Using Ad Hoc Transient Communities to Strengthen Social Capital: Design Considerations

Abstract

In this paper we argue that Ad Hoc Transient Communities (AHTCs) are a promising means to improve community sustainability by strengthening the social capital of the community. AHTCs are a means through which participants are brought together for a specific, learning-related goal ('ad hoc') and for only a limited amount of time ('transience'). In this paper a first design for an AHTC service is presented which will be implemented in the eTwinning network (+ 70.000 users). Following a short theoretical introduction, a use case is presented outlining how a new participant would use the service. In this use case the participant initially does not know who to contact for asking a question. Using the system, the participant receives an answer from two participants whom were selected by the service. Over time and with more use, the participant has gained many connections with other participants, feels a sense of belonging to the community, as well as is answering questions from others. However, not only the participant that asked the question benefited, also the participants helping did. By working together the invited participants got to know each other as well. Following the use case, important design choices are elaborated upon. These design choices are: *Finding the right participants with a matching system*, *participant accountability through ratings*, *showing participant's previous activity and contacts to increase sense of belonging*, and *accessibility and Usability*. Subsequently, related work on Question and Answer websites as well as Question and Answer services is described. Lessons learned from the related work concern the importance of a matching system, finding a balance between public and private questions, the value of ratings as well as the danger of providing paid tutors through the system. Finally, it is concluded that implementing an AHTC service as proposed in this paper should lead to the desired effects on social capital. These effects are decentralizing the social network structure, improving the sense of belong to the community, and increasing mutual support. Testing for these effects will be done with a combination of social network analyses, a questionnaire, and logging data. Based on the design a prototype can be built, while at the same time a user requirement analysis with stakeholders will be conducted, leading to a longitudinal study within the eTwinning network.

Keywords

Ad Hoc Transient Communities, Design, Social Capital, Related work, Peer Support, Matching, Sense of Belonging, Mutual Support

Introduction

Community formation in online learning environments has the capability to enhance learning (Anderson, 2004). An online community also gives participants a sense of belonging, provides easy access to other participants and prevents feelings of isolation participants might experience (Anderson, 2004; Eggens, Van der Werf, & Bosker, 2008; Wenger, 2004), thus reducing the chance of participants dropping out (Rovai, 2002).

However, since community formation is a dynamic process, it is inherently unpredictable (Lock, 2002; Smith & Kollock, 1999). While communities need a certain amount of dynamism (e.g., participants come and go, information flow increases and decreases, etc.) to be able to emerge and stay in existence (Kester et al., 2006), too little or too much dynamism can again have adverse effects such as a low information flow or a high drop-out rate (Chang, Cheng, Deng, & Chan, 2007). One aspect of communities that influences and is influenced by these dynamics is the social capital (Kadushin, 2004). Social capital represents the participant's relationships within a social network, as well as the mutual support between participants (Adler & Kwon, 2002). The features of social capital include: (1) the social structure of the network – how are participants connected - (Coleman, 1990; Eggens et al., 2008), (2) the sense of belonging to the community (Hughey, Speer, & Peterson, 1999; Krebs & Holley, 2006; Pooley, Cohen, & Pike, 2005; Rovai, 2002), and (3) the mutual support (Kester et al., 2007).

In order to improve the social capital of online learning communities, we hypothesize that each feature of social capital needs to be targeted. With regard to these improvements, the concept of Ad Hoc Transient Communities

(AHTCs) seems very promising. Sloep (2008; Van Rosmalen et al., 2007) introduced the concept as a means through which learners are brought together for a specific, learning-related goal ('ad hoc') and for only a limited amount of time ('transience') (Berlanga, Sloep, Kester, Brouns, & Koper, 2008; Sloep, 2008). In particular, Van Rosmalen et al. (2007) tested a peer-support service that created Ad Hoc Transient Communities, through which participants were able to receive support from their peers within an online learning community. The results of this research seem to indicate that AHTCs have a positive influence on the mutual support. However, because of the novelty of AHTCs there is no evidence on the effects AHTCs might have on the social network structure of and sense of belonging to the community.

Fetter, Berlanga, & Sloep (submitted; 2009) hypothesize that the use of AHTCs not only improves the support aspect of social capital, but also has a positive effect on the social network structure and sense of belonging. They hypothesize that AHTCs may function as a lever to decentralize the social network, increase the sense of belonging, and improve mutual support. By creating many short-term moments of contact, an increase and larger spread of ties between learners is expected. This would decrease the centralization and improve the communities' social capital. In other words, the network is less dependent on a select few participants. Furthermore, they expect that by introducing AHTCs the sense of belonging will increase because participants will gain more contacts and feel less isolated as well as perceive the community as more effective because their needs are met. Finally, they hypothesize that the use of AHTCs will improve mutual support. Because AHTCs are easy to use, the threshold for using should be low. This again should lead to participants making more requests being made and considering the community to be of higher value. To test for these effects, as well as further it is. We suggest to use AHTCs in an existing online learning environment, in order to extend the previous findings by Van Rosmalen (2007) and test for their effects on social network structure, sense of belonging, as well as on mutual support.

The eTwinning network (+ 70.000 users) is a large online learning environment. eTwinning has the purpose of bringing educational staff and their students together from all over Europe. Through this network, collaborative projects can be started which have a wide variety of subjects. They range from improving teaching skills of math teachers to having multiple primary schools students working together and learning about different cultures. According to recent survey, the main reasons for joining the eTwinning network are meeting new people, wanting to work together, and improve the teaching skills. However, at the same time two of the main barriers were the difficulty to find an appropriate partner and the difficulty to organize the collaborative work (eTwinning, 2009). We believe AHTCs will proof to be a strong solution for many of these barriers (Fetter et al., submitted; Fetter, Berlanga, & Sloep, 2008). In order to facilitate the testing of this proposed solution, a service needs to be constructed that allows the emergence and tracking of AHTCs in learning communities. In this paper a first design for an AHTC service is presented which will be implemented in the eTwinning network. First, a use case is presented outlining how the AHTC service can help a learner to find her way in a community like eTwinning. Through the service her questions are answered and she meets new people, leading eventually to her feeling a part of the community, having many contacts, and answering questions herself. Second, design choices are elaborated upon, third, related work is discussed, and finally conclusions and implications for future work are drawn.

Use case

Anne is a mathematics teacher at a Dutch high school. Anne would like to be able to offer her students new insights into the importance of mathematics, as well as improve her own skills in teaching. Anne has heard good things about the eTwinning network.
At the eTwinning website, Anne registers and fills in the basic questions asked during registration. Her profile includes: preferred languages, subject(s) she teaches, and subject(s) she is interested in. Once Anne is registered, she comes to the eTwinning network from where she has access to the other teachers, is able to start her own project, extend her profile, or post a request in a forum for help/information.
As Anne looks around the eTwinning network for the first time she is uncertain what to do now. There are a couple barriers withholding her from taking a next step namely:
- As Anne starts looking for a project she is overwhelmed by the sheer number. There are thousands of projects running.
- What's more is that the number of projects would not be such a problem if she could quickly ask another participant how to start or how to search best. But, the network has over 70.000 participants and Anne has no idea how to find the right person.

- The place where she could post her question would be the included forum, but Anne is reluctant to post here because she feels her question is too simple and she is maybe a bit embarrassed.
- All together it is too much information to take in and create a good overview of.
- And Anne does not know anyone who can help her, she has no social network within the community yet.

Because of these barriers, Anne thinks it is best to first gather some experience from other participants. To this end she goes to the eTwinning-groups area which is specifically meant for social interaction between participants. However, it soon becomes clear that Anne still does not know whom to contact.

Luckily as she is browsing the eTwinning-groups page she sees in the corner a box where a question can be asked. There is a field to type in a title, a field for her question, a drop-down list with question categories (these categories are the same as the teaching subjects), a drop-down list used for indicating the language of the question, a submit button and a help button. Before she types in a question, she reads the help part. It is explained that when she asks her question a collaborative space will be created and a few participants that should fit to her profile will be invited to answer her question. Furthermore, she reads that no other participants (except the ones invited) will have access to this area, and that once her question has been answered the question will be closed (but remain accessible for referencing). Finally, it is stressed that the type of question is not so important. It can be a question for information, clarification, but also for working together or meeting someone. Anne types in the following question: '*I have a question concerning the eTwinning projects. I am new and don't know where to begin with finding partners or setting up a new project. Could you please give me some advice?*'. Once she typed in the question she chooses from a drop-down list a fitting category. Once she presses on send, she is directed to a different page (for details of page see figure 1).
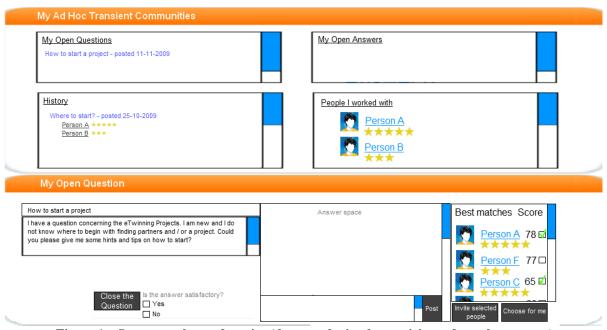

Figure 1 – Screen mock-up of service (does not depict the participant from the use case)

Based on the information in Anne's profile, a matching system has gone to work in finding suitable participants that can help her to answer her question. The matching system does this by calculating a score for each participant, based on their profiles. Separate sub-scores are calculated which are accumulated into one matching score. These sub-scores are:
- Availability: This sub-score is based on the average number of accepted requests over all participants compared to the number of requests accepted by a participant. The more requests the participant has accepted, the lower the availability score.
- Content competency: Participants whose teaching subject(s) are equal to the question category receive a positive sub-score.
- Similarity: Based on the participants teaching subject(s) a correlation score is calculated. The higher the correlation the more they have in common.

- Language: Based on the language of the question, only those participants that have that language selected in their profile are taken up in the matching.

After the matching score is calculated, the service creates a list with the 10 best matches for Anne. Anne has the choice of either choosing the people from the presented list or let the service make the decision for her. Since Anne is unsure whom to choose, she tells the service to choose for her. The service chooses those participants that fit best to Anne. If there are more best-fits than needed, a random selection is made. Once selected, participants receive an e-mail inviting them to answer the question. This e-mail includes the question itself so that participants can see immediately whether they can help or not. Also, two links are included, one for accepting the request and one for rejecting the request. If participants reject or not answer the invitation in a certain time period, a new invitation is sent out to next best matching person.

Ricardo is a Spanish math teacher and has conducted two projects through the eTwinning network so far. In his e-mail he finds a notification from eTwinning that he has a question from another participant. Since Ricardo has already been involved in two math related projects, he is able and willing to accept Anne's request and clicks on the link to accept. He is directed to the question page and has access from now on. Ricardo sees that another participant named Emmy has already provided an answer. However, the answer seems not complete and Ricardo types in the dedicated field his own response. In this response he first answers Anne's questions, but also makes some comments on some points Emmy made. Over the next two days a lively discussion comes up between Emmy and Ricardo, but in the end they find a common understanding. Ricardo found the discussion with Emmy very interesting and has added her to his contact list in the eTwinning network.

Anne is very pleased, she has received two clear answers and has now a better idea of what to expect. Also the discussion between Ricardo and Emmy was very informative and interesting to follow. At the bottom of the question page Anne presses the button for closing the question and indicates that the question has been answered satisfactory. She is then asked to provide a rating for each participant that helped her on a 5 point scale. Once provided, Anne is back in the eTwinning network and sees in her history a link to her question in case she wants to read the answer at a later stage.

After a couple of months Anne is not alone anymore. She has run a project together with multiple participants and has asked quite some questions using the service. Because of this Anne now has a growing social network and feels part of the eTwinning network. What's more is that now she is receiving questions to answer as well. Anne is happy to reply to these questions because it is a good way of meeting new people and because it is flattering to be selected as a good match.

Design choices

As can be seen in the use case, the use of AHTCs brings along some considerations that will be explained subsequently. For a more detailed description of the theoretical framework, see Fetter et al. (submitted). The AHTC service consists of two parts. The first part is where the participant can ask the question and is situated within the main page of the eTwinning groups. The second part is the main service screen from where participants have an overview of their activity within this service. Here they have access to their open questions, closed questions, can post within one of their active questions, and have an overview of the participants they worked with previously (see Figure 1). In designing this service, certain design choices have been made that need special attention. These features include:
- Finding the right participants with a matching system.
- Participant accountability through ratings.
- Showing participant's previous activity and contacts to increase sense of belonging.
- Accessibility and Usability

Finding the Right Participants with a Matching System

Through the matching system similar participants are found and suggested / chosen. As illustrated in the use case this is done by calculating four sub-scores and taking these together to provide a best match scoring. Below each sub-score is elaborated upon, focusing on the rationale behind the choice for that matching criteria.

Availability

The availability sub-score is calculated by comparing the number of answers given by the participant in comparison to the average number of answers given by participants in the network. This way the availability score should prevent the same participants receiving an invitation all the time. This is expected to help in the decentralization of the social network as well as relieve the very active participants to some extent with receiving fewer questions.

Content Competency
It is important to find those participants that are likely to be able to answer the question. To this end the question category is compared with the teaching subjects of participants.

Similarity
Following the principles of eligibility, it is important to bring participants together that are close together in their experience (Kester et al., 2007). Having participants with similar experience or expertise working together has multiple benefits, namely:
1. Miscommunication can be prevented. When compared to novices, experts tend to have a different mental framework and deal with a problem in a different way (Berlanga et al., 2009). Thus having an expert answer a novice question can result in a response the novice is not able to understand yet.
2. Experienced participants receive requests on their own level rather than being flooded by beginner questions (Brown, 2001).
3. The participant answering the question can learn significantly from providing the answer (Griffin & Griffin, 1998).

With these advantages in mind we calculate sub-score for the *similarity* by correlating the teaching subjects of the questioner and the participants. The higher the correlation, so the more they have in common, the higher the sub-score

Language
Within an internationally focused network like eTwinning language preferences are important to take into account. There is not one common language that everyone speaks and if the matching system suggests participants that do not speak a language the participant that asked the question speaks, the whole system loses its function. To this end the preferred languages of the participants are compared to the language the question was asked in. If there is no match, participants are not taken up in the rest of the matching.

Participant Accountability Through Ratings

After closing the question, the questioner is asked to rate the answer as well as the participants involved. The ratings included have the function of creating an environment where participants are accountable for their actions. This accountability is important because we want to create an environment where the tit-for-tat strategy as described by Axelrod (2006) is the best strategy to follow. This collaborative strategy holds that one starts to collaborate as a first move and after that always copies the other person's moves. So collaborating is reciprocated with collaborating and defecting with defecting. This strategy has been shown to be one of the most effective ones possible under a variety of circumstances (Axelrod, 2006). There are three conditions which are needed for the tit-for-tat strategy. (1) The groups in which participants work together are small, (2) The chance for participants to meet again over time are high, and (3) participants are accountable for their actions. The first condition is already met through the inherent AHTC functionalities. The chance to meet again is boosted by providing the list of people to whom the participant worked with previously. The accountability is taken care of by introducing ratings, not just of the answer but of the participants as well. This should motivate participants to actually contribute to the answer once they accepted the request. Having a low rating will reflect badly in the community as well as stop other participants from working together with you.

Showing Participant's Previous Activity and Contacts to Increase Sense of Belonging

One of the main hypotheses of our research is that we expect AHTCs to have a positive effect on the sense of belonging to the community by providing an easy communication method, showing a working network and matching them to other participants. Additionally, we try to facilitate this feeling by providing a history list showing past actions as well as a list of people worked together with. The history should show the participant that the service is useful. The feeling that the community is useful is known to increase the sense of belonging to

the community (Lesser, Fontaine, & Slusher, 2000). At the same time by providing a list of participants worked together with should help against the feeling of isolation and will be a good reference to use when being matched to other participants. If one the participants matched to your question is one you worked together with before, you can look this up quickly.

Accessibility and Usability

As with any communication service, accessibility and usability are major factors whether or not the service will be used in the first place. The challenge as we see it is that while it should be easy to ask a question, there should also be enough depth to the service on the longer run. The ease of asking a question is attained by minimizing the widget on the eTwinning-groups page. The participant only needs to type in the question and press on send, at the same time a help link is provided to help participants understand the service. The main AHTC page is more elaborated (see Figure 1). Here participants have easy access to their previously asked questions and / or answers provided to others. They also have an overview of the participants they interacted with in an AHTC.

Related work

Evidently, AHTCs are not the first in providing a means to ask a question to other participants. There are many online sites (e.g. Yahoo Answers) and sevices (e.g. BitWine) that are solely meant for asking questions. It is wise to learn from these Question and Answer (Q&A) websites and services, since there they are very popular, have an extensive experience, and manage to ask questions to strangers easily.

Q&A Online Sites

The first striking observation with any Q&A site is the fact that many of the questions asked are easily findable on the internet. A search in Google would provide the answer and would involve less work. Yet still many people prefer to use the Q&A site for this, even though the quality of the answer might be lower and time investment is higher. This shows that the social aspect of asking and answering the questions plays a vital role; people are often not so much interested in the answer as in meeting other people.

Typically, a Q&A site includes some important features, namely: profiles for recognizability, a rating system (either for the answer, the people, or both), ease of use, limited time span, and topics for the questions to be classified. These features all help in creating a space where people are eager to ask and answer questions, while at the same time the ratings help in establishing a sense of accountability for one's actions. However, there are also some features regarding these Q&A online sites where AHTCs will bring improvement. First of all, each question asked is posted publicly, heightening the barrier for new people who might feel reluctant in doing so. Secondly, there is no peer-matching done and no overview of the participants one worked with. Third, one has no say in whom is allowed to post or not, making spam and verbal abuse a common practice on these online sites. We believe that the design of AHTC will avoid these problems.

Q&A Online Services

Whereas Q&A sites take a more public approach, Q&A online services provide the participant the possibility to ask a question privately to a (often paid) tutor. A good example of this type of service is the program BitWine (http://www.BitWine.com). BitWine is an extension for Skype and allows participants to find a tutor they need on a specific subject. If online, the participant can then have an introductory talk with the tutor. If the participant deems the tutor capable enough, they then continue the consultation (Often for a certain amount per minute). The advantage of such a Q&A service is that participants can ask a question in private and will receive an answer immediately. However, what is missing is a matching mechanism. Now a participant needs to find the right tutor themselves from a very extensive list and base this choice on a couple of lines of introductory text. Finding the right tutor in such a system can thus be grueling work. Furthermore, with the emphasis on paid tutors (although everyone can be one), a surrounding is created where seeking out a free tutor seems like the second best option. In opinion, this hampers the possibility for a community to form significantly. The main lessons learned from this service is that we need a matching mechanism in systems like this to find who we need, as well as that the focus on paid tutors should be avoided when the aim is to strengthen the social capital of the community.

Discussion and Future Work

As has been argued, we expect that the use of AHTCs service will have a positive effect on the social capital of the participants within an online community. While previous research indicates a positive effect of AHTCs on the mutual support, it is still unclear what effect they will have on the social network structure and on the sense of belonging to the community. Combining the knowledge of previous research with related work has led to a combination of design choices, resulting in a design for an AHTC service. Through this design it is our intention to strengthen the social capital of the eTwinning network. These design choices reflect our aim for a service that provides participants with a personal peer-tutor recommendation, for working in a private space, on a specific request for a limited amount of time. Furthermore, by making participants accountable for their actions through ratings, a tit-for-tat cooperation strategy is encouraged. By matching participants for each question, we aim at decentralizing the social network structure. This means that the social network is not dependent on a few core participants, but that participants are highly interconnected. As a result of providing a communication service where participants can work together and see what they did and who they worked with, an improvement in the sense of belonging to the community is also expected. Finally, by using peers as tutors in a fast and easy to use service, we expect the mutual support to go up.

 The next step is now to build the prototype of the AHTC service. At the same time we will conduct a user requirement analysis with stakeholders. Once the prototype is build according to our design and the stakeholder requirements, the prototype will be implemented within the eTwinning groups network. This implementation should result in a longitudinal study, providing an overview of the influence of AHTCs on the social capital. To this end, and test our hypotheses, three approaches will be used. Regarding the social network structure, a social network analysis approach will be used. For the sense of belonging to the community, a questionnaire as constructed by Rovai (2005) will used. With respect to the mutual support, logging data will be used to determine how often requests have been made and fulfilled.

Acknowledgments

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