## Project Deliverable Report

**Internal Deliverable nr ID8.16 – Policies to stimulate self-organisation and the feeling of autonomy in a network**

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Policies to stimulate self-organisation and the feeling of autonomy in a learning network

**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.

**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).
**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)

**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).

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 information 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 amply 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).

**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 keywords, 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.
References


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Annex 1

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.

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

**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.

**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.

**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.