the market.....	23
2.4.5 Target groups for this service	24
2.5 Formal Learning Support System – Course Editing Service (WP6.1) & Informal Learning Support Service to Locate Content and Peers (WP6.2)	25
2.5.1 Description.....	25
2.5.2 Motivation for exploitation.....	25
2.5.3 Pre-requisites for exploitation.....	26
2.5.4 Position in the market.....	26
2.5.5 Target groups for this service	28

2.6	Exploitation of LTfLL Threads	29
2.6.1	The LTfLL Long Thread	29
2.6.2	The LTfLL Short Thread and its potential in marketing activities	29
2.7	Side Outcomes and Motivation for Exploitation	31
2.7.1	Description.....	31
2.7.2	LTfLL Methodologies	31
2.7.3	Transferability of the LTfLL services	32
2.7.4	Target groups for these outcomes	33
3	Roadmap for exploitation and sustainability.....	34
3.1	Learner Positioning Service (WP4.1)	34
3.2	Service for Monitoring Conceptual Development – CONSPECT (WP4.2)	36
3.3	Chat & Forum Analysis and Feedback System – PolyCAFe (WP5.1).....	38
3.4	Online Synthesis Advisor – PenSum (WP5.2)	40
3.5	Formal Learning Support System – Course Editing Service (WP6.1) and Informal Learning Support Service to Locate Content and Peers (WP6.2)	41
3.6	Exploitation of LTfLL Threads	42
3.6.1	The LTfLL Long Thread	42
3.6.2	The LTfLL Short Thread.....	42
Annex	44
	Existing contacts for exploitation.....	44
	Annex - Mapping of motivation for exploitation of LTfLL project outcomes to target user groups.....	47

Executive Summary

This report describes the exploitation strategy of the LTfLL services and their potential impact in the current market. For the planning activities the project team used the results of the validation for the version 1 services and the defined improvements of the next versions. The D8.5 has been extended in June 2010 to add a more detailed planning for the exploitation of individual LTfLL services, threads and the LTfLL outcomes at all.

The report is organized as follows:

- The first section identifies the exploitable results (services and side outcomes) of the project, the relevant target groups and target markets for for exploitation of the LTfLL results (including the LTfLL ecosystem) and main exploitation activities to be undertaken in year 3 of the project. The target groups and markets are: learning organisations, content and service providers, consumer functionality developers and researchers, environment integration support and policy makers and decision makers. The exploitation activities to be undertaken are centred around openness in information and documentation, training for end-users, content and service providers and developers; and awareness-raising for end-users, content and service providers, developers and policy makers.
- The second section describes each service developed in LTfLL, its value for exploitation and its position in the market. Also, the specific target groups each LTfLL service addresses are mentioned.
- The third section explains the detailed planning for the required steps during year 3 of the project to ensure successful exploitation of the LTfLL project results.

1 LTfLL Exploitation Strategy

The Language Technologies for Lifelong Learning (LTfLL) project is developing a set of next-generation services to support users during the lifelong learning process. These services are offered for integration in existing learning environments. This section describes the strategy taken to exploitation in the project. It will look at the exploitable outcomes of the project, identify the relevant target groups and project the main exploitation activities.

1.1 *Exploitable Results – What we can exploit*

Through ongoing discussions within the partnership, the LTfLL services, and a number of side outcomes of the research conducted during the project emerged as the most valuable outcomes of the project.

All services developed in LTfLL use high-level technology to bring more insight and analysis to available data (such as learner output in essays and blogs, learner conversations on chat platforms and forums). Their aim is to support users in processing this vast amount of data in a faster and more profound way, through the provision of small user-friendly applications in widget format.

The second chapter of this report describes the services, the motivation for their exploitation, their position in the current market and their individual target groups. The services include:

- Learner Positioning Service (WP4.1)
- Service for Monitoring Conceptual Development – CONSPECT (WP4.2)
- Chat & Forum Analysis and Feedback System – PolyCAFe (WP5.1)
- Online Synthesis Advisor – PenSum (WP5.2)
- Formal Learning Support System – Course Editing Service (WP6.1)
- Informal Learning Support Service to Locate Content and Peers (WP6.2)

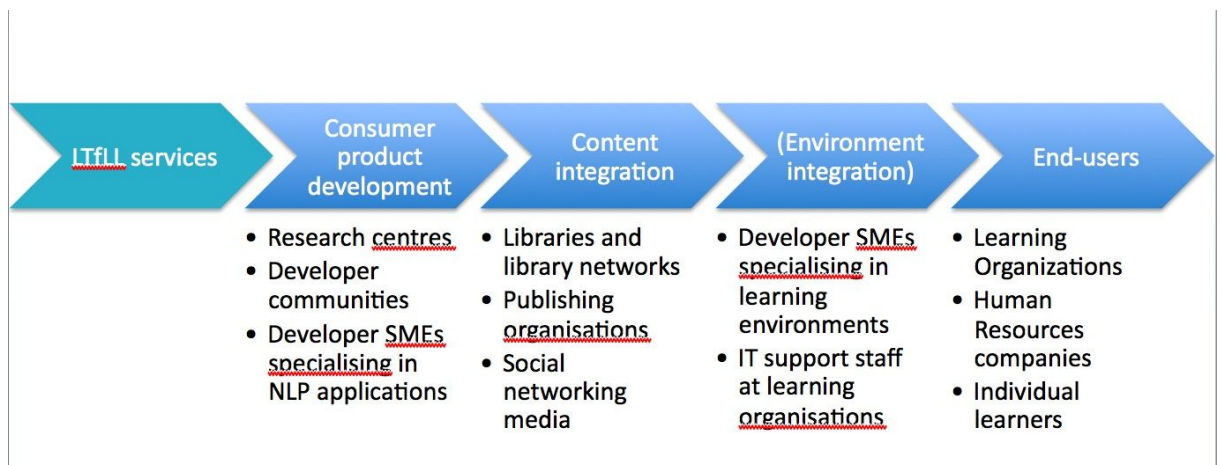
Also a number of side outcomes of the research in this project have been identified as potential exploitable results. Especially, the methodologies used and validated in LTfLL (Scenario Based Design Methodology and Validation Methodology) and research and technical experience on Natural Language Processing (LSA, discourse analysis, etc.) and on

the integration of Widgets and Inter-Widget Communication have value for exploitation in commercial and non-commercial environments.

1.2 Relevant target user groups and markets – Who do we target

Building further on the report ‘D8.3 – Exploitation plan’, the project team enhanced the definition of relevant target user groups and markets. This additional input to exploitation possibilities was informed by consortium-internal discussions as well as informal talks with contacts in different learning environments. Even if some of the target user groups are not in the primary focus of the LTfLL project as described in the DoW, the consortium is using existing contacts of all project partners to create awareness of the project results in a wide area of interested communities.

The outcomes of the LTfLL project are prototypes of next-generation services built on advanced research on the application of language technologies in education. Their exploitation to a consumer market requires (i) some further development (on usability, transferability to other domains and other learning environments, etc.), (ii) the identification and support of a number of ecosystem business partners, (iii) awareness raising with policy makers and (iv) awareness raising and training with end-users. Figure 1 illustrates the required process to create consumer market products from the LTfLL services as research prototypes.



The target groups (as targeted *people*) of the LTfLL outcomes can be grouped in three:

- **researchers and developers:** these stakeholders are targeted for further development of the LTfLL services to create consumer products. This includes the NLP development of the applications to other domains, the creation of new services based on language technologies and integration and customisation to specific user environments.
- **content service providers:** these are the content providers and support providers who ensure the organisational, logistical and technical prerequisites of the services
- **end-users of the LTfLL services:** these are the actual users of the LTfLL applications, i.c. lifelong learners, students and/or teachers at learning organisations.

These target groups can also be viewed from an organisational point of view. The end-users of these services are the clients of **learning organisations**, namely schools, school networks, higher education institutions, training providers and Human Resource companies and departments. Learning organisations can offer the LTfLL services as tools supporting their client services. Social Networking Media can also play a role in reaching individual lifelong learners not connected to any learning organisations. The LTfLL services can also be provided as part of functionality on social networking media to give learners the tools to enhance their learning experience from this media.

All these organisations will depend on some internal support for the set-up and maintenance of the services, but also on some essential business-to-business cooperation to be able to offer these services to a wider public. The companies in an LTfLL ecosystem are:

- **content and service providers:** the LTfLL services build on underlying general language and domain-specific corpora and ontologies. A widespread sustained exploitation of these and other NLP-based services needs commercial providers of this type of databases. Possible candidates are (academic and public) libraries, library networks, publishing houses, etc. Also, social networking media can be interested to offer these services to their clients directly, as tools for clients to gain more value from their networks.
- **consumer functionality developers and developer networks:** the LTfLL services in their current shape are prototypes that offer functionality for one domain. Exploitation will require some development to make these services ready for a consumer market.

Also, some further development will be needed to extend functionality to other domains, or even investigate new NLP-based functionality. Considering this, developers in developing communities and software companies and SME's specialising in NLP-based applications will be targeted.

- **environment integration:** the LTfLL services are designed to offer functionality through widgets. The integration of these widgets into customer environments may require some customisation in look-and-feel. For this, developers of customer environments and technical support staff at learning organisations may be required.

Finally, for a successful exploitation of the LTfLL services to consumer environments, further investments in research and development of consumer applications based on high-level language technologies will be needed. As part of the exploitation strategy, **policy makers and decision makers** will also be reached to raise awareness on the potential of language technologies.

Examples of these target organisations are:

- learning organisations
 - o schools, school networks: e.g. schools and teachers using Moodle, European Schoolnet, national school networks
 - o higher education institutions: e.g. LTfLL partner HE institutions, universities and polytechnics in partner countries, networks of HEIs
 - o training providers (vocational, adult, e-learning providers, training companies): e.g bitmedia,
 - o Human Resources companies, HR departments in companies, training mediators
- Content and service providers: e.g. (academic and public) libraries and library networks for corpora, such as Vereniging Openbare Bibliotheken (NL)
- Consumer functionality developers and researchers: e.g. Moodle developer community, SMEs specialised in Moodle, German Society for Computational Linguistics and Language Technologies (GSCL)
- Environment integration: e.g. Moodle developer community, SMEs specialised in Moodle,

- Policy makers and decision makers: e.g. Ministries of Education, National Agencies at partner countries

1.3 Main exploitation activities – How do we manage the exploitation of LTfLL outcomes?

The exploitation activities are centred on three pillars of openness, training and awareness-raising.

Successful exploitation depends on **openness** of information and standardisation. To ensure that the LTfLL services can have a high impact, the technical results of the project will be made available in well-documented releases under General Public Licence (GPL). During the project, the project consortium will offer advanced implementation support of the services. The language technology based source code of all LTfLL services will be available on the Sourceforge website, a common platform to share source code in the developer community. Also, the technical results make use of available standardised formats. The LTfLL project produces a set of standard open source widgets and web services that are available for downloading. The produced tools and services are based on existing standards to ensure that the developer community is able to reuse the LTfLL tools in a variety of different environments. This will enable language technology software developers and researchers to further develop the code into user-friendly applications and/or add on new enhanced functionality as per user demand.

Training is the next key factor in the LTfLL exploitation strategy. The implementation and use of the tools need some initial training support from the project consortium. Training will be developed on different levels and for different target groups. Videos, presentations and demo's will be made for dissemination and training to end-users of the LTfLL services. Technical training material will also be developed in the form of extensive documentation and implementation support for content and service providers. If the need occurs, on-site trainings can also be provided. As the Moodle community has been identified as a particularly suitable target group for the LTfLL services, a demonstration of the services, as widgets for the Moodle platform, will be developed. Full technical documentation and workflow will be provided for the Moodle demo's as well as an end-user training. The Moodle community will

be reached through Moodle conferences and Moodle developer conferences. Also, as the content and service providers are an essential partner in the LTfLL ecosystem, demonstrations of the LTfLL services will be given at libraries, to gauge their interest in providing these new types of business-to-business services.

Awareness-raising is the final part of the LTfLL exploitation strategy. Presentations, workshops and seminars on the potential of language technology based services in education will be held during the last year of the project, aimed at all target groups. Appropriate platforms and events will be selected to reach the target groups in their own environments and networks. These can include face-to-face events such as conferences or seminars, but also online communities, networks and portals. Examples are: Moodle conferences and Moodle developer conferences, Online Educa Berlin 2010, Sourceforge ...

Policy makers will be reached through dissemination to the National Agencies of the partner countries.

The LTfLL website will be central to these exploitation activities. Links to the Sourceforge code website, documentation, training materials and demo's will be available here. The LTfLL group on the teleurope.eu website will be promoted as the community around language technology applications for educational purposes.

For a more detailed description of the dissemination activities see also the deliverable 'D8.4 – Dissemination & Training Results y2 & Plan y3'.

2 The LTfLL Services and Side Outcomes

2.1 Learner Positioning Service (WP4.1)

2.1.1 Description

The Learner Positioning Service performs a qualitative and a quantitative analysis of learners' texts, to give measure of the similarity and fit between the learner's language use and the language used by the Community of Practice the learner strives to belong to. Qualitative analysis involves the scoring of phrases extracted from learner texts according to distinctive features of their usage by comparing its frequency in high and low quality texts as graded by experts. Quantitative analysis uses information such as occurrence counts of these phrases to compute a measure of fit of the learner language as compared to the relevant Community of Practice. In addition, conceptual coverage of learner texts is computed using ontologies by counting how many associated concepts are found in the learner texts.

Tutors can use the results to decide which materials need to be studied by the learner, and in which area of conceptual knowledge the learner may require further support. Learners can evaluate their own positions and identify their strengths and weaknesses.

2.1.2 Motivation for exploitation

The LTfLL Learner Positioning Service is designed to support tutors and learner candidates to establish a specific definition of required training units and corresponding learning methods.

The provision of detailed and optimised hints for the learning path provides many benefits:

- The learner *saves time* during the learning curve.
- This implies also that learners and tutors will be *more satisfied and motivated*.
- The enhanced functionality of the positioning process will enable education providers to develop *individualised and cost reduced training*.
- The improved positioning process will reduce the *overall cost per individual*.

The scenario of this service is based on the real-life requirements of the Austrian Public Employment Service (AMS), which matches unemployed individuals with job openings. An individualized training path is established to achieve the required skills for the job openings.

The use and benefits of the LTfLL Learner Positioning Service are transferable to real-life scenarios and many knowledge domains.

2.1.3 Pre-requisites of the service

The LTfLL Positioning Service requires some initial basic building blocks and some preparation tasks from the end-user (the teacher and tutor in this case).

The service uses Latent Semantic Analysis and will need a starting domain-specific corpus for its calculations. Also, a domain ontology is necessary for giving feedback on the conceptual coverage of the learner. For updating the ontology, the new version of the Positioning Service will provide a semi-automatic solution.

The end users of this service are teachers and tutors. They will need a short training session (some hours) about the usage and goals of the service. With this knowledge, they will be able to build a questionnaire for the job seekers. In the case of an existing questionnaire, the tutors will need to adjust the questions based on the requirements of the service (e.g. change the questions from multiple choices to open questions). For initial use, the teachers or tutors need to collect and grade sample answers for the initial use and upload the required training materials. This initial amount of time for preparing the service for the first use has to be taken into account.

2.1.4 Position in the market

There are currently three popular solutions to positioning of learners in the job market: personal interviews, multiple choice testing and self-reporting.

The use of **personal interviews** provides a useful way of positioning the learner, because the human interaction between the learner and the interviewer is not limited to a predefined environment. To achieve high quality results an interviewer with deep knowledge of the domain is required. Because of these highly educated (and expensive) interviewers and the amount of time needed, the concept of personal interviews is time consuming and expensive (e.g. for interviewing the IT-support team of a typical environment, the number of expert interviewers depends on the number of used systems – for Windows operating systems, Linux operating systems, different database environments, different network infrastructure...).

The positioning service provides a semiautomatic solution to reduce the amount of time the personal interviewers have to invest.

The **multiple choice testing** environment is used for different kind of certifications (e.g. driving licence, certificates in the IT-environment...). The candidates use specialised techniques for the exam preparation, which improve their results but do not improve their real knowledge (e.g. use of ‘brain dumps’ for certificates in the IT-environment).

On the other hand, multiple choice testing is not intuitive and confusing, if the learner is not familiar with the concept of this type of testing. Experienced lifelong learners will be more familiar with multiple choice tests.

The results of multiple choice tests do not cover the complete range of the learner’s existing knowledge. Because of this limitation, this methodology is not the best solution for positioning scenarios. The LTfLL Positioning Services offers a better solution based on open text analysis.

In assessment through **self-reporting**, it was recognised that learners use a very different rating of their own knowledge. Differences in rating were founded on the different personalities of the persons and their current situation (company, family...). As a result, assessment through self-reporting may not always be useful for positioning.

2.1.5 Target groups for this service

The LTfLL positioning service offers a wide range of opportunities for supporting learning environments. Based on the results of the validation the project team will address the following stakeholders.

The Positioning Service is deemed to be useful in particular for the following learning organisations.

The concept of the LTfLL positioning service is useful for a wide range of **training provider institutions** in different domains (e.g. different technical trainings for IT, electricity, electronics...). The main benefits for this target group are:

- Efficiency of the positioning task: the number of learners in the training provider institutions is typically increasing. Using a tool-based positioning system reduces the amount of time tutors need to support one learner.
- Motivation and self-guided learning: based on the results of the validation, the project team found out that the LTfLL positioning service is able to motivate the learners and

provide the next steps for learning without tutor interaction. Especially in combination with the other LTfLL tools, an improved learning environment could be established.

Traditional secondary school environments increasingly use different learning materials, tools and methodologies to improve the learning quality. The LTfLL Positioning Service will enable teachers in the secondary school to improve their pupils' skills in self-guided learning. Using this approach the teachers can achieve important goals:

- Train pupils for self-guided learning: experience in self-guided learning will be useful for the lifelong learning process of secondary school pupils.
- Teachers are able to save time: teachers will be able to spend less time on process-oriented tasks and more time on providing qualitative support for pupils.
- Offer extended support for pupils with weak spots in knowledge: the positioning service can help bring pupils with weak spots in knowledge to the teacher's attention quicker, thereby giving them more time to provide additional support to these pupils.

This will help pupils complete their school education and acquiring the required skills.

E-learning providers can use the Positioning Service to provide additional support to learners and increase their motivation through just-in-time and on-demand feedback. In face-to-face learning environments, the tutor is the most important motivating factor for learners. The teacher can have reduced visibility in e-learning platforms.

By improving the contents and methodology of the learning process (e.g. by using multimedia, interactivity, variety, and learner support tools such as the positioning service...), e-learning providers can offer compensations for this loss of visibility and resulting lack of motivation of the learners.

2.2 Service for Monitoring Conceptual Development – CONSPECT (WP4.2)

2.2.1 Description

CONSPECT is designed to provide a means by which a learner's conceptual development can be monitored and feedback opportunities can be promptly and effectively provided.

CONSPECT monitors conceptual coverage of topics based on an automated analysis of textual evidence presented by learners, in comparison with others or over time, to identify shortcomings, misconceptions, and emerging learning opportunities within the learner's zone of proximal development. It uses textual artefacts from both individuals and groups of learners, such as essays or blogs, to establish a visual model, a "conceptogram", of how learners relate concepts to one another.

Learners are able to compare their own model with an emerging group reference model in order to identify differences, or to get feedback on where to seek advice from their tutor.

2.2.2 Motivation for exploitation

CONSPECT helps learners and tutors to analyse the progress of a learner, individually; and to compare the learner with another learner, with the course learning outcomes, with the emerging reference model, and with a group of learners.

The advantages of using CONSPECT include:

- immediate feedback to learners
- enhanced motivation and satisfaction for learners to prepare summaries
- the ability for tutors to locate students lagging behind the group
- more efficient use of the tutor's time

Although CONSPECT is being tested with medical students, with the proper training material, it transfers easily to other domains. It is suitable for both formal and informal learning. It has been targeted to be useful for Problem Based Learning situations but can be used in any environment that requires periodic summaries written by the learner.

2.2.3 Pre-requisites of service

The main pre-requisite of the CONSPECT services is to build the domain-specific corpus. But at the same time this is a unique point of sale: a corpus can be developed by content providers as part of their business model and sold. The corpus itself is a value.

2.2.4 Position in the market

CONSPECT is unique in providing visual comparisons of learner texts, online. Whilst other available tools can provide client-side concept analysis and visualisations of text materials (e.g. Leximancer), no tools yet exist that offer similar features to CONSPECT, for learners, online.

2.2.5 Target groups for this service

The exploitation of the CONSPECT service will address the following learning organisations as target users.

Training providers working on technically oriented concepts for training will be able to add an additional benefit to their courses. The main benefit for this target group is:

- Monitoring the conceptual coverage of topics: using this information for the learners enables the learner himself and also the tutors to concentrate the next steps for learning on specific topics, where the “conceptogram” identifies differences with other learners.

Schools will be approached through the European Schoolnet (EUN) network. To improve the quality of their learning methods the schools are interested to add new approaches to their learning environments.

Based on the amount of time the pupils are spending in the schools, there is enough time available to guide the learners to produce text for the analysis based on their knowledge. Using the “conceptogram” provided by CONSPECT offers benefits for the teachers and pupils:

- Compare the concept coverage between different classes: the CONSPECT service enables teachers to compare the concept coverage of the pupils in their classes with pupils from other classes or schools.

The result of this analysis is useful to identify the topics, where the used learning

method of the teacher does not achieve the learning goals, and enables the teacher to improve the methodology exactly where needed.

- Pupils are able to compare their own concept coverage: The availability of highlighting the differences in covered concepts assists the pupils to identify their weak spots of concepts.
- Identify the strengthen of concept coverage of pupils: The “conceptogram” also shows the topics where the individuals have excellent coverage of the concepts and therefore provides guidance for determining the interests of the learners and ideas for possible jobs in the career planning.

2.3 Chat & Forum Analysis and Feedback System – PolyCAFe (WP5.1)

2.3.1 Description

PolyCAFe produces various kinds of information about discussions in chats and forums, both quantitative and qualitative, such as metrics (e.g. the relative importance of each utterance, learner grades both globally and for particular features like the involvement in the collaboration, the social effect of what they said, etc.), and content analysis results (such as the coverage of the key concepts to be discussed and the discourse threads).

PolyCAFe also provides visual feedback about the interactions and the social participation. The visualization of the conversation and forum is interactive; that means the learners and tutors may explore different perspectives and discussion threads, they may view implicit links discovered by the system between utterances or posts and they may see the threading of using different concepts.

Additionally, the system offers the possibility to search for the most important participants or utterances in the discussion given a search query, using lexical and semantic similarities, plus a social score. Thus, the users can discover other learners who are very good on a given topic and filter the conversation with regard to a given perspective given by the search query.

2.3.2 Motivation for exploitation

Learners in various contexts (schools, universities, communities of practice and other web communities) are using web communication technologies such as instant messaging and discussion forums. However, most of this data is **not really used by the teachers and learners** after the discussion is finished and the data is lost. One of the reasons for not using this data afterward is the difficulty of getting useful information back from the conversation without reading the whole transcript. Moreover, these discussions are rarely examined by a tutor or advanced learner to offer feedback to the participants based on their participation in the chat or forum. Thus, the users sometimes feel isolated and may be not attracted to use such a technology. The PolyCAFe aims at solving these issues by offering the participants real-time feedback, support and recommendation for their participation in a web discussion. It also provides improved visualization of the discussion and implicit link detection between

utterances in order to assess collaboration - one of its objectives being to stimulate the collaboration of users in web conversations.

By taking into account all these issues, the main benefits of using PolyCAFe are:

- Learners get *useful feedback immediately* after they finish a chat discussion and *just-in-time* for forums
- Offers a *better understanding and a way of visualization* of the collaborative processes and of conversations in general
- Students are *more involved and motivated* with the course or domain of the conversation and *are encouraged to use web communication technologies*
- *Reduces the time* needed by tutors to provide feedback and grading
- *Increases the quality* of the feedback for collaborative chat sessions and discussion forums
- *Increases the quality* of the support that teachers can give to learners, because they get interactive abstraction facilities on the collaborative learning, which allow them to better understand the teaching process

The scenario used in the development of this service is based on the ideas and approaches advocated by the Computer-Supported Collaborative Learning (CSCL) community.

Moreover, it contains elements of Self Regulated Learning (SLR) where learners are part of an ad-hoc community. PolyCAFe is intended to be used in most domains and contexts where chat and forums are used as communication tools for learning tasks; it is being tested in the domains of IT and Medicine.

2.3.3 Pre-requisites of the service

The PolyCAFe service needs access to the forums and chat systems to analyse the data. This access to personal data is typically protected by privacy laws (often the local law of the country). Therefore, learners using this system need to be aware of the privacy issues and need to be given the opportunity to express their explicit permission to the system to use their private data. This can be achieved by having the involved learners sign an agreement before the service can be implemented in existing environments.

As the results of PolyCAFe are very much focused on individual contributions to group performances, all involved learners need to be made aware of the benefits of joining in forum

and chat platform and participating in discussions, without being afraid of being monitored or rated..

2.3.4 Position in the market

PolyCAFe will have a unique position in the market, being the single open-source web-based (widgetised) solution for the analysis of chat and forum discussions, offering feedback and interactive graphical support to students and tutors. Moreover, PolyCAFe combines analysis in three dimensions: classical Natural Language Processing (NLP), Social Network Analysis (SNA) and Polyphonic Inter-animation.

The other similar products that provide feedback and recommendations based on chat and forum discussion are stand-alone solutions intended mainly for research such as TagHelper (developed at Carnegie Mellon University - <http://www.cs.cmu.edu/~cprose/TagHelper.html>). They are either based on NLP or on SNA. None of these solutions consider the original polyphonic analysis and none offers interactive graphical analysis of the threads of discussions.

PolyCAFe offers a set of benefits to the market:

- LTfLL is based on a new theory and paradigm (polyphony and inter-animation) that extends the range of analysis from a local (pairs) to a global dimension (threads of discussion).
- It reduces the time required by tutors to provide feedback for the chats and forums that the students participated in.
- It provides preliminary feedback and support for students who participated in collaborative learning tasks using chats and forums.
- It increases the quality of the feedback provided by tutors to students.
- It is a simple web-based solution based on widgets that are easily integrated into various web platforms or that can be used stand-alone

For the PolyCAFe service to be successfully exploited, some challenges have to be overcome:

- In the configuration of the tool, domain-specific corpora will need to be found to train the LSA learning process
- Transferability issues: the NLP pipe may be difficult to create for some languages

- From the end-user (teacher and tutor) perspective, there can be difficulties in designing collaborative learning tasks to be analysed with PolyCAFe
- Some people might be reluctant to receive feedback from the software

2.3.5 Target groups for this service

The main target groups of the PolyCAFe service are end-users at learning organisations and the developer community.

Tutors and teachers at learning organisations have a very difficult and time consuming task to provide feedback to students who participate in collaborative activities using chats and forums and to get an overview of the discussion. PolyCAFe provides the following benefits:

- It reduces the time needed by tutors to provide feedback and grading
- It increases the quality of the feedback for collaborative chat sessions and discussion forums
- It increases the quality of the support that teachers can give to learners, because they get interactive abstraction facilities on the collaborative learning, which allow them to better understand the teaching process
- Learners can get useful feedback immediately after they finish a chat discussion and just-in-time for forums
- It offers a better understanding and a way of visualization of the collaborative processes and of conversations in general
- Students are more involved and motivated with the course or domain of the conversation and are attracted to use web communication technologies

For the **developer community**, PolyCAFe may be a starting point for a tool that supports creativity and collaborative problem solving using the inter-animation ideas of Bakhtin.

2.4 Online Synthesis Advisor – PenSum (WP5.2)

2.4.1 Description

PenSum supports learners in the automatic assessment of their essays (summaries, syntheses) in order to let teachers focus on higher-level activities (e.g. individual learner guidance or course design). PenSum analyses how well learners understand course texts as shown by their textual productions; it provides frequent just-in-time feedback on the on-going writing activities, giving indications of the relevance of written sentences, inter-sentence coherence of the synthesis, résumé of each course sentence..

2.4.2 Motivation for exploitation

PenSum is aimed at providing students attending a course at a distance with feedback on their written productions. Such students take a lot of notes, summaries, syntheses from the courses they attend and they encounter difficulties to be timely assessed by their teachers. Moreover, they have difficulties to self-assess their work and to identify possible misunderstandings. Because of the cognitive effort to assess students' work at this level, teachers often postpone or delay such feedback to their students. Computer-generated feedback is thus useful, for both students and teachers.

PenSum provides semantic-based feedback at two main levels, about how well a given set of sentences are explained and argued (relevance of students' course syntheses, coherence between sentences) and about how the different sentences from the course are covered. More generally, such a tool allows students' self-regulation of their learning and lets teachers focus on higher levels of assessment and scaffolding.

2.4.3 Pre-requisites for exploitation

This service depends on the availability of reference materials. It has been designed for supporting students in universities where the required reference materials are already present. The service could also be useful in additional learning environments as an additional pedagogic approach to enhance the variety of learning methods for individual lifelong learners. But to use PenSum in this case, the required reference text material will have to be established and the learners will need to be given guidelines on how to produce the essays.

2.4.4 Position in the market

To our knowledge, there are very few written-based feedback advisors in the market (even though a lot are under testing in laboratories), and those existing are not under Open Source licensing. Spell and grammar checkers put aside (as well as databases for courses and revision management like <http://www.academium.com/fr/logiciels/7x/logiciel-7x.php>), we can list the following systems.

- **Shallow assessment:** *PaperRater* (<http://paperrater.com>), *Turnitin* (<http://www.turnitin.com>) or *ProofWriter* (ETS, <https://proofwriter.ets.org/>). These systems provide various lexical and style-oriented advice but are mainly at the lexical level (word usage, grammar, mechanics, readability formula).
- **Organisation strategies prompters:** these systems do not check students' essays from a content basis, but prompt them with advice to organize or revise their writing, e.g., for generating ideas (*WriteThis*, <http://www.theprint.dk/writethis.html>; *QuickStory*, <http://www.characterpro.com/quickplot/index.html>).
- **Collective course revision.** Since almost all Learning Management Systems (LMS) allow student collaboration to revise a course, there is a special web service, *myexamopedia* (<http://sites.google.com/site/myexamopedia/>) which uses a special blend of web 2.0 collaborative functionalities (i.e., a wiki engine and Twitter) to let students organize their revisions and refine their work strategies in small groups. Feedback from peers or tutors is also possible, but non-automated.
- **Semantic-based assessment.** *Pearson*, a US publisher, has developed a department (*Knowledge Technologies group*) entirely devoted to the application of Latent Semantic Analysis. They implement a wide range of products devoted to the semantic analysis of writings in school settings (*IEA*, aka *Intelligent Essay Assessor*, *Summary Street*). *Criterion* from ETS is derived from *e-rater*, one of the first automated essay assessors (*Educational Testing Service*, <http://www.ets.org/>) is another automated assessor, which has in addition a scale of assessment criteria teachers can use for providing students with ready-made feedback, based on 12 criteria like proportion or grammar errors, total number of words, etc. *c-rater*, from ETS, is a further attempt to assess the content of students' essays. Finally, *MyAccess* (from *Vantage Learning*, <http://www.vantagelearning.com/school/products/myaccess/>) is another automated essay assessor based on gold-standard comparisons.

PenSum pertains to the third category of tools, but offers functionality in an open source software code. The main strengths of the PenSum service are:

- It provides information on the extent a course is understood through the assessment of the quality of students' writing (syntheses).
- Students get immediate feedback on the relevance and coherence of the written synthesis.
- Students' self-regulated learning is fostered.
- Teachers can devote some of the time previously used to assess relevance/coherence of syntheses to higher-level tasks (e.g., scaffolding, tutoring).

2.4.5 Target groups for this service

The main target group of PenSum are learning organisations and content providers.

Learning organisations in general, and especially schools and higher education institutions will benefit from the use of this service. It is aimed at providing students attending a course with feedback on their written productions.. More generally, it allows students' self-regulation of their learning and lets tutors or teacher focus on higher levels of assessment and scaffolding. The benefits for this target group are:

- The feedback for the learners (students) is independent from human resources.
- The interaction with the system mimics that with a teacher (reading suggestions, assessment of understanding; low transactional distance).
- Learners can get immediate feedback on their productions as often as they want.

Content providers will also be a key target group of this service. As students can have access to specific material (e.g., course texts, additional information, advice) delivered by the system customised to their individual need, there will be a need for the underlying corpora in other domains of interest.

2.5 Formal Learning Support System – Course Editing Service (WP6.1) & Informal Learning Support Service to Locate Content and Peers (WP6.2)

2.5.1 Description

The Formal Learning Support System (FLSS) as part of the Common Semantic Framework (CSF) offers various browsing and searching functionalities. A simple text search returns documents with a varying degree of relevance. Semantic search makes the results more relevant, by using different wordings of a concept and exploiting implicit semantic relations in the text. Browsing the domain ontology helps the teacher to organize taxonomically his/her curriculum...

The learning materials in FLSS are annotated automatically. Users can browse these texts with annotated concepts and contexts, and thus can compile manually a curriculum, a glossary and a test for the learners that will take into account the learner's profile (as a group and individually).

The LTfLL Common Semantic Framework (CSF) supports stakeholders in identifying, retrieving and exchanging the relevant learning material for a given learning task. The Informal Learning Support system (iFLSS) supports the knowledge discovery process through an ontology enhanced with the vocabulary of the Community of Practice (CoP) and by recommending material on the basis of the content, tags and users belonging to the CoP. Communication is facilitated through the use of social networks and new communities of learners can be established through the recommendations provided by the system.

2.5.2 Motivation for exploitation

The LTfLL Informal Learning Support Service is designed to support tutors and learners in finding relevant content and peers by offering ontology-based and social network-based search services.

The Informal Learning Support Service provides many benefits to the learner and tutor:

- Learners *save time* during the learning curve, because the service assists the learner in *locating appropriate materials*
- Learners *save time* because the service enables the learner to locate *relevant peers* whom they can ask for help

- Learners *improve their understanding of a topic* during the search process, since they *acquire knowledge* on a domain on the basis of the ontology fragment. To provide a quick impression on a topic, the service also includes definitions for the search topics.
- The *quality of learning improves*, since the documents retrieved are coming from trusted users (i.e. users in the network of the tutor);
- The *collaborative building of knowledge is supported*, since the social search service allows the learner to make *valuable contacts from the tutor's network* and to extend his own network in this way
- The *collaborative building of knowledge is supported*, since the social search service allows the learner to *identify relevant peers from his own network* with whom he can collaborate to improve their shared knowledge

The scenario developed for this service is based on a situation in which a learner needs to acquire knowledge on a topic in the context of a course. The Informal Learning Support Service is used to locate relevant and trusted content and to acquire knowledge. The use and benefits of the LtFLL Informal Learning Support Service are transferable to different scenarios and many knowledge domains.

2.5.3 Pre-requisites for exploitation

The service assumes that learners are actively using their social networks for learning purposes, as it imports connections and recommended stored material from these networks. This service also depends on the availability of relevant learning materials in the system. The configuration of the service might take some time to be set up. Tutors have to be introduced to the goals of the Learning Support Service to clarify that the additional amount of time and resources needed to use the service is helpful and adds efficiency to the learning process.

2.5.4 Position in the market

The LtFLL Informal Learning Support Service can be differentiated from existing search engines on the basis of the search space and the search philosophy. Both aspects are especially relevant in a learning context.

Like iFLSS, existing search engines, such as Google and Yahoo, aim to retrieve learning materials. With respect to the visualisation, the Wonder Wheel from Google is relevant for our search services. In this view, the results of a search query are visualized in a wheel structure, which shows the topics that are related to the query. For example, when one types in the query 'online social network', a wheel is shown with links to topics like 'twitter', 'facebook', and 'linkedin', while on the right the retrieved documents are shown (<http://tinyurl.com/y5cuq6v>).

While most search engines crawl the complete web for relevant content, the Informal Learning Support Service considers only content that has been marked by other users as being relevant:

- The search space for the Semantic Search includes only content that has been marked by users of social network sites (at the moment only Delicious). By using the bookmark frequencies, the results can be ranked.
- The search space of the Social Search is even more restricted and investigates only the content of a learner's network.

The search philosophy that has been adopted in the Semantic Search service is based on the semantic representation of a domain in the form of a domain ontology. The semantic search not only offers the users a list of results, but also an ontology fragment in which the relevant concept is centred. The learner can browse through the fragment and will in this way acquire knowledge of the domain: the fragment shows related concepts and how they are related to the search term.

iFSS offers a functionality to enrich existing domain ontologies automatically. In this way the Semantic Search service can be adapted easily to different domains. The enrichment process is based on social tags and the structure of DBpedia. The enriched ontology makes a distinction between expert concepts and social concepts. The expert concepts are those concepts that were present in the domain ontology created by experts. The social concepts have been added automatically on the basis of social tags, which ensures that they are relevant.

In the Social Search service, the search philosophy is based on three aspects: users, tags, and resources. These three aspects are used to recommend content that is relevant within a learner's network. In this way, a trust aspect is added to the search process, since the learner knows the people who recommended a document and can use this knowledge to assess the quality of a document.

In addition to the search for documents, the Social Search service also offers the possibility to search for relevant peers in the learner's network or the networks of his contacts. This enables the learner to establish contacts with relevant people that can assist him in his learning process.

A clear added value of our graph visualisation and representation compared to the Wonder Wheel is the underlying semantic structure, which ensures qualitatively good results for the learner's aspects.

2.5.5 Target groups for this service

The Learning Support Services exploitation offers the following benefits to the end-users at learning organisations:

- Identifying appropriate learning materials: Learners save time during the learning curve, because the service assists them in locating appropriate materials
- Identifying relevant peers and tutors: Learners save time because the service enables them to locate relevant peers which they can ask for help
- Getting acquainted with a new domain and finding out which concepts are relevant: Learners acquire knowledge of a domain on the basis of the ontology fragment. To get a quick impression of a topic, the service also includes definitions for the search topics.
- Assessing relevance and quality of learning objects: The quality of learning improves, since the documents retrieved are coming from trusted users (i.e. users in the network of the tutor)

- Enabling collaborative learning: The collaborative building of knowledge is supported, since the social search service allows the learner to make valuable contacts from the tutor's network and his own network.

2.6 Exploitation of LTfLL Threads

Additional to the exploitation of the individual LTfLL services the project team is addressing the usage of LTfLL Threads (combinations of LTfLL tools).

2.6.1 The LTfLL Long Thread

The LTfLL Long Thread uses the following tools in one integrated set:

- Service for Monitoring Conceptual Development – CONSPECT (WP4.2)
- Chat & Forum Analysis and Feedback System – PolyCAFe (WP5.1)
- Online Synthesis Advisor – PenSum (WP5.2)
- Informal Learning Support Service to Locate Content and Peers (WP6.2)

The Long Thread demonstrates how different language technology tools can be combined to assist the learners' work. It is only one example of possible threads based on LTfLL tools. Further development on the implementation of these threads will take place in the next stage of the project.

The demonstration of threads is useful for further discussions with stakeholders about possible threads based on their requirements for learning. The project team is interested to get additional ideas and feedback from different stakeholders.

2.6.2 The LTfLL Short Thread and its potential in marketing activities

The LTfLL Short Thread uses the following tools in one approach:

- Learner Positioning Service (WP4.1)
- Formal Learning Support System – Course Editing Service (WP6.1)

The approach of this thread gives an excellent example of opportunities for self-guided learning by using language technology tools.

The LTfLL Short Thread provides a concept that can be integrated in the learning process of a variety of environments (university, schools, and companies). Therefore it has a high chance of being directly exploited and it will be used for demos on dissemination events (e.g. ALT-C).

As an additional usage of the positioning service and the learner support service, the project team established a concept for integrating the tool in marketing activities from learning providers:

- The LTfLL Positioning Service can be offered as a free service by a learning provider, for their specific domain of interest. Customers are invited to use the LTfLL Positioning Service, to give the customer a first step to a customised offer. The learning provider could offer additional benefits for the customers who finish the positioning task (e.g.: a voucher for trainings or training materials, a small gift...) Unlike traditional testing tools which measure customers' performance, the LTfLL Positioning Service avoid this issue by discovering the position of the customer with respect to the learning provider's offer.
- The Learning Support System can be used following the positioning task to provide a list of adequate learning resources for the customer (based on the basket the learning provider is offering).

This marketing thread enables the learning provider to achieve two goals:

- Selling the learning resources (e.g. books, face-to-face trainings, E-Learning...)
- Collecting information about the weak spots of knowledge: this information is very useful for the learning provider to adapt the learning materials, concepts and further marketing activities for an individual customer and for the wider customer base.

2.7 Side Outcomes and Motivation for Exploitation

2.7.1 Description

The LTfLL project also produced a number of side outcomes, besides the technical services themselves. These include: (i) the methodologies used and validated in LTfLL (Scenario Based Design Methodology and Validation Methodology), (ii) the research and technical experience on Natural Language Processing (LSA, discourse analysis, etc.) and on the integration of Widgets and Inter-Widget Communication.

2.7.2 LTfLL Methodologies

The Scenario Based Design Methodology and the Validation Methodology used in the LTfLL project have value for exploitation.

The **Scenario Based Design Methodology** was used in the project to develop tools that solve real-world problems in the education sector. The methodology promotes a staged application development plan, starting from a use case, to define a problem scenario, a solution scenario and an information and interaction scenario, and finally a validation scenario. WP3 deliverables describing this methodology have value for dissemination and exploitation. The first step for this exploitation will be the potential use of this methodology in further projects at the partner institutions.

The used **Validation Methodology** was established appropriate to the Scenario Based Design Methodology and the requirements of learning in different contexts. This methodology is useful for different software projects in the IT domain and also to improve the validation in existing learning environments. Using this methodology can improve the efficiency and results of software projects or might be used for creative processes for bringing up concepts for new software products. WP7 deliverables describing this methodology will be used for dissemination and exploitation purposes. As with the Scenario Based Design Methodology, this methodology will have its first exploitation possibilities in future projects in partner institutions.

2.7.3 Transferability of the LTfLL services

The research experience and technical experience gained during the LTfLL project by the project partners have a high potential for exploitation. This is especially useful, as the development and validation of the LTfLL services were done based on pre-defined domains (e.g. medicine, information technology) and a limited number of different languages (e.g. English, France, German, Bulgarian, Dutch). Transferability to other domains and other languages will depend on effective exploitation of this gained experience. In particular, the experience in working with language technologies and widgets will be especially useful.

Within the partnership, the theoretical and implemented **Natural Language Processing (NLP) knowledge** will be relevant for future projects and further development in different environments. The research community will be able to work on further improvements of the language technologies. The validation results for the LTfLL services will provide initial information for these improvements.

The experience gained by this partnership will also be interesting for service providers and NLP developer companies, which can new business models based on the new functionalities shown in this project. By no means are the ideas of using language technology for consumer applications limited to the educational sector..The LTfLL services show a prototype of the potential of language technologies, and further development of these technologies will provide many new areas for innovation.

Regarding **widget integration**, there are two approaches used in the project:

- Integration of widget-based services in existing learning environment.
- Establishing a widget-to-widget communication to enable the LTfLL services to work together.

The WP2 developed useful methods for establishing a widget-to-widget communication, which can be interesting for other software development projects in the partner institutions and for the developer communities in general.

2.7.4 Target groups for these outcomes

Learning Organisations - Universities

Researchers at universities will be able to pick up the language technologies based outcomes of the project for reusing them for further development, integration in their work and establishing new ideas and concepts for using language technologies.

Software Developers and Development Companies

Developers might be interested in the use of the Scenario Based Design and the Validation Methodology to improve their own software development process. The experience gained by the project consortium in NLP technologies and widgets and inter-widget communication concepts can also be valuable for this target groups. If interest is apparent, on-site trainings by project partners at interested development companies can also be part of the exploitation strategy.

Companies

Overall business oriented companies might be interested in the opportunities the language technologies are offering for their business.

As prototype applications showing the potential of language technologies for consumer applications, the demonstration of the practical use of language technologies in real life highlights the capabilities and can opens minds for new approaches.

3 Roadmap for exploitation and sustainability

The project team established a roadmap for exploitation and sustainability which is based on individual tools and also combinations of tools (threads) to offer the best value for the individual stakeholders who are addressed by the LTfLL outcomes.

3.1 Learner Positioning Service (WP4.1)

Learning Organisations - Training Provider Institutions

The LTfLL positioning service will be implemented in the training environment of bitmedia to establish a showcase in the lifelong learning area in Austria.

To prepare for implementing this tool in the business environment the following steps will be done during year 3:

- The LTfLL positioning service will be improved by further development as described in the D7.3 (until the next validation round in October)
- The documentation to implement the tool in the learning environment will be used for the next validation round and adjusted based on the feedback of the tutors and learning managers.
- In December 2010 a meeting with the responsible project manager for the learning project will be used for the final decisions (e.g. for which course the service will be implemented).
- During the first quarter of 2011 the implemented showcase of the LTfLL positioning service will be active and an event to demonstrate the benefits to customers will be scheduled.

Learning Organisations - Secondary Schools

To implement the positioning service in the secondary school environment we had informal meetings with the responsible IT teacher in the partner school (“Schulzentrum Hitzendorf”) and the responsible director.

The following steps are scheduled for the school environment:

- After the finalisation of the next version of the service two teachers of the partner school will begin with further testing and preparation for the use of the tool in their environment.
- In January 2010 the implementation of the LTfLL positioning service based on the schools’ requirements will be done.
- The usage of the service during the class lessons will begin in the second half-year of the following school year 2011 (beginning in the end of March 2011).
- The usage of the LTfLL Positioning tool in the school environment will be posted on the official web site of the partner school and promoted to the school inspectors based on the contacts of the responsible director.

Learning Organisations - E-Learning Provider

To use the LTfLL services in E-Learning environments requires a well-tested platform to avoid issues, which we are not able to solve with remote support of the learner. Therefore a pilot could be established after the end of the LTfLL project next year.

For enabling an E-Learning provider company using our tools we plan the following activities:

- Improve the service based on the results of the next validation round in October/November 2010.
- Publish the source code for the positioning service as decided on Sourceforge with adding the offer of additional support for implementation.
- Promote the functionality of the LTfLL services with focus on the positioning services (Online-Educa in Germany).

3.2 Service for Monitoring Conceptual Development – CONSPECT (WP4.2)

Learning Organisations - Higher Education Institutions

The CONSPECT service v1.5 will be implemented for validation in Manchester Medical School and OUNL's Psychology department. The results of the validation will be used to build a business case for future uptake, further development and use of the CONSPECT service by e-learning platform development companies, project stakeholder universities and other universities not associated with the project.

To prepare for the implementation of this tool in a business environment the following steps will be undertaken during Year 3:

- The CONSPECT service will be further developed as described in D7.3, to refine usability (by October 2010)
- The CONSPECT service will be trialled by another UK medical school in late 2010.
- By December 2010 the validation of the CONSPECT service will be completed, results compiled and an event to demonstrate the benefits to interested internal parties will be scheduled.
- A further event to showcase the tool to external stakeholders will be scheduled to take place in January.

An additional implementation of CONSPECT in another UK-based medical school is planned.

- The requirements for use with students and staff in Dundee will be established in September 2010.
- During October and November 2010 training will be provided to initiate the usage of the tool.

Learning Organisations - E-Learning

A showcase presentation of the LTfLL tools (including a thread) for using Language Technologies in e-learning environments will be used to establish contacts in e-learning and technical teams:

- In November 2010 the internal contacts of UNIMAN will be used to establish interest for the tools.
- The showcase event is planned for December 2010 for interested parties (based on CONSPECT v1.5).

Additional contacts to organisations that may see potential to embed CONSPECT within their environments are planned. These presentations are focused on presenting the validation results to demonstrate the value of the tool:

- The marketing presentation and a letter of introduction will be developed in October 2010.
- Identifying and approaching the contact in SAKAI (Open Source Collaboration and Learning Environment - CLE) and similar organisations to establish interest in CONSPECT and open dialogue (November 2010).
- An event at UNIMAN will be scheduled to present a showcase of CONSPECT v1.5? in use alongside results of validation.

Within the specific educational context of the Open Universiteit Nederland (distance learning), we see many opportunities to take up this tool. As many courses in OUNL use student blogs to support learning, there is scope for exploiting the functionalities offered by CONSPECT:

- If it is technically feasible an internal LTfLL demo aimed at course organisers at the OUNL can be organised in November 2010 to disseminate to teachers.
- For successful exploitation we need to enhance the functionalities a bit more and improve the usability (as planned for version 1.5).
- Specifications of the underlying corpora will be needed to be defined (for extension to other domains).

An Implementation of the CONSPECT service has been planned for the Learn@WU (The E-Learning system of WU Vienna). For this implementation, the widget plugin will be transferred to an OpenACS plugin and furthermore an XOTcl widget engine is being developed (August 2010).

Learning Organisations: Training Provider Institutions and EUN: European Schoolnet

The corpus needed to use the CONSPECT-Service represents a value for the training providers and schools (similar to other learning materials).

- The corpus as unique point of sale
The project team defines the corpus as value which allows companies to establish a business strategy.
- Highlighting the Business opportunities
During year 3 we are going to point out the business point of view at the Online Educa conference in Berlin to inform the market.

3.3 Chat & Forum Analysis and Feedback System – PolyCAFe (WP5.1)

The PolyCAFe –service provides a set of benefits to the addressed stakeholders and during year 3 of the project we have planned to improve the service:

- Usability: The new version will be easier to use...
- Analysis: The forum analysis facilities will be significantly improved.
- Configuration of the tool: Difficulties with the configuration tool have been identified and will be avoided in the next version.

Researchers and Research Centres

The LTfLL project will address the following opportunities and plans for internal and external exploitation:

- The Romanian partners plans to use the tool on a regular basis in their Computer Science Department and disseminate it for exploitation in our University and other education units (both K12 and higher education) in Romania.
- The Romanian partners will contact mainly stakeholders who are acting as multipliers for the dissemination and who offer exploitation opportunities:
Formal and informal learning - Dr. Gerry Stahl (Drexel University)
Developers - Dr. Carolyn Penstein-Rose (Carnegie Mellon University)
Formal and informal learning - Dr. Daniel Suthers (Hawaii University)
Formal and informal learning – Dr. Nic Nistor (Ludwig Maximilian University, Munchen)
These contact persons will be directly supported for implementing and using the service.

Learning Organisations: Higher Education Institutions

The Romanian partners will contact informal education stakeholders in Romania and abroad and propose the exploitation of PolyCAFe. Their presence in the CSCL community will also be used in order to propose exploitation of PolyCAFe to interested parties.

Within the specific educational context of the Open Universiteit Nederland (distance learning), we see many opportunities to take up this tool. OUNL courses make much use of chat and discussion forums. The analysing functionalities of PolyCAFe could be of much use to course organisers and teachers.

- If it is technically feasible an internal LTfLL demo aimed at course organisers at the OUNL can be organised in November 2010 to disseminate to teachers.
- For successful exploitation, the functionalities need to be enhanced and the usability needs to be improved.

3.4 Online Synthesis Advisor – PenSum (WP5.2)

For the year 3, the following activities have been planned to improve the exploitation possibilities:

- Improve the quality of the feedback particularly on the coherence between sentences
- Allow teacher to make comments on the synthesis and to enrich the feedback given by the system.
- Improve the flexibility of the software in order to strengthen the user control on the system (the teacher could choose the degree of severity of the feedback, possibility for student to make self-assessment and to annotate his synthesis, etc.).

The following opportunities will be used for the exploitation and sustainability of the PenSum-Service:

- PenSum supporting online courses in “Centre National d’Enseignement à Distance” (CNED), the most important French (and European, as well) provider of e-learning courses (260.000 students per year).
We have been in contact with CNED since 2009 and have planned to present the PenSum-Service to the responsible manager of the R&D department.
As a next step a training session for CNED is planned to enable the teachers to use PenSum for their courses.
- PenSum supporting online courses in Campus FORSE (online campus, University of Lyon 2, France)
A first informal contact with the Campus FORSE was undertaken by Philippe Dessus and Sonia Mandin with the manager: Stéphane Simonian.
- Pentilia
Philippe Dessus and Sonia Mandin established contact with Pentilia, a software and computing services company from Chambéry (France), in March 2010.
The contact will be followed up to open exploitation possibilities.

3.5 Formal Learning Support System – Course Editing Service (WP6.1) and Informal Learning Support Service to Locate Content and Peers (WP6.2)

The WP6 services are quite innovative for teaching institutes (at all levels). The focus has been primarily on research and demonstrating what can be done instead of developing a product that will be ready to use immediately after the project.

To this end, the WP partners aim to demonstrate and discuss our tools at two types of educational institutes:

- We have had initial contacts with a teacher education institute (Mr. P. Murre) and a secondary school (Mr. A. Otten) in the Netherlands. Both were positive about the potential of the services. The secondary school has plans for development in the near future into the direction of a 'school without books', where all learning content will be stored in an on line environment. Our services could be deployed and embedded in such an environment.

The main issue required for exploitation of the knowledge discovery part of T6.2 concerns the adaptation to new domains, which depends on the presence of suitable domain ontologies and the availability of enough resources and tags in social media in this domain. For the social network search, it is mainly the attitude of learners and tutors that needs to be influenced in order to ensure successful exploitation of the services in the end.

3.6 Exploitation of LTfLL Threads

3.6.1 The LTfLL Long Thread

The LTfLL Long Thread uses the following tools in one set:

- Service for Monitoring Conceptual Development – CONSPECT (WP4.2)
- Chat & Forum Analysis and Feedback System – PolyCAFe (WP5.1)
- Online Synthesis Advisor – PenSum (WP5.2)
- Informal Learning Support Service to Locate Content and Peers (WP6.2)

This LTfLL service showcase demonstrates how the language technology acts in a state of the art learning environment.

- Publishing the LTfLL Long Thread gives an excellent example to the stakeholders for finding ideas to use the LTfLL tools in their environments.
- Therefore we will add the demo of the LTfLL Long Thread as a part for dissemination to highlight the opportunities offered by the project outcomes.
- An exploitation of the LTfLL Long Thread”for direct use is not planned because the predefined usage of the tools in this combination enables only a smaller set of stakeholders to implement this showcase.

3.6.2 The LTfLL Short Thread

The LTfLL Short Thread uses the following tools in one approach:

- Learner Positioning Service (WP4.1)
- Formal Learning Support System – Course Editing Service (WP6.1)

The concept of the LTfLL Short Thread was established based on the results of the validation round during the first half of this year and we are planning to enhance the defined exploitations of the LTfLL Positioning Service by adding the WP6.1 service to the approach.

An integration of the LTfLL Short Thread has been planned for the Learn@WU (The E-Learning system of WU Vienna). For this implementation, the widget plugin will be transferred to an OpenACS plugin and furthermore an XOTcl widget engine is being developed (August 2010).

The LTfLL positioning service & Learning Support System supporting marketing activities

To implement a marketing campaign using the language technologies, a marketing activity has been planned in second quarter of 2011 for a course (IT training) of bitmedia in Austria. The following activities have been scheduled for the preparation of the marketing campaign:

- Defining the course (IT training) the marketing activity will be used for (e.g. Training for using Office 2010 in the SharePoint 2010 environment).
The decision will be made based on the current situation in the market and available training resources in January 2011.
- In February and March 2011 the training materials and questionnaire will be established for LTfLL services.
- The detailed planning for the marketing activities will be done directly by the responsible marketing unit of the company (invitation by mail or letter, measurement of the response...)

Annex

Existing contacts for exploitation

- An informal talk with the ‘Schulzentrum Hitzendorf’ (Primary and Secondary School in Austria) was undertaken by Christoph Mauerhofer with both directors (Veronika Schober - primary school, Gertrude Leitner – secondary school) and the IT-representative (Maria Pall).

During this informational talk the possibilities for implementing the LTfLL services in the IT environment of the ‘Schulzentrum Hitzendorf’ were discussed.

As a result the test implementation of the ‘Positioning Service’ for the ECDL education will be done for the secondary school.

- The version 1 of the LTfLL services were presented to the management of the company ‘bit Schulungcenter’.

A further use and development of the LTfLL services in the adult education environment was discussed. An additional presentation will be arranged in January 2011 based on version 2 of the services.. Based on the status of version 2 of the LTfLL services the use of the project results will be settled.

- A presentation of the LTfLL positioning service was provided to ‘Gertrude Neumüller’ (Delivery Manager) from ‘Global Knowledge Education Austria’. This company is responsible for IT technical trainings in different domains (Microsoft, CISCO, Project management...).

The use of Learner Positioning Service and CONSPECT for advanced learners were defined as useful tools for future learning environments.

- Informal talks about the LTfLL services were done by Horst Ortmann during the Microsoft PAC (Partner Advisory Council) meeting (Bellevue, WA).

The PAC team is responsible for discussing further development and positioning of ‘Microsoft Learning’.

The goal of these informal talks was to get awareness for the project and schedule a presentation of the final LTfLL results in a future Microsoft PAC meeting.

- Christoph Mauerhofer and Dominik Neuner (Consultant, PDA Group, Universitaetsstrasse 9/10, Innsbruck, Austria) had an informal talk during the ‘Online Educa Berlin’ (December, 2009) regarding a test implementation of the LTfLL services.
An additional contact in May 2010 was planned for defining additional details of the test implementation.
- Evgenia Terekhova (Multimedia Department, TheWebProduction, Novgorodskays str. 12A, 191144 St. Petersburg, Russia) remarked on their interest in further cooperation in developing language technology based concepts. The access information for the LTfLL services will be provided to Evgenia Terekhova.
- An LTfLL presentation event with the education department of the WIFI (‘Wirtschaftsförderungs Institut’) with Mag. Ulla Föbbleitner (management of the IT education part) will be established in the second quarter of 2010.
- The bfi (‘Berufsförderungsinstitut’) as one of the major institutes in adult education in Austria will be contacted to establish an alliance with the bit group for further exploitation of the LTfLL services (Both companies are already cooperating in the adult education area and are interested in innovative tools for learning environments).
- A presentation of WP5.1 was performed at IBM Academic Days for Universities in Romania (15 March 2010). At this occasion, prof. Stefan Trausan-Matu talked with professors from the Technical University of Cluj-Napoca and from the University of Suceava, Romania, following their manifestation of the interest in using the PolyCAFe system...
- We have discussed our work in WP5.1 with the Virtual Math Teams project team conducted by Dr. Gerry Stahl from Drexel University, US and the research team of Dr. Carolyn Rose from Carnegie Mellon University. We intend to ask them to use PolyCAFe for their classes and experiments.
- Dr. Patrick Sins form University of Utrecht has contacted the project team after the EC-TEL 2008 presentation of the prototype version of the service as he needed a service similar to PolyCAFe.
- Contacts, since 2009, with “Centre National d’Enseignement à Distance” (CNED), the most important French (and European, as well) provider of e-learning courses (260.000 students per year). A first informal contact with the Campus FORSE (online

campus, University of Lyon 2, France) was undertaken by Philippe Dessus et Sonia Mandin with his manager: Stéphane Simonian. These contacts were then extended to use CNED's platforms and students to validate the version 1 prototype of *Pensum* (two attempts so far). We are waiting for first validation results for disseminating them to the research and development department of CNED.

- Contacts with *Pentila*, a software and computing services company from Chambéry (France), in March 2010.
- Some dissemination-oriented conferences have been carried out: *Education & Technology Summer School (Strasbourg, August 2009)*; *Grenoble Cognition Pole (Grenoble, June 2010)*. Two others are under negotiation: Primary Teachers French Association Annual Congress (AGEEM, Annecy, July 2010); Cognicité Conferences (La Cité des Sciences, Paris, June 2010).
- APOSDLE - learn@work (<http://www.aposdle.tugraz.at/>)

We talked with Stefanie Lindstaedt from the APOSDLE project on the aspects from their work that can be relevant for our search services. Relevant aspects are the work they did on determining user profiles, linking processes/tasks to required knowledge and learning goals in order to provide a learning model, and the recommendation system they developed.

- BONY - Babylon & Ontology (<http://www.bonynetwork.eu/>)
We had contacts with Alfio Gliozzo from the BONY project on the expert search they have implemented, which is relevant for our work.
- Edia (<http://www.edia.nl/>)
Edia is a specialist in education technologies. This company develops educational software. They are interested in the disambiguation system that has been developed within WP6.2.
- Hyves
Hyves is a free Dutch social networking site which has been online since October 2004. The focus of this website is on keeping in touch with existing friends and making new friends. Users can create personalized pages of themselves with rich media content, such as photos, videos, flash content and custom layouts. We had contacts with this company on the possibility of a privileged channel to social data if we decide to work more in Dutch..

Annex - Mapping of motivation for exploitation of LTfLL project outcomes to target user groups

Stakeholder Key:

A General public, Policy makers, decision makers

B Formal learning - Schools

C Formal learning – ‘Higher Education’ Areas

D Formal learning – Vocational education and training

E Formal learning – Adult education

F Informal learning for pupils and students

G Informal learning for adults

H Developers community

LTfLL project outcome (service)	Motivation for exploitation (key benefits)	Target user groups							
		A	B	C	D	E	F	G	H
Learner Positioning Service (WP4.1)	The learner saves time during the learning curve.	X		X	X	X			
	This implies also that learners and tutors will be more satisfied and motivated		X	X			X	X	
	The enhanced functionality of the positioning process will enable education providers to develop individualised and cost reduced training	X	X						X
	The improved positioning process will reduce the overall cost per individual	X			X	X			X
Service for Monitoring Conceptual Development – CONSPECT (WP4.2)	Tutors are able to easily identify those learners who are not progressing in line with the intended learning goals. This will allow tutors to work with individual learners in a more time-effective manner.	X		X	X	X		X	
	Learners are provided with timely individual formative feedback, which can promote self-directed learning.	X		X	X	X		X	
	As an aid to learning, CONSPECT provides learners and tutors with a simple means of identifying the key concepts in essays, notes and resources, and comparing the coverage	X		X	X	X		X	

LTfLL project outcome (service)	Motivation for exploitation (key benefits)	Target user groups							
		A	B	C	D	E	F	G	H
	of their own materials via conceptogram visualisations.								
Chat & Forum Analysis and Feedback System (WP5.1)	Learners get a useful feedback immediately after they finish a chat discussion and just-in-time for forums		X	X	X	X	X	X	
	Offers a better understanding and a way of visualization of the collaborative processes and of conversations in general		X	X	X	X	X	X	X
	Students are more involved and motivated with the course or domain of the conversation and are attracted to use web communication technologies		X	X	X	X			
	Reduces the time needed by tutors to provide feedback and grading	X	X	X	X	X			
Online Synthesis Advisor – PenSum (WP5.2)	Provides information on the extent a course is understood through the assessment of the quality of students’ writing (syntheses).	X	X	X	X	X	X	X	
	Students get immediate feedback on the relevance and coherence of the written synthesis.		X	X	X	X	X	X	
	Students’ self-regulated learning is fostered.	X	X	X	X	X	X	X	
	Teachers can devote some of the time previously used to assess relevance/coherence of syntheses to higher-level tasks (e.g., scaffolding, tutoring).	X	X	X	X	X			
Formal Learning Support System – Course Editing Service (WP6.1)	Learners can find relevant learning materials in more effective way.		X	X	X	X	X	X	
	Tutors can prepare faster their learning materials – lectures, tests, additional reading materials, etc.		X	X	X	X			
	Learners can understand the topics of learning via connection between learning materials, ontologies and other stakeholders’ comments		X	X	X	X	X	X	
Informal Learning Support Service to Locate Content and Peers (WP6.2)	Learners save time during the learning curve, because the service assists the learner in locating appropriate materials	X	X	X	X	X	X	X	
	Learners save time because the service enables the learner to locate relevant peers which he can ask for help	X	X	X	X	X	X	X	

LTfLL project outcome (service)	Motivation for exploitation (key benefits)	Target user groups							
		A	B	C	D	E	F	G	H
	Learners improve their understanding of a topic during the search process, since they acquire knowledge on a domain on the basis of the ontology fragment. To get a quick impression on a topic, the service also includes definitions for the search topics		X	X		X	X	X	
	The quality of learning improves, since the documents retrieved are coming from trusted users (i.e. users in the network of the tutor)	X	X	X	X	X	X	X	