SUPPORTING LEARNING COMMUNITIES THROUGH A LIFECYCLE IN A
SERIOUS GAMES CONTEXT: REQUIREMENTS FOR SOCIAL TOOLS

Ekaterina Prasolova-Førland, Leif Martin Hokstad
Norwegian University of Science and Technology
Norway
E-mail: ekaterip@idi.ntnu.no, Leif.Hokstad@ntnu.no

ABSTRACT
In this paper, we focus on the requirements for social services and tools needed to support learning communities in an organizational context. The purpose of such communities is to foster and maintain a fruitful environment for learning and development for the organizations the community is a part of. Introducing new technologies such as serious games for learning in organizations imposes new challenges on supporting the development of communities through the different phases of their lifecycle. In order to identify these challenges it is necessary to study the interrelationship and mutual reciprocity among the concepts of organization, community, learning, knowledge and technology. As a result, the traditional understanding of learning communities will need to be augmented or re-described.

KEY WORDS
Learning communities, social tools, serious games, organizational learning.

1. Introduction
Recently there has been a growing interest in innovative forms of e-learning such as serious games that may be better suited to provide memorable and transformational experiences. Serious games are digital games that are driven by learning objectives. Such games can be deployed as testbeds for Experience Management that are highly motivating and emotionally engaging, causing high and long knowledge retention. In TARGET project, serious games are combined with digital storytelling techniques, thus enabling the learning community to store and share experiences reflecting complex situations.

The TARGET (Transformative, Adaptive, Responsive and enGaging Environment) project was started January 1st, 2009, as a large-scale integrated project under Digital Libraries and Technology-Enhanced Learning EU FP7 framework. The main aim of the project is to develop a new genre of technology-enhanced learning environment that supports rapid competence development, and the two domains of innovation and project management have been selected as pilot areas. The TARGET environment will consist of a learning process supported by the TARGET software platform (including a 3D virtual environment), whose main core is a so-called serious game. Interacting with the TARGET software, the learner will be presented with complex situations in the form of game scenarios. During the game-playing, the learner can try out different strategies and solutions, completely risk-free compared with real life, and see how these work. Playing the game over time will result in experiences that are gradually honed into knowledge.

Learning communities, where members develop their competences by leveraging the knowledge and experience of their peers, is a central part of the TARGET process. In general, the purpose of learning communities is to foster and maintain a fruitful environment for learning and development for the organizations the community is a part of. Using serious games for learning in organizations imposes new challenges on supporting the development of communities through the different phases of their lifecycle. These challenges can be seen in the context of the changes in the learning landscape as well as adoption of state of the art 3D virtual world and web 2.0 technologies. In order to identify these challenges it is necessary to study the interrelationship and mutual reciprocity among the concepts of organization, community, learning, knowledge and technology. As a result, the traditional understanding of learning communities will need to be augmented or re-described. In this paper, we focus on the requirements for social services and tools needed to support learning communities in an organizational context, primarily focusing on the serious games scenario and using TARGET as an example.

There exists an ambiguity in the literature concerning the possibility to “design” a successful learning community. Wenger’s original “emancipatory” understanding [1] of communities of practice stresses that communities emerge through informal social interaction while Swan et al [2] argues that the current trend is focusing on the role of managers in constructing and supporting communities of practice to exploit fully the human capital. In this work, we follow the understanding, principles, methodology and terminology suggested by Wenger, especially as suggested in [3]. In this tradition, the design principles
for vibrant and alive learning communities are not meant to be “recipes” and are not the same as most organizational designs. They could rather be seen as triggers and catalysts for a community’s natural evolution, often based on pre-existing social structures.

The rest of the paper is organized as follows. The next section shortly outlines the theoretical background we use when discussing learning communities. In section 3 we introduce a characterization framework together with recommendations for supporting and nurturing learning communities during different phases of their lifecycle. In section 4 we present a scenario for the development of a learning community in a serious game/TARGET context and outline the requirements for corresponding social tools and services for the different phases of the community lifecycle. Section 5 concludes the paper suggesting directions for future work.

2. Theoretical background

The literature regarding learning communities and communities of practice with relevance to the TARGET project rests on two lines of thought in addition to the Wenger tradition. First, it is Activity theory. Activity theory offers a perspective on learning that contains a comprehensive and robust theory, a model and a terminology to better understand the processes of learning [4]. The main focus here is activity, along with context and situation [5]. Central concepts are mediation, the use of artifacts, dialogue, and the situated and social nature of learning [4].

Related to the perspective of activity is the dialogic tradition, represented by critics such as Bakhtin, Buber and Gadamer, with historic lines back to Socrates [6, 7, 8]. Whereas Bakhtin’s dialogic principles open for contradiction and strife, and call for a multiplicity of voices, in his own term heteroglossia, Buber’s dialogue is more introvert and more oriented towards harmony and consensus. Gadamer in turn equals dialogue to learning, with an emphasis on togetherness, or “Miteinander” to use his own term [8]. In this tradition there is a profound emphasis on the importance of dialogue in learning and knowledge development. In a dialogic perspective knowledge is developed in the interfaces and relations between people and the artefacts they apply.

Some critics have attempted to bring the theories outlined above more in line with technology rich learning environments. Connectivism is a recent theoretical approach that builds on an integrated approach to fields of research such as chaos theory, network theories, complexity and self-organization theories. In this perspective learning is seen as a process “within nebulous environments of shifting core elements - not entirely under the control of the individual” [9]. In this perspective the focus is on networks being established between people through technologies. This perspective also emphasises the multiple possibilities that technology affords, and mastering network affordances becomes a major prerequisite for learning.

The epistemological perspective that emerges from these theories is that knowledge is constructed in the exchange, through dialogue, reciprocity and joint construction of artefacts. Learning is thus embedded in the contexts and interfaces between people and the technical artefacts that are established.

3. Supporting a learning community through its lifecycle

The major stages in a community’s life can be described as follows [3]:
1. Early/”seed”: planning, launching, coalescing
2. Mature/sustaining: maturing, stewardship, consolidating
3. Final phase: transformation

The communities involved in TARGET or related projects will typically consist of three possible components and constellations:
- The traditional in-house community where the members are co-located
- A virtual/distributed community connected by the 3D TARGET virtual environment and other collaborative tools
- A community consisting of members of various cultures – the intercultural aspect of TARGET

In the following, we provide recommendations for stimulating and supporting communities during different phases of development.

3.1 Recommendations for the early (seeding) phase of a learning community’s lifecycle

In the early/”seeding” phase of a learning community where the focus is on planning, launching and coalescing we identify the following measures to support its initial growth and development [3]:
- Defining the primary intent of the community (e.g. helping communities, stewarding communities, innovation, best-practice [3]). A community can adopt different roles through its lifecycle, also sub-communities may have different roles.
- Defining the domain and engaging issues: issues and aspects that are important for the organization, motivating for people and can bring in new members. This also includes identifying the ideas, insights and practices that are to be shared in the community at the early phase [3, 10].
- Focusing on the value of the community both for the organization and for its members. In the latter case,
3.2 Recommendations for the mature (sustaining) phase of a learning community’s lifecycle

In the mature phase of community development, where the focus is on sustaining, stewardship and consolidating, we identify the following key measures [3]:

- The process of seeding a community should to a substantial degree be based on existing social networks in order to be successful. It is recommended to interview potential members to identify the existing social structures, activities and needs [3, 12].
- Community members with similar interests should be connected together as early as possible. Connections between the members of the “core” group should be strengthened during the whole lifecycle. Both “strong” and “weak” ties are important to support [12].
- The potential coordinators and leaders should be identified as early as possible, with proper legitimization and formalization of their role in the community and the organization. The managers and officials in organizations should be engaged early [10].
- Providing initial boundary objects and introducing shared artifacts as catalysts of collaboration: “Monuments”, “Instruments”, “Symbols” [1, 14].
- Launching the community with dedicated community spaces, both private and public and corresponding initial community events [3].
- Identifying what knowledge to share and how, laying an initial plan for a community repository, identifying ways to capture and store “soft knowledge” (to be embedded into community practice and stored into relationships) [3, 15].

3.3 Recommendations for the transformation phase

“Death” or transformation into a new form is a natural part of a community’s lifecycle. There are several ways of natural transformation [3]:

- Maintaining trust and social “glue” is crucial to keep the community together and alive, therefore it is necessary to “re-charge” the existing relationships through social events and interactions, especially for distributed communities (by using audio-visual equipment and face-to-face events) [15, 17].
- To support innovation and a cross-cultural approach, it is important to seek relationships outside organizations and to connect professional communities and networks in different disciplines, providing corresponding infrastructure for interaction (meeting fora, boundary objects etc) [2].
- Introducing a “stewardship team” for the community: Facilitator, Knowledge leader, Event coordinator, Librarian [10].
- Supporting ongoing rhythm, milestones and events (rounders, rituals, ringers) [16]. This includes cycles of (regular) events following common patterns, e.g. mentor/peer sessions, game sessions, reflection and dissemination rounds, updating the repository after each gaming session. Also unexpected events are important to renew interest and avoid stagnation.
- Building and organizing a knowledge repository for the learning community facilitating access to the community’s shared understanding [3].
- Motivating contributions and increasing their effectiveness by introducing peer rating and other mechanisms for in-time feedbacks from peers and mentors. Celebrating exemplary contributions to support the sense of ownership [11].
- Linking contributions to personal profiles/journals/portfolios, flagging them for future feedback, tracking contributions during their lifecycle (trajectory) [11].
- To enable positive engagement and creativity the community members should be allowed to negotiate own norms and boundaries. There should be support for uninhibited debates as there is a need for a “careful balance between guidance and authority” as well as emotional support and “protected space” for speaking openly and uninhibited [13].
- Supporting communication not only within but also between the community and wider organization/other communities, supporting open dialogue. Designing corresponding boundary objects/artifacts to be used across different communities and media [15].
• Loosing its focus and turning into a “social club” as opposed to stewarding a practice.
• Merging with other communities or splitting into distinct ones.
• Institutionalization of communities (e.g. into centers of excellence).

At this stage it is important to ensure that a community does not “die” before its time. Following measures can be taken to ensure that [3]:
• Establishing a balance between opening and closing a community’s boundaries.
• Ensure acknowledgement from the senior management.
• Engage coordinators and members for an active participation.
• Support healthy power and social dynamics.
• Focus on value associated with participation in the community.

Depending on the direction for the transformation (e.g. dissolving, splitting, merging), the methodology would be the same as for the early or mature stages of a community’s lifecycle.

4. Requirements for social tools

In the following we outline how social services and tools can be designed to support the different stages of community development. We present a general scenario showing how a typical learning community develops through the different phases of its lifecycle. The organizational context is typically a knowledge intensive company, a healthcare enterprise, a company with dynamically changing strategies.

4.1 An initial scenario

In this scenario we will illustrate what kind of social tools and services are needed to in order to support learning communities in the context of an educational serious game. For example, a group of players in TARGET-participating companies want to start a distributed cross-cultural community for collaborative serious game playing and creation of a shared repository using the TARGET platform. As successful communities usually build on existing social networks, the initiators create an overview of such networks, activities and skills by performing interviews among potential community members, trying to link together those with similar interests and activities. At the same time, the social networks are explored and analyzed by using appropriate techniques and tools. It is important to emphasize the value of the new communities to the management, stakeholders and members and to facilitate the design of the new practices, ways of sharing knowledge, and repositories. A way to achieve it is to analyze, visualize and map the existing workflows and practices, identifying problems and ways of improvement for better learning.

When the learning community is launched, the initiators (who by now have probably adopted the roles of leaders/coordinators) focus on attracting new members by emphasizing the value of the community and by creating a strong community identity. This is done by launching a community website, establishing community spaces for both synchronous and asynchronous collaboration and negotiating community practices for knowledge sharing. Connections between the community members are further strengthened (especially within the core group) and contributions and value added by individual members are emphasized by establishing personal profiles and portfolios with overview over expertise, activities, participation in different networks and contributions (e.g. additions to the TARGET repository, best gaming scores). From the very beginning attention is being paid to establishing and strengthening special roles in the community, such as leaders, coordinators, librarians, with special responsibilities, and therefore dedicated toolsets to support their tasks. The role of librarian will be especially important during the maturing phase of the community development where the TARGET repository should be maintained and expanded.

As the community grows, the coordinators have the challenge to redefine the boundaries and establish mechanisms for regulating admission of new members and the corresponding processes. At the same time, the growing knowledge repository needs maintenance and possibly reorganization. In order to demonstrate the value of the community to the organization, management and other stakeholders, the community’s performance is monitored and measured by using appropriate indicators and tools. For sustaining momentum and keeping communities alive, the coordinators and the leaders in the community make sure to establish a healthy rhythm of events, both regular (meetings, discussions, gaming sessions) and “unexpected” ones such as appearance of guest speakers/players and arranging joint game sessions with international partners. In order to maintain the focus on the “cutting - edge” perspectives and “rejuvenate” the community, connections are established with other related communities, e.g. involving companies not earlier connected to TARGET.

Towards the end of the TARGET project there will be a need to aid the transformation of the original community, e.g. merging it or a part of it with the one or several other TARGET communities.

Based on this preliminary scenario, we will now suggest a set of requirements for social services and tools to support the different phases of the learning community’s lifecycle.

4.2 Tools for the early phase (seeding)
Following tools are required to support the early phase of the community development:

- Tools for creating initial overview and establishing profiles of the members, stating their resources, skills, roles, interests etc.
- Tools for initial interviews of community members (e.g. online questionnaires)
- Tools providing overview and visualizations of existing workflows, practices, communicational networks etc.
- Tools for collection and transformation of existing knowledge and resources into a repository suitable for a TARGET (or a general) learning community.
- A community portal with initial information, links to resources and individual members.
- Community spaces, both public and private, with corresponding tools:
  - Tools and spaces supporting synchronous and asynchronous communication and collaboration, e.g. forums, chats, 3D virtual spaces, 2D/3D “whiteboards”, audio-visual communication tools
  - Tools and spaces supporting both strong ties (contact and friend lists) and weak ties (places for hang-outs and serendipitous encounters)
  - Personal places containing blogs, user profiles showing their expertise (also with peer “rating” and recommendation systems), portfolios with contributions
- Tools and services for managing membership:
  - Mechanisms for managing new memberships as well as different levels of memberships with different rights, responsibilities and tasks.
  - Mechanisms for supporting strong personal identification with the community, e.g. visual symbolics on the portal/webpage and in the avatars.

4.3 Tools for the mature phase (sustaining)

Following tools are required to support the mature phase of the community development:

- Tailored set of tools to support different roles in the stewardship team (such as knowledge leader, facilitator, librarian, event coordinator).
- Tools supporting ongoing rhythm, milestones and events (rounders, ringers, rituals [16]), e.g. agents doing reminders, prompting for certain contributions, performing simple moderator tasks.
- Tools allowing easy contributions to the community’s repository, as well as modifications, annotations and easy linking to personal profiles and portfolios of the contributors. The repository should also support efficient tools for search and navigation, including social navigation by peer recommendations.
- Support for individual portfolios with overview over contributions and participation in activities, in order to clearly indicate learning and participation trajectories.
- Reward mechanisms, e.g. increased “user rating” for those who participate in community activities and contribute actively, different forms for encouragement and feedback. This includes for example tools for peer rating and recognition.
- Tools supporting communication and social networks not only within but also between the community and wider organization/other communities, e.g. mechanisms for opening some of the community spaces for outsiders, mechanisms for managing multiple and joint memberships.

<table>
<thead>
<tr>
<th>Category of technology</th>
<th>Description and purpose</th>
<th>Types of Web 2.0 applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaboration</td>
<td>Sharing of resources, shared production of documents</td>
<td>Google docs, wikis, blogs, shared workspaces</td>
</tr>
<tr>
<td>Communication</td>
<td>Instant messaging systems</td>
<td>MSN, twitter,</td>
</tr>
<tr>
<td>Content creation</td>
<td>Interactive, user generated content</td>
<td>Wiki, blog,</td>
</tr>
<tr>
<td>Social graphing/ mapping</td>
<td>Charting collaboration patterns (internally – externally content wise, frequency, etc. Leveraging connections between people, “who knows who”, “who knows what”, what knowledge can be found where</td>
<td>Different chart visualizations</td>
</tr>
<tr>
<td>Information tagging /metadata creation</td>
<td>Tagging of resources, social/shared bookmarking, user tracking, filtering, RSS, adding information to primary content to prioritize information or to make information more valuable</td>
<td>Types: Delicious, digerati, technocrati</td>
</tr>
</tbody>
</table>

Table 1. Overview of web 2.0 applications for supporting learning communities

4.4 Tools for the transformation phase
Depending on the result of the community transformation (dissolving, merging, splitting) the tools and services required are the ones used for the early/seeding and mature/maintaining phases.

In the table above (Table 1) we summarize the discussion above and provide an overview of concrete existing tools used for supporting different community activities.

5. Conclusions and further work

In this paper we have presented requirements for social tools and services for supporting learning communities through their lifecycle in a serious games context. As we mentioned in the Introduction, there exists different approaches to this issue. Our approach is mostly based on the understanding adopted by Wenger [1, 3], focusing on the fluid and emergent nature of learning communities. Therefore these requirements are by no means final and will be extended and supplemented as the TARGET project develops. For the time being we provide general requirements, while in future work we will study in more detail the support provided for different types of learning communities involved in TARGET, both in academic and organizational context. We will develop a framework for analyzing and monitoring learning communities, suggesting design for corresponding probes, measurements and monitoring tools. We will also investigate the dynamics and challenges of learning communities in the context of educational serious games.

Acknowledgements

The research presented in this paper is funded by EU FP7 TARGET project.

References