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Building the European Network for Lifelong Competence Development

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Project Deliverable Report

D8.3 - Report with overall WP8 results during months 37-42. Aggregates internal deliverables ID8.16, ID8.18 and ID8.19

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ID8.16: Policies to stimulate self-organisation and the feeling of autonomy in a network
ID8.18: Goal Orientation (Overview) portlet, integrated into LifeRay
ID8.19: Social Help Portlet, integrated into LifeRay

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Introduction

The emergence of self-organizing communities within which members are self-directed and actively share, negotiate and create knowledge in a lifelong learning context remains a major challenge. The focus of WP8 is mainly on the social network dimension of competence development and management systems and in particular seeks to provide personalised support in all stages, from the identification of relevant competences to the choice of the appropriate competence development approach, to the sharing of community-resources and experiences within the learning network. The objectives of WP8 during the period from December 2008 to June 2009 were to:

1. Develop policies to stimulate self-organisation and the feeling of autonomy in a network (ID8.16).
2. Develop, test and integrate into Liferay the Goal Orientation (Overview) portlet (ID8.18).
3. Develop and test the Social Help portlet and integrate it into Liferay (ID8.19).

These objectives correspond to end-of-project targets as defined in the Description of Work and the DIP-4 document. The completion of these objectives resulted in three internal deliverables which have been aggregated to make this report.
Chapter 1: Policies to stimulate self-organisation and the feeling of autonomy in a learning network

1.1 Learning networks

A learning network is, among other things, a community of people (members) who share the intention to learn something about a particular domain of knowledge. Actually, calling a learning network a community presumes already too much, as its connotation is one of people who somehow interact and have a shared history. We do not assume this to be the case up front, although it may, as a matter of contingent fact, happen to be true for some of the members. Eventually, it will become true. Either way, we assume that strengthening the social ties within a (learning) community will positively affect learning. So, through active participation in the community the learning goals people have set for themselves will be attained more effectively, more efficiently, more attractively; or, put differently, reshaping a learning network as a community enhances the quality of the members’ learning experience. In order words, a learning network should self-organise such that a community emerges.

The main characteristic of effective communities evolve around social space and social interactions (Kester et al., 2006; Kreijns, 2004; Nichani, 2001; Rovai, 2002), next to a clear boundary (Kester et al., 2006; Weber, 2004), common goals, rules and sanctioning mechanisms (Kollock & Smith, 1996; R. Koper & Sloep, 2003). Another characteristic is the heterogeneity of the community population and the different roles each of the members can take.

The model for network management thus evolves around guidelines that foster social space, guidelines for community characteristics and guidelines for community population. To foster social space, three social prerequisites should be met in order for social interaction, in particular cooperation, to occur: (1) any two individuals must be likely to meet again in the future (continuity), (2) all individuals must be able to identify each other (recognisability) and (3) all individuals must be able to know how any other person has behaved in the past (history) (Kollock, 1998).

Community characteristics are set by the proximate and ultimate goals learners have. The goal affects the amount of social interaction. Peer-tutoring could be one of the solutions to stimulate social interaction. A community should be populated with people in various roles, or a mix of expertise, and types of people (trendsetters, lurkers, posters) (Nichani, 2001; Preece, Nonneke, & Andrews, 2004) and should allow people to take on different roles.

1.2 Sociability in sustainable learning networks

Learning networks, and also ad hoc transient communities, rely on active participation of the members (Kester et al., 2006; E. J. R. Koper & Sloep, 2002) and should provide tools, applications and functionality that allow and encourage these interactions (E. J. R. Koper,
Rusman, & Sloep, 2005; R. Koper & Specht, 2007) as well as contribute towards sustainability of the community.

Sociability and interactions do not arise spontaneously. However there are several short- and long-term motives for learners to collaborate and thus initiate interactions. There is sufficient proof that learning benefits from social interaction e.g. in collaboration and learners also feel less isolated, which is beneficial for the learning process. Because learners engage in social interactions with others, they get to know those others as well. This builds up trust between people, but also creates a knowledge network they can rely on in other situations (P. Sloep & Kester, 2009; P.B. Sloep, 2008). And by helping out others, people increase the chance of receiving help in return (P. Sloep & Kester, 2009).

Following an analysis of popular existing online communities, we distinguish the following required functionality that allows users to manage, organize, and regulate resources and communities (A. Berlanga, Rusman, Bitter-Rijpkema, & Sloep, 2009; A. Berlanga et al., 2007).

- **Self-management.** This is related to administration and sharing; permitting users to create own profile, contacts, communities, networks, resources, and tags, etc.
- **Self-organisation** permits user to interact and react to member’s resources: commenting, recommending, copying, subscribing, rating, bookmarking, seeing related resources.
- **Self-categorisation** allows users to classify and evaluate their own contributions as well as those of others.
- **Self-regulation** allows users to control existing resources and communities: create private and public resources/communities/groups, mark communities/resources/groups as offensive.

In addition, it is important that learning network participants build up trust. Without trust, interactions are not sustainable. Trust about people is built in various phases and encounters. The first encounter can set the stage. Reputation, as indicated by indirect experiences or what other people tell about a person can influence this. Of course direct personal experience during collaboration can have a major impact, but the context in which the interaction occurs can be of influence. In online environments where visual and non-verbal clues usually are missing, particular attention should be paid to features that allow trust to be developed. That entails that it must be possible to exchange personal information, other than those required for the collaborative task, to show and exchange information about a person’s reputation. Indicators of presence (profile information), availability (who’s online), as well as activities somebody has performed and/or contributions made, are used in trust formation. The group composition, or in this case the purpose and overall activity of the community assists participants to determine whether they have a sense of belonging to the community (A. Berlanga et al., 2009).

Even if it would be possible to force a learning network to become a community, this would never be as effective as a community that emerges from the learners themselves. Learning networks, like communities are dynamic with changing composition and
purpose. The dynamic nature of communities is required for Learning Networks, but can also have an adverse effect on sustainability. Resilient communities are able to deal with these dynamics. The social structure of a network determines resilience. In centralized networks, activity evolves around a small core group of people. For a more resilient and efficient community the network should become less centralized. Good selection criteria for matching peers in ad hoc transient communities should function towards a more stable and efficient network (Fetter, Berlanga, & Sloep, 2008).

1.3 Ad hoc transient communities

As we stated before, we believe that strengthening the social ties within a learning community will enhance the quality of the learning experience. Mechanisms that allow or promote strengthening of social ties involve users engaging in joint activities in different roles. Role specific user characteristics and descriptors related to a particular activity are required. Users should be recognisable and identifiable.

Ad-hoc transient communities are seen as the vehicle to organise this (Kester et al., 2007; P.B. Sloep et al., 2007; P. B. Sloep, van Rosmalen, Kester, Brouns, & Koper, 2006). Ad hoc transient communities serve a specific goal, are limited in time (i.e. dissolve when the goal has been attained), and operate according to social exchange policies that enhance social embedding and knowledge exchange.

Surveys among higher education staff indicated that having to repeatedly answer content related questions of students imposed a high workload; while they still indicate this as a valuable contribution towards the learning process (de Vries et al., 2005). Therefore one of the first implementations consisted of a peer-tutoring ad hoc transient community to assist learners in finding answers to content-related questions (Kester et al., 2007; P. B. Sloep et al., 2006; Van Rosmalen, Brouns et al., 2007a; Van Rosmalen, Brouns et al., 2007b). This proved to be very effective, not only towards the proximate goal of obtaining an answering to an immediate pressing question, but also towards the more ultimate goals of improving interactions and providing learner support and even of promoting social space (A. Berlanga et al., 2008; Van Rosmalen, Brouns et al., 2007a; Van Rosmalen, Brouns et al., 2007b; Van Rosmalen, Sloep et al., 2007; van Rosmalen, Sloep, Kester et al., 2008; van Rosmalen, Sloep, Brouns et al., 2008).

Ad-hoc transient communities improve the social network structure; allow users to get a feeling of community and a sense of belonging. In short they can improve social capital (Fetter et al., 2008; Fetter, Berlanga, & Sloep, 2009).

1.3.1 Setting up and maintaining communities

There are examples that large networks, that allow sub-communities to arise such that a few community members get together to address a specific goal, are usually more effective (Lui, Lang and Kwok, 2002). That would support our notion of ad hoc transient communities. Setting up ad hoc transient communities does not guarantee that the desired effect will occur or that learner will interact. Solely providing environment with, suitable, tools does not mean that people will use it or use it for the intended purpose. We analyze motivational factors and incentive mechanisms and their effect in successful communities.
as described in the literature; we look at effects of these mechanisms both as proposed by relevant theories and as found in successful online communities (A. Berlanga et al., 2007). Based on that, we propose and describe a design rationale for a profile and portfolio type incentive, and argue why it will enhance participation in (ad hoc transient) communities.

There is an extensive literature on how to set up and maintain communities as well as on policies for effective communication and stimulation of participation (Bitter-Rijpkema, Martens, & Jochems, 2002; Bogenrieder & Nooteboom, 2004). In the literature, many theories on motivation to contribute to and participate in, mostly peer to peer, communities have been described. Researchers looked at psychology and community behaviour reviews for theories to explain users' behaviour in communities and mechanisms to enhance contributions and participation. The self-organisation, social exchange theory, systems, and expectation-state theories provide sufficient backing for the general principle behind the mechanism of ad hoc transient communities. Additional support for our claims can also be found in behavioural and psychological literature on motivational mechanisms on why people would participate and contribute in communities. (Millen & Patterson, 2002) and (Erickson & Kellogg, 2000) argue that visualising users and their actions in a community is important to stimulate participation. (Cheng & Vassileva, 2005) present five theories (reciprocation theory, consistency theory, social validation, persuasiveness of liking, theories of discrete emotions) to explain why community members would participate and contribute; they applied design rules based on these theories to a P2P system used by university students. (Lui, Lang, & Kwok, 2002) summarised psychological studies by several authors to explain motivation and incentives for participation in communities and reported that both individual and interpersonal factors play a role in the motivation of people. The individual factors again can be divided into extrinsic motivations (rewards, personal needs) and intrinsic motivations (altruism, reputation). (Ling et al., 2005) applied design principles based on social psychology theory to the Movielens application, a movie rating site; they were able to confirm that people would contribute more when the system showed them how unique they and their contributions were, and when they set specific goals to attain. Most authors seem to conclude that incentive and reward mechanisms have to be in place for people to share knowledge.

The dynamics of a community is influenced by social capital and vice versa. Social capital can be seen as the structure of relationships in a community or network. It not only characterises the social structure, but also provides a sense of belonging and a measure of reciprocal social support. As this also affects learning, it is important to improve social capital in Learning Networks. This could be accomplished by the use of ad-hoc transient communities (Fetter et al., 2009).

1.3.2 Profile and eportfolio information for enhancing social interaction

For social interaction to occur at all, people need to get acquainted with each other. This is done on the basis of personal information. Visualizing the users in the system and their contributions to and participation in the community should promote contribution and
participation because it raises awareness of a user’s own actions and those of others; it also demonstrates people’s responsibility and the consequences of their actions (Erickson & Kellogg, 2000). (Meyerson, Weick, & Kramer, 1996) and (Coppola, Hiltz, & Rotter, 2004) discuss the notion of swift trust, which emerges in temporary teams whose existence is formed around a clear purpose and common task with a finite life span. Swift trust helps to establish engagement and commitment. This is exactly what is required for our ad hoc transient communities.

Several studies showed the relevance of background information on personal profile and expertise on knowledge exchange and building of trust in teams that had to jointly work on a product ((Rusman, van Bruggen, & Koper, 2007; Rutjens, Bitter-Rijpkema, & Crutzen, 2003). An easy to use template, pEXPi (abbreviation for personal expertise inventory or personal identity and expertise profile) was developed to allow community members to introduce themselves and their expertise (Rutjens et al., 2003). This pEXPi has been used successfully in various academic communities and according to the participants this contributed towards learning interactions and emergence of community feeling (Ogg et al., 2004). We believe that a user’s profile should be designed not only to give information about the learner, but also to foster interaction (A. Berlanga et al., 2008), encourage participation and motivation (Brouns et al., 2007) and develop trust (Rusman et al., 2007).

Profile and eportfolio information is also required for the peer matching selection criteria for the ad hoc transient communities. To that end, we conducted a first exploration of existing popular profiling sites, to determine what kind of information is made available in user’s profiles and how they motivate registration and stimulate contribution. All these sites have in common that the services they offer evolve around the members’ profiles. Given their capacity to encourage members to be connected with other members and their growing popularity, we believe that some lessons can be learned from these successful sites. Registration for all of these sites is free, because the main aim of these sites is to get as many members as possible. The sites provide extensive information about the benefits of the membership and importance of the profile and assist in compiling the profile, often already in the registration process. Most sites ask the members to complete only a brief profile during registration, but provide ample opportunity after registration to extend and expand on the profile, even beyond the bare necessity for the type of profiling site. The main strength of these sites is the affordances for creating connections (A. J. Berlanga, Bitter-Rijpkema, Brouns, & Sloep, 2008).

1.3.3 User generated content for enhancing social interaction

With the advent of Web 2.0 applications, it is getting much easier for people to bring in their content to the web. People in a Learning Network provide their information and set restrictions as public or private, such information can be written as a free-text description on their web page, they might also write blogs which are then tagged to the concept and could be viewed as tag clouds to indicate their interests. For example, such sources of information could be their bookmarks of interests, their writings about the knowledge expressed in the forms of blogs or their association to a concept using a particular tag. This information is relevant for any Learning Network: people can bring in their content
(aka user-generated-content) to the web that can be used for learning related purposes, or to get to know about someone's interests and to share knowledge. The user-generated content can be in different forms like texts, videos, audios, pictures, documents. This is dynamic content because it is regularly updated and could provide latest information about people, like their working context, interests, knowledge, expertise and ideas. This information about people is relevant to suggest who is associated with which topic. The user-generated content (text) is a bottom-up information source about people, facilitated by Web 2.0 applications like web logs (blogs), wikis and social bookmarking tags. For example, a blog provides semi-structured content which is a writer's dairy post, chronologically ordered, with other reader's comment. It can describe authors interests on a given topic, and such information can be used to search for people and recommend them to connect with others who might be suitable match on a given knowledge domain.

There are several reasons to consider the user-generated content. First, with the advent of Web 2.0 applications, it has become easier to maintain online information on the internet. People can write what they think about particular issues using blog services (Wordpress, blogger etc.) and categorize (tag) the blog posts using key-words, bookmark their interests using social bookmarking services (furl, delicious etc.) and manage their social contacts (friends or colleagues) using social networking sites (Facebook, LinkedIn etc.). These informal sources of information are useful in getting to know about people. Next, even when a new learner enters a learning network, s/he may already have existing information (blogs, bookmarks and social contacts). So we do not only depend on learner's information maintained during learning (e.g. completion of learning activities in learning network) but we can make use of personally generated information (blogs, bookmarks and social contacts) about learners that reflect their learning achievements, knowledge, competence and interests performed before even joining a learning network. The challenge is to use the information from user-generated-content to prototype a system for recommending suitable people to a learner in a Learning Network.

1.4 Social support and ad-hoc transient communities

The social help usage profile describes a learner support service in which other learners in the network are engaged in providing assistance to learners who have a particular request for support. After a learner has formulated a question, the TENCompetence infrastructure assists in finding the most suitable person(s) to answer this particular question. There is overlap between the social help, overview tool and ePortfolio usage profiles in data used and functionality offered. There are also relations to the follow course, CDP and PDP usage profiles, mainly in data used. A generic model for a social help service is depicted in figure 1.
Figure 1: Generic social support model

There are however, alternative flows possible (see figure 2). The most distinctive aspect is whether the learner decides whom to contact, or to rely on the system to do all or part of the selection of suitable people. Some scenarios are provided in the use cases below.
In the use case below we also describe some events that are prerequisites for the social help usage profile to operate, but factually do not belong to the social help usage profile. Some of these steps should be taken care of by the ePortfolio and the CDP usage profiles.

1.4.1 Scenario 1: Ad hoc transient community for support to a content related question

1.4.2 Description
Suppose we have a Community on Psychology with a set of action A1 - A10. The user Philip has registered for this community and has determined that in order to meet his goal of getting acquainted with the domain of Psychology he has to study A1, A2, A3, A6, A7, A9 and A10. Next, we know that Philip given his working experience and prior studies has exemptions for A5 and A6 and has already successfully finished A7. Finally, let’s assume that Philip while studying A1 Quantitative data analysis runs into problems. He has a problem understanding the relations between a number of concepts and as a consequence he is not able to complete an assignment. He studies some additional literature and searches the web, to no avail though. Philip is studying on his own and thus
out of touch with any peer students decides to pose a question to the 'on-line tutor'; he describes the general problem and his question.

Below we outline the most extensive flow of events for such a scenario, but omit from the flow those events that factually should be dealt with by the ePortfolio, CDP, or PDP usage profiles, even when those events include functionality and not just data.

This scenario could also be followed for any other type of question or request for support and is not restricted to content-related questions.

**Actors:** Learners and peers, system  
**Primary Actors:** Learner, system  
**Flow of Events**

1. While working for action A1, Philip has difficulty understanding some concepts. The resources in the action do not provide sufficient detail or are of the wrong level to help Philip in finding the answer himself. He decides to look for support.
2. Philip accesses the support form that is available from the action or the community and poses his question in sufficient detail indicating which action sprouted the question.
3. The form provides detailed information on how to phrase his question with sufficient detail to allow the system to select suitable peers.
4. The system determines to which action the question belongs, searches for related resources, selects the most suitable peers and invites them to assist Philip in finding an answer to his question.
5. The peers can accept or decline this invitation, giving a reason for this decision.
6. When the peers accept the invitation they indicate how competent they perceive themselves.
7. When the required number of peers has accepted the invitation, the system sets up an ad hoc transient community (e.g., forum or wiki) that can be accessed only by Philip and the selected peers. The ad hoc community contains the question, related documents and a guideline.
8. The system notifies Philip and the peers that a sufficient number of people have accepted and ask them to join, providing access to the ad hoc community.
9. Philip and peers can discuss the question, using the related documents as starting point, and jointly reach a solution or answer to the question.
10. When Philip is satisfied with the answer he can close the discussion, rating the answer and the contribution of the peers.
11. Philip also has the possibility to add the peers to his contact list.
12. The system archives the ad hoc community.

**Model for content related questions:**

**Precondition:** A community with a competence profile, competence development plan, set of actions and a set of users with their profiles indicating their progress with regard to the actions and competence proficiency level.

**Main steps:**

1. Philip poses a question
2. The system determines
a. the most relevant text fragments
b. the appropriate actions
c. the most suitable peers
3. The system sets up a collaboration space (wiki/forum) containing the question, the text fragments and guidelines.
4. The system sends invitations to the selected peers to assist.
5. Philip and the peers discuss and formulate an answer in the collaboration space.
6. If answered (or after a given period of time) Philip closes the discussion and rates the answer.

Postcondition: The answer is stored.

Alternate flow I
An alternate flow is possible. At step 4 above, the system selects the most suitable peers, but in stead of inviting the peers on behalf of Philip, the system present Philip with the list of selected peers, together with additional information (profile, eportfolio, etc) to allow Philip to choose peers himself.
The flow of events can stop here, or continue with alternate flow II.

Alternate flow II
When step 4 is partly replaced by alternate flow I, the system can continue setting up the technical infrastructure for the ad hoc transient community and make them available to Philip and the peers he selects.

1.4.3 Scenario 2: Finding people
For the scenario described above a different approach can be taken. It still involves setting up an ad hoc transient community, but more initiative is left to the user and system involvement is less.

When a learner has a question, the learner can choose whether to contact people they already know or look for support by somebody else. Again, there is a choice; the learner browses the learning network for other people. Here the user depends on availability of user profiles and visualisation of profile relative to the question. Or the learner asks the system to choose for him (like described in the first scenario) or asks the system to support him in the selection process. In the latter case, either the system assist in providing access to users’ profiles like in the Overview tool or presents visualisation of users’ profiles related to the support request.

In order to generate a user profile which has richer semantic, social contexts as well as updated content, the user-generated-content can be used. For example, blog content, tagged data and person's social network can provide additional information about a learner in a Learning Network. With these informal sources of information we can infer an implicit profile about a learner’s expertise and interests. Let’s call this Profile 2.0, an implicit profile that can be built based on user-generated-content, by analyzing their dynamic content over the web.
A scenario is when a new learner enters a Learning Network and wants to find other people who might be of his/her interests on any given knowledge domain. The system looks for others who have interests, knowledge and skills in a similar domain and recommends the list of learners to the person who seeks others. People in Learning Networks may already have publicly available information about themselves spread over web. Based on these information sources an implicit profile can be built up for each user (Profile 2.0).

For the model to work the pre-condition is that the person maintains information on the web by writing blogs, bookmarking and tagging content of his/her interest. Then via RSS, blog content, tag information, and using mash-up services, we can gather person's domain related interest. We can also gather information about learner's existing social network of friends or colleagues; social information about people makes it easier to know about someone's social contacts and develops certain level of trust while deciding to form a new connection. It is interesting to use user-generated-content and social network of people to provide a model that an intelligent agent can calculate the social capital.

1.4.4 Scenario 3: Community formation
- increase participating by actively connecting persons and creating shared experiences and therewith stepwise promoting community formation –
- increase social capital in a Learning Network by forming ad-hoc transient communities to improve the social structure, provide a sense of belonging and meaning via reciprocal support

A well-engineer at a small specialised consultancy company is following a series of online courses to acquire the required competences on topics such as ‘safety measurements: legal and technical’, ‘soil conditions’, ‘drill angle and techniques’ and alike.

Unfortunately, being from a small company he does not know any peers in the network. Nevertheless while studying he is regularly confronted with the need to find peers to discuss problems and to work on specific assignments e.g.:  
- Who can help me with the following question: “while studying the allowed combinations of type of soil and drill technique, I have arrived at –at least to my understanding- an inconsistency in the applicable legislation and the optimal technique. Who can help me to answer this?
- For the course ‘safety measurements: legal and technical’ I have to do a small research project and to write an essay together with a peer. Who can help me?

**Typical aim:** Establish a community.  
**Typical users:** Individual user trying to establish a community of peers with a shared interest.
**Actors:** learner, peers, system

**Workflow:**
1. The user opens the social help and launches the ‘ask-us’ and formulates his question.
2. ‘Ask-us’ reacts with the choice to contact one of e.g. (1) a list of known contacts for this person, (2) a list of last contacted by this person; (3) a list with users with matching profiles related to this person (4) a network visualization of ongoing related contacts (4) automatically contact the “best” peer.
3. In most cases users are matched on availability and competence scores.
4. The user selects one or more of the people from the list and browses their profiles. When you found a suitable person, he can contact them, either by using one of the communication facilities provided by the system, or via the contact details provided in the portfolio (email, telephone, street address).
5. The user sets up a communication facility (or request the system to do that) and invites his contacted persons to participate in the community.
6. The outcome of the request are rated.
7. Requests, outcome and ratings are stored.
8. If requested, the FAQ is updated.

### 1.5 References


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Chapter 2: Goal Orientation Portlet

The Goal Orientation Portlet helps a person to get an overview of available competence profiles. The portlet is used by people who have no idea what they want to learn or what profession or career interests them. The outcome of using the goal orientation portlet is a list of competence profiles that the person may like to investigate in greater detail. Based on this list of competence profiles the person may then get in touch with a person in a competence network to make further inquiries, look up a relevant resource or even decide to choose one of the listed competence profiles as his goal for a personal development plan.

The basic idea of the portlet is simple: a user selects his likes and/or dislikes for some competences and the system shows the competence profiles that best match those preferences.

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Note: for the TENCompetence domain model, with detailed information about concepts like Competence and Competence Profile, see [2].

2.1 Main process behind the idea

*Figure 3: Process* depicts the extended version of the basic idea, as it has been implemented in the portlet.

![Process Diagram](image-url)
The steps in the process, which are the steps each user goes through, are as follows:

1. **Indicate complexity**
   The user starts by indicating how easy or hard the profiles should be, on which to orientate.

2. **Shuffle and Deal**
   After starting *Shuffle and Deal*, the system selects a random set of competences and shows these in a Competence pool.
   Note: the competences are not completely random, because all of the shown competences occur in at least one competence profile of the specified complexity range.

3. **Perform action**
   The user can perform one of two actions:
   a. The user updates his likes / dislikes for a competence. This is done by marking one of the competences from the Competence pool as “Love it!”, “Interesting”, “Rather not” or “Hate it!” or by changing the like / dislike level for a previously marked competence.
      The process proceeds with step 4.
   b. The user presses *Shuffle and Deal* again to show a new random set of competences. It’s not mandatory for a user to express his like / dislike for any of the shown competences, because he might not have a strong feeling about any of them. In that case, he can use the *Shuffle and Deal* option again to get a fresh set of competences.
      The process proceeds with step 2 again.

4. **Update best matching competence profiles**
   Based on a change in the liked / disliked competences, the system automatically recalculates the best matching competence profiles and updates the list of “Best Matches” accordingly.

### 2.2 Main process in detail

#### 2.2.1 Scope

As many of the TENCompetence portlets, there is an implicit scope of the data used by the Goal Orientation portlet. When the portlet is added to a Liferay page, it will use the data of the community owning that specific page. The competences and competence profiles shown are the ones existing within that community.

During the orientation, a user can change his selection for the complexity levels. *Figure 3* doesn’t show this for simplicity’s sake. Changing the selection will affect the set of competences shown after using *Shuffle and Deal* again and will affect the competence profiles shown as Best Matches.
2.2.2 Indicate complexity

Each community has exactly one Competence Map and as part of the Competence Map, a number of (Competence) Profile Levels should be defined. The Profile Levels are used as a scale to identify per Competence Profiles in the map how easy or hard it is. E.g. the profile “Full Professor in Biology” has a higher Profile Level than “Bachelor in Biology”. The Goal Orientation portlet uses the Profile Levels scale to let a user indicate the level(s) of complexity of the Competence Profiles he might be interested in. Selecting multiple (or even all) levels of the scale is allowed, without any restrictions.

2.2.3 Shuffle and Deal

The name of this action is taken from card games. Instead of shuffling a deck of cards and dealing a random set of cards, we are shuffling a deck of competences and dealing random competences. When a user doesn’t like the “dealt” competences, he can shuffle and deal again.

In case there are many competences in a competence map, the Shuffle and Deal functionality can be used to browse through the competences. When you see a competence for which you have a strong like / dislike, mark it. Otherwise, quickly deal the next set.

2.2.4 Update best matching competence profiles

When a user sees a competence that he likes or dislikes, he can express his feeling by marking it as “Love it!”, “Interesting”, “Rather not” or “Hate it!”. It’s also possible to change or the erase the marking. After changing the marking for a competence, the system automatically recalculates which competence profiles best match with the full set of marked competences. The ones matching best are shown as “Best Matches”, in order of matching.

The calculation of a match is done by scoring competence profiles for each marked competence that’s contained by it. Table 1 shows the scoring weights used. The total score determines the match: the higher the score, the better the match. A score of zero means a neutral score for a profile.

<table>
<thead>
<tr>
<th>Marking</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Love it!</td>
<td>+3</td>
</tr>
<tr>
<td>Interesting</td>
<td>+1</td>
</tr>
<tr>
<td>Rather not</td>
<td>-1</td>
</tr>
<tr>
<td>Hate it!</td>
<td>-3</td>
</tr>
</tbody>
</table>

Table 1: Scoring

Example: the competence profile Software Architect contains the competences Communication Skills, Analytical Skills, Database Knowledge, Quality Attributes
Knowledge and Programming Skills. Marking Database Knowledge as Interesting (+1), Programming Skills as Interesting (+1) and Quality Attributes Knowledge as Hate it! (-3) results in a total score of $1 + 1 - 3 = -1$. This is even lower than a neutral score, so it’s not a good match.

2.5 User guide

The previous sections explained the ideas behind the Goal Orientation portlet. This section is a short user guide of the portlet.

2.5.1 Start

To start the orientation, click “Start…” in the opening screen of the Goal Orientation portlet, as shown in the left part of Figure 4.

![Figure 4: Start](image)

2.5.2 Functionality main screen

After clicking “Start…”, the main screen of the Goal Orientation is displayed in full screen mode, as in Figure 5 on the next page.
D8.3: Report with overall WP8 results during months 37-42. Aggregates internal deliverables ID8.16, ID8.18 and ID8.19

Figure 5: Main screen initially

The main screen contains the following items:

1. **Return to Full Page**
   Leaves the Goal Orientation portlet and takes you back to a Liferay page.

2. Complexity indication: *“How easy or hard should the job / function be?”*
   Shows the Profile Levels defined in the Competence Map. In this case, the Competence Map contains four Profile Levels: Junior, Medior, Senior and Guru. You can check one or more of these.

3. **Shuffle and Deal**
   Fills the Competence pool with a random set of competences.

4. **Competence pool**
   Shows a set of competences that can be dragged to the four boxes at the bottom of the screen. Dragging a competence to one of those four boxes marks it for scoring, according to the weighting explained in 0 2.2.4 *Update best matching competence profiles.*

5. **Love it! / Interesting / Rather not / Hate it!**
   The title of a box indicates the marking of the competences contained in it.
6. **Best Matches**
The Competence Profiles that best match the marked competences.

7. **Select as goal**
Clicking on a Competence Profile from the Best Matches and then clicking this button will set a Competence Profile as the goal for a new Personal Development Plan. The portlets for Personal Development Planning (My Plans, Activity Navigator, Assessment and Progress) can then be used to attain the Competence Profile. As a final step, an initial motivation for the goal can be provided (see Figure 6).

![Figure 6: Motivation](image)

### 2.5.3 Main screen after use

After selecting three Profile Levels, dealing the competences and dragging some to the boxes at the bottom to mark them, the screen will look similar to Figure 7.

In the screenshot, we see the Best Matches box contains three competence profiles. All of these contain the competence “Programming – Junior” and because that competence is also required for the Database Administrator profiles, they still are shown disregarding the “Database performance tuning” minor dislike.

**Note:** Figure 7 shows a bug in the tool. The Competence pool is showing Competence Levels (the different levels at which a Competence can be mastered) instead of Competences. This is for instance visible in the items *Analytical skills (level 1)*, *Analytical skills (level 2)* and *Analytical skills (level 3)*, where just the one item *Analytical skills* should be shown.
2.6 Technical implementation

This section provides brief information how the code of the Goal Orientation portlet has been implemented.

The portlet is fully based on ICEfaces ([3]) and Java. For the screens, there are three ICEfaces views in the portlet:

1. smallView.jspx: the initial view of the portlet (as shown in Figure 4: Start), which just redirects to the next view. It is analogous to the small view of the Model Editor portlet.

2. orientationGame.jspx: the main view of the portlet (as shown in Figure 5: Main screen initially and Figure 7: Main screen in use). It contains the whole competence selection / deselecting process and the view of best matching competence profiles. The panelPositioned ICEfaces tag is used for the implementation of the drag-and-drop behavior.

3. motivationDialog.jspx: the dialog window shown when the "Select as goal" button is clicked (as shown in Figure 6: Motivation). It allows the user to input a motivation
text for his/her choice, and then registers the choice as a new Goal model object (see [5]).

The Java source code of the portlet is in package
org.tencompetence.portlet.goalorientationtool, which is stored in the /portal/
org.tencompetence.goalorientationtool-portlet module as part of the TENCompetence
CVS repository on SourceForge ([4]). There are two main subpackages that contain all
the classes:
1. **beans**: the managed beans that implement the logic of the views, containing the
classes SmallView, for the logic of the smallView.jspx view and OrientationGame, for
the orientationGame.jspx view. The motivationDialog.jspx view is such a simple
view, that it doesn't need a managed bean class.
2. **utils**: the utility classes used in the implementation of the OrientationGame class. The
relevant classes are:
   a. **GoalMotivationDialog**: implements the IOkCancelDialog interface, and contains
      all the logic of the motivationDialog window.
   b. **RankedCompetenceLevel**: encapsulates a CompetenceLevel (see [5]), assigning a
      numeric rank to it. It also implements the Comparable interface to allow sorting of
      a list of ranked competence levels.
   c. **RankedProfileLevel**: encapsulates a ProfileLevel (see [5]), assigning a numeric
      rank to it. It also implements the Comparable interface to allow sorting of a list of
      ranked competence levels.
   d. **SelectableLevelValue**: encapsulates a LevelValue (see [5]) of a competence
      profile, adding a boolean property that indicates whether the level value is
      selected or not.

2.7 **Wrap up and future work**

In its current form, the Goal Orientation portlet is a very simple tool, which can already
help people to quickly find competence profiles that could be interesting to them.

Because the tool is in its first release, there are obvious options for possible changes,
which however require further research for their effect:

1. Update the set of shown competences, based on the already marked ones.
   When a few competences related to, for instance, biology competence profiles are
   marked in a positive category, other competences related to biology could
   automatically be added to the competence pool.
2. Show the competences as a tag cloud, to emphasize popular competences.
   Competences used in many different competence profiles or part of competence
   profiles that many people try to achieve, could be shown in a bigger font in the tag
   cloud.
3. Leave out competences that are used in only one or two competence profiles, to
decrease the total number of competences to browse through.
4. Evaluating the scoring algorithm with pilot groups, to find out what a good weighting
   of the different markings is.
These options all require research. Numbers 1-3 because they steer the user towards certain competence profiles, whereas the current approach is a neutral approach. Number 4 because it requires testing with pilot groups.

The most important remark, is that testing in user groups is essential to find out how useful the tool is and what its strengths and weaknesses are.

### 2.8 References


Links checked on 26-12-2009.
Chapter 3: Social Help Portlet

The Social Help Portlet helps users find the most suitable person to answer their particular question. The questions can be of varying nature (i.e. questions related to content, or more generic questions like who should I approach when I want to know something about x). The main objective is to increase the social capital of the learning network in order to contribute towards emergence and maintenance of the network. Promoting social capital should not only enhance the social structure of the network and provide users with a sense of belonging but also increase social support.

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After a learner has formulated a question, the TENCompetence infrastructure assists in finding the most suitable person(s) to answer this particular question. The social support portlet caters for the following kind of scenarios.

3.1 Scenario

Suppose we have a Community on Psychology with a competence profile for Educational psychology. User Philip has registered for this community, selected the CP Educational psychology and created a personal development plan (PDP). Finally, let’s assume that Philip while studying A1 Quantitative data analysis, runs into problems. He has a problem understanding the relations between a number of concepts and as a consequence he is not able to complete an assignment. He studies some additional literature and searches the web, to no avail though. Philip is studying on his own and thus out of touch with any peer students decides to pose a question to the 'on-line tutor'; he describes the general problem and his question. The TENCompetence system then selects those peers that would be the best candidate for assisting Philip and sets up an ad hoc transient community to allow Philip and his peers to arrive at an answer to his question.

Actors: Learners and peers, system
Flow of Events

1. Philip has registered to the community and created a basic profile, containing at least his name and email address.
2. Philip has selected the competence profile, matching competence development plan, performed a self-assessment and created a personal development plan.
3. While working for action A1, Philip has difficulty understanding some concepts. The resources in the action do not provide sufficient detail or are of the wrong level to help Philip in finding the answer himself. He decides to look for support.
4. Philip accesses the support form that is available from the action and poses his question in sufficient detail.
5. The system selects the most suitable peers and invites them to assist Philip in finding an answer to his question.
6. The peers can accept or decline this invitation.
7. When the required number of peers has accepted the invitation, the system sets up a forum that can be accessed by Philip and the selected peers. The forum contains the question, and a guideline.
8. The system notifies Philip and the peers about the existence of the forum.
9. Philip and peers can discuss the question, and jointly reach a solution or answer to the question.

A generalized workflow is depicted in Figure 8.

---

**Figure 8: Flow of events for social support**
3.2 Portlet implementation

A first release of Liferay social support portlet has been implemented. The source code is available under the BSD licence, copyright TENCompetence Foundation, from Sourceforge (http://sf.net/projects/tencompetence). The first release is also available from the DSpace repository at http://hdl.handle.net/1820/2121

Figure 9: Overview of social help portlet options
D8.3: Report with overall WP8 results during months 37-42. Aggregates internal deliverables ID8.16, ID8.18 and ID8.19.

Figure 10: Form to formulate the request

Figure 11: Request was successful

Figure 12: Discuss with peer to obtain answer
### 3.3 Portlet API

The technical design is described in the form of the API.

#### 3.3.1 Activities/Portlets

This section contains a list of activities that LNUs (learning network users) may perform. These activities are split up into three separate portlets:

#### Diagram 1: Portlet architecture

1. **Request Portlet** – This portlet serves requests to the system to start the social help procedure. *Request* is sent by the *LNUs* and is not visible from *LNUs*.

   This portlet launch the follow activities:
   
   - Define *specific Request* to some problem.
   - Set all *LNUs* as potential *peer tutor* participating in a *Social Help*.
   - Launch the *jobSearchSchedule Portlet*.

2. **Invite Portlet** – this portlet executes the search algorithm for tutor suitability. It creates a ranked list of users and selects the first two of them. Then executes the job which invites the selected peer tutors by mail. This job and task has an exactly specified time (2 days). These are persistent jobs, for which the state is saved in a database and it can be sure that those jobs won't be lost. The invitation cycle has reached completion when some peer tutor accepts the invitation.
The tutor gets an invitation by e-mail. The message contains a description of the problem and corresponding activity. The tutor may either refuse or agree to join. If a tutor were to either accept or reject after expiration of the invitation, he or she should receive a message to the effect that the invitation has expired.

3. **Discussion Portlet** - The Discussion Portlet is used for holding Discussions. Every Request initiates a new Thread of the Discussion. The Thread consists of a multitude of Messages containing information about the Request of the respective Thread. Discussions may be added by the LNU with make the Request. Threads are formed when a LNU sends a Message. The LNU may also reply to an existing Message. This way he continues the Thread. Then it (The Thread) becomes a hierarchy of Messages – sent and replied. Messages have a title and contain a short text. They must also keep information about their sender and the sending date.

### 3.3.2 Flow of events (design phase)

#### Flow of events for do Request Use Case

**Precondition:**

The user has logged to the system and is recognized as a system LNU.

**Main flow:**

1. The UI creates a Request Processor instance.
2. The Request Processor instance is initialised.
3. The UI provides the content of the Request.
4. A new instance of the Request Content database object is created.
5. The Request Processor saves into the database and launches the search algorithm and job schedule for sending invitation mail to peer tutors.

#### Flow of events for Refuse/Agree to Participate In Discussion Use Case

**Precondition:**

The user has logged to the system and is recognized as a system LNU.

**Main flow:**

1. The LNU follows a link to the Views Requests from his/her control page.
2. The system shows the main page of the Active Requests. It contains all current Requests for this LNU.
3. The LNU selects a request and view problem’s details.
4. The LNU may Refuse or Agree the request invitation.
Flow of events for Participate In Discussion Use Case

Precondition:

The user has logged to the system and is recognized as a system LNU.

Main flow:

LNU may participate in any Problem Discussion that exists in the Social Help Discussion Board.

1. The LNU follows a link to the Social Help Discussion Board from his control page.
2. The system shows the main page of the Social Help Discussion Board. It contains all current Problem Discussion.
3. The LNU selects a request and launches it.
4. The system shows all requests (Threads) available.
5. The LNU may send (S1) either a new Message, or browse the tree of Messages and reply to any of them. After sending the Message, the system goes back to (4).

Subflows:

S1. The system shows a new page – a Message composer. There the LNU types the text of the message. Finally the LNU sends the Message.

3.3.3 Objects

In this section the objects needed for the Social Help are described. It should be noted that the lists of object fields listed below may not be exhaustive and it include only specific fields. Social Help API should provide getters and/or setter for all fields listed in this section.

The main Social Help API objects are showed in follow class diagram:
Diagram 2: Class diagram social help user

SocialHelpUser

This section contains an extension of the definition of the user object in invitation cycle.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Values</th>
<th>Default Value</th>
<th>M/A</th>
<th>Reason/ Meaning/ Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>M</td>
<td>E-mail address of the user.</td>
</tr>
<tr>
<td>socialHelpRole</td>
<td>Integer</td>
<td>0</td>
<td>A</td>
<td>Indicates what is the user role: (1) learner and (2) peer tutor.</td>
</tr>
<tr>
<td>socialHelpStatus</td>
<td>Integer</td>
<td>0</td>
<td>A</td>
<td>The status has follow value: (1) – receive invitation; (2) – accept invitation; (3) – decline invitation.</td>
</tr>
</tbody>
</table>

1 This column describe whether the associated filled is either filled in ‘Manually, by the user, or ‘Automatically, by the system.
The list of methods of this class follows:

<table>
<thead>
<tr>
<th>Method Name</th>
<th>Static</th>
<th>Return</th>
<th>Parameters</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>receiveInvitation</td>
<td>N</td>
<td>Boolean</td>
<td>question</td>
<td>Integer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>This method should be used to invite a user to participate as a tutor in a peer community. If the user accepts the invitation, the method returns true and false, otherwise.</td>
</tr>
</tbody>
</table>

**SocialHelpRequest**

This object represents the user request for social help.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Values</th>
<th>Default Value</th>
<th>M/A</th>
<th>Reason/Meaning/Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>socialHelpRequestID</td>
<td>Integer</td>
<td>Last ID + 1</td>
<td>A</td>
<td>A unique identifier for each agenda.</td>
</tr>
<tr>
<td>socialHelpUserID</td>
<td>Integer</td>
<td>UserID</td>
<td>A</td>
<td>Uniquely identifies, the LNU, associated with the Request.</td>
</tr>
<tr>
<td>description</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>M</td>
<td>The description of the problem.</td>
</tr>
<tr>
<td>title</td>
<td>String</td>
<td>&quot;&quot;</td>
<td>M</td>
<td>The title of problem request.</td>
</tr>
</tbody>
</table>

**SocialHelpWorkflow**

This object represent the invitation cycle.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Values</th>
<th>Default Value</th>
<th>M/A</th>
<th>Reason/Meaning/Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>SocialHelpWorkflowID</td>
<td>Integer</td>
<td>Last ID + 1</td>
<td>A</td>
<td>A unique identifier for the tutor competence object.</td>
</tr>
<tr>
<td>socialHelpRequestID</td>
<td>Integer</td>
<td>0</td>
<td>A</td>
<td>Provides identifier from Request.</td>
</tr>
<tr>
<td>numberOfCycle</td>
<td>Integer</td>
<td>0</td>
<td>A</td>
<td>The number of invitation cycle.</td>
</tr>
</tbody>
</table>

**SocialHelpForum**

This object is used to represent a problem discussion forum.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Values</th>
<th>Default Value</th>
<th>M/A</th>
<th>Motivation/Reason/Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>socialHelpForumID</td>
<td>Integer</td>
<td>Last ID + 1</td>
<td>A</td>
<td>Provides a unique identifier for forum.</td>
</tr>
</tbody>
</table>
3.3.4 Invitation Scheduler Service

The Invitation Scheduler service would ensure that jobs (send invitation email) are scheduled to run at specific times in the future. These jobs could be run multiple times based on the user’s preference.

The Invitation Scheduler Service that we are going to develop will have the following features:

- The ability to schedule jobs at fixed and varying times
- The ability to schedule jobs that can run at fixed intervals indefinitely
- The ability to cancel jobs
- The ability to list all the currently scheduled jobs.

The figure below shows the sequence of events of the Invitation Scheduler Service.

Diagram 3: Invitation Scheduler Service