

D.3.1- Major trends arising from the network

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Tellnet - Teachers' Lifelong Learning Network

*How can social learning networks support
teachers' digital competences?*

www.tellnet.eun.org

D.3.1

Major trends arising from the network

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Executive Summary

The workpackage 3 of the Tellnet project, Teachers' Professional Development, focuses on studying the professional development aspects of an informal lifelong network. The case studied in this deliverable is based on early analyses of the eTwinning data extractions from the eTwinning platform. More than thirty countries in Europe participate in eTwinning and the eTwinning platform provides a central point for teachers.

The Lifelong Learning Project Tellnet aims to explore and support eTwinning as a lifelong learning system and study it using novel tools such as network theory, Social Network Analysis (SNA) and scenario building to forecast alternative future visions. Social network analysis views social relationships in terms of network theory consisting of nodes and ties. Nodes are the individual actors within the networks and ties are the relationships between the actors. This deliverable builds on the collaboration between the Tellnet partners and is based on *D2.1 Data Management of Large-scale Lifelong Learning Data* that provides tools to study eTwinning trends. The data extracted for the report is from June 2010 and November 2010, enabling a snapshot of eTwinning at that given time.

Various networks can be detected in eTwinning using the data extracted from the tools used by teachers on the platform, e.g. Project collaboration network; Contact-list network; Messaging network; Wall-posting network; Blog network; Guest book commenting network. Combining these networks through their connections, an eTwinning network can be constructed. In this deliverable, some early trends will be analyzed using social network analysis (SNA) to identify strengths and weaknesses in these networks. Additionally, empirical data about eTwinners "sense of connectedness" and a number of other characteristics was collected using surveys and a workshop and will be reported here.

Social network analysis (SNA) on the most interesting network, namely the Project collaboration network, shows that this network is strongly dependent on a core group which is nevertheless a large and well interconnected group. The eTwinning project collaboration network is divided into multiple clusters, most of them are small clusters formed by 2-9 eTwinners. The fraction of the teachers who only have one connection-degree is 17,5% for those who are in the Project collaboration network (i.e. connecting edges are projects that teachers have done together), 49,01% for those in the Blog network (i.e. connecting edges are comments on each-others blogs) and 63,41% for those in the messaging network (i.e. connecting edges are emails exchanged). Finally, in accordance with eTwinning principles, eTwinners mostly collaborate with other eTwinners from different countries.

Regarding eTwinners sense of connectedness, empirical data shows that eTwinners feel well connected; this perception is positively correlated with the number of projects in which eTwinners were involved. eTwinning contacts are made both on-line and off-line, half of these contacts are not only online which shows the blended nature of the network.

From these results we believe that the next step to foster various eTwinning networks identified at this early stage of the project should not only be the expansion of the network, but also connecting eTwinners to each other and preventing isolation and small clustering. To accomplish this, we propose the use of peer-support mechanisms: Ad Hoc Transient Groups

(AHTGs). Through this mechanism, eTwinners that have a question to ask can be connected and helped by other eTwinners who have relevant experience in the area. It is expected that by introducing AHTGs, the sense of belonging will increase because participants will have more contacts and will perceive the community as more effective as members help each other to meet their needs. A tool that facilitates peer-support has been already validated in a first workshop with eTwinners. Results from this validation are also presented in this deliverable.

Finally, the deliverable discusses findings from the current state of the network and their implications for eTwinners, and presents new possible areas of improvement for eTwinning.

Table of Contents

1. Introduction.....	6
2. What do we know about eTwinning and eTwinners?	7
2.2 Highlights from the eTwinning monitoring survey in 2008 and now . Error! Bookmark not defined.	
3. Sense of Connectedness, Ad Hoc Transient Groups and Social Network Analyses	10
3.1 Sense of connectedness.....	10
3.2 Workshop at eTwinning conference 2010	13
3.3 New understanding gained from Social Network Analysis	16
4. Discussion and conclusions	19
4.1 Global network perspective.....	19
4.2 eTwinner perspective.....	20
5. References.....	22
6. Appendix.....	23
6.1 Appendix I – Questions for SNA	23
6.2 Appendix II – Survey – eTwinning workshop.....	26
6.3 Appendix III - eTwinning fact sheet.....	29

1. Introduction

The eTwinning¹ action is defined as the community for schools in Europe. It promotes teacher and school collaboration through the use of Information and Communication Technologies (ICT). eTwinning is nowadays in a transitional phase. Since the beginning of the eTwinning action in 2005, its main purpose was the facilitation of collaborative school projects across borders in Europe, whereas since 2008, its aim has broadened more towards the delivery and maintenance of a social network for teachers (eTwinning, 2010). The eTwinning platform (hereafter platform), from which the data is extracted for this study, has gone through major changes over the period and new social networking features have been added to the platform to allow eTwinning teachers (eTwinners) to do projects, to socialize, to extend their professional network and to improve their teaching skills (eTwinning, 2010; Annex 6.3). The socialization of the network is, therefore, paramount to eTwinning's future development. However, building and maintaining a strong network is a complex endeavour (Fetter, Berlanga, & Sloep, 2008).

The Lifelong Learning Project Tellnet² aims to explore and support eTwinning as a lifelong learning system and study it using novel tools such as network theory, Social Network Analysis (SNA) and scenario building to forecast alternative future visions. Social network analysis views social relationships in terms of network theory consisting of nodes and ties. Nodes are the individual actors within the networks and ties are the relationships between the actors. This deliverable (D3.1) builds on the collaboration between the Tellnet partners and is based on *D2.1 Data Management of Large-scale Lifelong Learning Data* that provides tools to study eTwinning trends. The data extracted for this report is from June 2010 and November 2010, enabling a snapshot of eTwinning at that given time.

Whereas eTwinning is a community consisting of more than 100'000 teachers in Europe, various networks can be detected in eTwinning that are created through interactions between the teachers. Using the data extracted from the tools used by teachers on the platform, we can create the following network graphs where teachers are the nodes and the interaction among them create the ties:

- *Project collaboration network* where the ties between nodes are eTwinning projects that eTwinners have collaborated on;
- *Contact-list network* where the ties between nodes are contacts that eTwinners have added to their contact-list for potential project partnerships;
- *Messaging network* where the ties between nodes are the messages that eTwinners have sent to each other using the internal messaging system on the platform;
- *Wall-posting network* where the ties between nodes are the comments that eTwinners have left on each others "wall";
- *Blog network* where the ties between nodes are the comments that eTwinners have left on each others blogs;
- *Guest book commenting network* where the ties between nodes are the comments that eTwinners have left on each others Guest book.

¹ www.etwinning.net

² www.tellnet.eun.org

These are defined in more details in *D2.1 Data Management of Large-scale Lifelong Learning Data*. In this deliverable, some early trends will be analyzed using social network analysis (SNA) measures to identify strengths and weaknesses in some of these networks. However, as the step from conceptual analysis to computing the data is big and rather labour intensive, in this deliverable we are only able to scratch the surface and set the scene for the future Tellnet studies. Additionally, empirical data about eTwinners “sense of connectedness” and a number of other characteristics was collected using surveys and a workshop and will be reported here.

The aim of this deliverable is to identify a number of research questions to study eTwinning networks and to provide some early indication on the state of eTwinning as it was during the data extractions in June and November 2010. The results presented in this deliverable will feed into the scenario building exercise (WP4), outlining some of the major trends that arise from the network based on early analyses conducted by RWTH (WP2) based on the research questions that were elaborated by the whole partnership. To do so, data from different sources and types is used and combined in an effort to provide an overview of eTwinning. Additionally, we build upon them taking advantage of the previous research literature and recent research in the field. Once the current state is described, its meaning is described in relation to other Tellnet deliverables and possible recommendations for eTwinning are presented.

2. Highlights from the eTwinning monitoring survey in 2008 and now

Teachers from all participating countries can register on the eTwinning platform and use the eTwinning online tools to find each other, meet virtually, exchange ideas and practice examples, team up in eTwinning Groups, learn together in Learning Events and engage in online-based projects. The eTwinning platform (hereafter platform), from which the data is extracted for this study, has gone through major changes over the period and new social networking features have been added to the platform. For the Tellnet project, and for this document, it is important to consider two timeframes for the development of the eTwinning platform:

1. September 2008 until October 2010
2. From October 2010 onwards which marks the launch of the new Desktop with more elaborated Web 2.0 features

In the following part, we outline a view on eTwinning using various sources. By combining different approaches and data, we can build up a meaningful current status of eTwinning. Finally, it is explained how such overview can be used on other Tellnet deliverables as well as how it can inform eTwinning on what future developments to pursue. The following information is explained:

- Monitoring report of eTwinning in 2009
- Survey measuring the sense of connectedness and general connectivity (n=795)
- Results and impressions from a workshop with eTwinners (eTwinning conference 2010)
- Social network analyses (data from the eTwinning platform)

In December 2008, eTwinning conducted a survey asking eTwinners about their opinions and actions on eTwinning. The survey was conducted online in 22 different languages. In total, 1308 eTwinners filled in the survey (eTwinning, 2009). Even if the survey from 2008 and with a rather small sample size could be considered outdated, we highlight some results that are relevant for better understanding eTwinning and this information can give more meaning to the findings in the Tellnet data. Additionally, we use information derived from the very first Tellnet data set (generated on June 5, 2010).

Who are eTwinners and what motivates them?

From the survey in 2008, a clear distinction between primary (2/3) and secondary school teachers (1/3) arise. Also, while many different topics are taught (e.g. Mathematics, ICT, Literature), the topic Foreign Languages clearly dominates the survey, as it accounts for 44.3% of the teachers. Looking at the data extracted from the eTwinning platform in June 2010, we can further define the subjects taught by eTwinners. While there are more than 20 different subjects that the teachers indicated in the data, there are four most common ones, namely Foreign Languages, Language and literature, ICTs and Maths (see Table 1).

Subject taught	N	%
Foreign languages	57782	9.2%
Language and literature	19508	3.1%
Informatics/ICT	15609	2.5%
Mathematics/Geometry	13829	2.2%
Other	524272	83.1%

Table 1 – Main teaching subjects

A second classification can be based on the reason for registration as this provides insight into the different goals eTwinners have. From the survey in 2008, the four main reasons for registration were:

- Help students meet other students (main)
- Meet other European teachers
- Find partners for projects/Comenius actions
- Improve teaching skills

The survey also finds that eTwinners came into contact with eTwinning initially either through colleagues, teacher training activities, or by browsing the Internet.

A third classification can be made based on whether or not an eTwinning participant has participated in a project yet. As explained previously, before 2008, the idea of cross-border school collaboration projects was the main driver for joining eTwinning. Out of the 1308 survey participants, 1024 or 78.3% had already participated in an eTwinning project. This means that the respondents to this survey consist of the core eTwinners who are active in project collaboration among many other activities in eTwinning. The data from the platform, collected in mid 2010, shows a reversed trend; a small percentage of teachers collaborate in the projects whereas the majority have no involvement in the project work (73% of the eTwinners had not yet participated in a project), while of those that did half participated in multiple projects.

Therefore, to study eTwinning, it is paramount to concentrate also on other indicators than the project collaboration, as it only tells the story of those eTwinners who are active in project work. From the new data extractions, for example, we can see that 8000 eTwinners have used the Journal feature of their eTwinning desktop (see eTwinning 2010b for more details on these features) sending 20 000 comments and eTwinners have sent 303 000 messages through using the internal mailbox function.

Most respondents in the survey of 2008 indicate that they are satisfied about the coordination with partners and almost all participants (+95%) who were in a project were satisfied with eTwinning in general. Moreover, they report that the projects have impacted their teaching practice in numerous ways, for instance:

- Making it was fun
- More interest in taking part in future projects
- Improvement of ICT skills
- Improving foreign languages and communication skills
- Learning about other school systems
- Learning new teaching techniques
- Improving skill to work in interdisciplinary teams

There are however challenges to overcome during a project like:

- Lack of time
- ICT problems
- Difficult to find a partner
- Difficult to organize the work online
- The user friendliness of the eTwinning platform

Where the eTwinning platform has already improved significantly since the survey in December 2008, many of the challenges enumerated still are relevant and touch upon eTwinners. Between the period of time October 2009 and October 2010, the eTwinning platform received over 4 million visits accounting to more than 10 000 users daily who login. Figure 1 shows the traffic on the eTwinning site

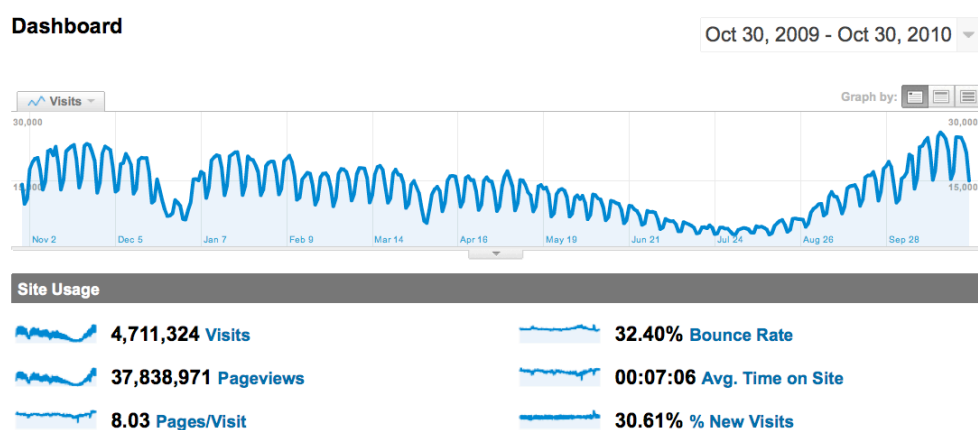


Figure 1. eTwinning portal visits (October 2009 and October 2010).

3. Sense of Connectedness, Ad Hoc Transient Groups and Social Network Analyses

In the following part, we briefly explain the approach of the Tellnet workpackage 3 to study eTwinning. It is based on the idea that eTwinning can be studied through different types of networks that are created among individuals. The structure of networks is important to estimate the networks' value for the individuals who are part of it. In general, the more ties the network has, the better value it can yield to individuals who are part of it. In order to give some proposals with the aim of fostering the various eTwinning networks, we first measure the sense of connectedness among individuals who participate in eTwinning and then we give some early indications of the state of the network as a starting point. This gives an overall impression of eTwinning that includes various elements like the connections between eTwinners, whether or not they feel being part of the community, but also statistical measures like how many eTwinners have collaborated in a school project.

Sense of connectedness (SOC) represents how well someone feels connected to others and how the person feels about being part of a community (Rovai, 2002). As part of an ongoing experiment (which will be reported in D3.2), a survey was conducted to better understand the SOC of eTwinners, their online behaviour and a number of other characteristics. Studying Sense of connectedness is important when the interest is to understand the value of networks for individuals through the concept of social capital. Social capital consists of three factors:

- the social network structure
- the sense of belonging to the community
- the provided and received support.

The WP3 focuses on the professional development aspects that an informal collaboration network can provide. The key for such opportunities to emerge is collaboration and interactions among participants. The tools that the WP3 aims to build and test is to better understand which support functions are needed to leverage social capital in learning networks and further invigorate the overall network structure. Through design and development of peer-support tools based on a model of Ad Hoc Transient Communities (AHTC) (Sloep, 2008; Fetter, Berlanga, Sloep, 2010), the Tellnet project conducts a number of experiments using these mechanisms. It is expected that by introducing Ad Hoc Transient Communities based mechanisms, participants' sense of connectedness will increase thanks to more contacts and they will perceive the community as more effective in meeting their needs.

3.1 eTwinners' sense of connectedness

The survey was based on the SOC questions proposed by Rovai (2002). We adapted the questions to fit to the eTwinning context rather than the classroom context for which they were originally created (see Appendix II). In addition, we altered the scale from a 5-point Likert scale to a more continuous scale. This scale ran from 'Strongly Disagree' to 'Strongly Agree' along a 9-point scale. While this survey was taken as a pre-measurement for the experiment in deliverable 3.2, it provides a valuable insight into the general sense of connectedness eTwinners have.

In December 2010, eTwinners were invited to participate in the survey through a newsletter and a "desktop alert". Eventually, 795 eTwinners filled in the survey. This represents a subset

of eTwinners who can be classified as “active eTwinners”, most of them were notified about the invitation through their eTwinning desktop, which means that they had to log-in on the eTwinning platform.

The main result of the survey is that the majority of the respondents reported an average sense of connectedness of 6,65 on a 9-point scale (SD= 1,2). According to Rovai's definition, this means that they “feel connected to others” and they “feel being part of a community”, indicating that the respondents felt rather well connected within eTwinning. Interestingly, the SOC is positively correlated with the number of projects responding eTwinners were involved in $r = .22, p < .001$. As mentioned above about survey conducted with eTwinners in 2008 (eTwinning, 2009), this result concords with the survey result where people who do projects also feel satisfied about eTwinning in general.

Also, SOC was positively correlated with the number of months they had been a part of eTwinning $r = .19, p < .001$. Unsurprisingly, the number of months and number of projects were also positively correlated with each other $r = .32, p < .001$.

Respondents were asked about the number and nature of their contacts with other eTwinners (e.g. “In the past 6 months, with how many eTwinning teachers did you have contact?”). Results show that respondents indicate that around 50% of their eTwinning contacts are based on online contacts. In other words, many respondents have multiple contacts whom they meet face-to-face as well. This is an important result as it indicates that eTwinning should be seen more as a blended social network rather than only an online social network. Moreover, it can indicate that eTwinning is succeeding in establishing online relations without a prior face-to-face meeting. From a general media studies' perspective, this is a very interesting finding. Not many online communities succeed in such type of relations. Lastly, the fact that eTwinning exhibits the behaviour of a blended network has influence on how to interpret the various networks that can be identified only by using the eTwinning platform. As mentioned in the D2.1, studying only the interactions through platform has its limitations. For example, eTwinners who might be labelled as “isolates” in the network based on participation detected through the platform, could still have a strong set of relationships based on face-to-face meetings, and therefore should not be considered as “isolate”. This is an important finding that needs to be taken into account when interpreting the SNA of the data.

A large proportion of the respondents think the amount of contact with other eTwinners is “right” with a mean of 4.8 on a 9 point scale ranging from 1 – too little, to 9 – too much (Figure 6). Yet variation on this preference is high, and most of the respondents indicate they would like to have more contact with fellow eTwinners.

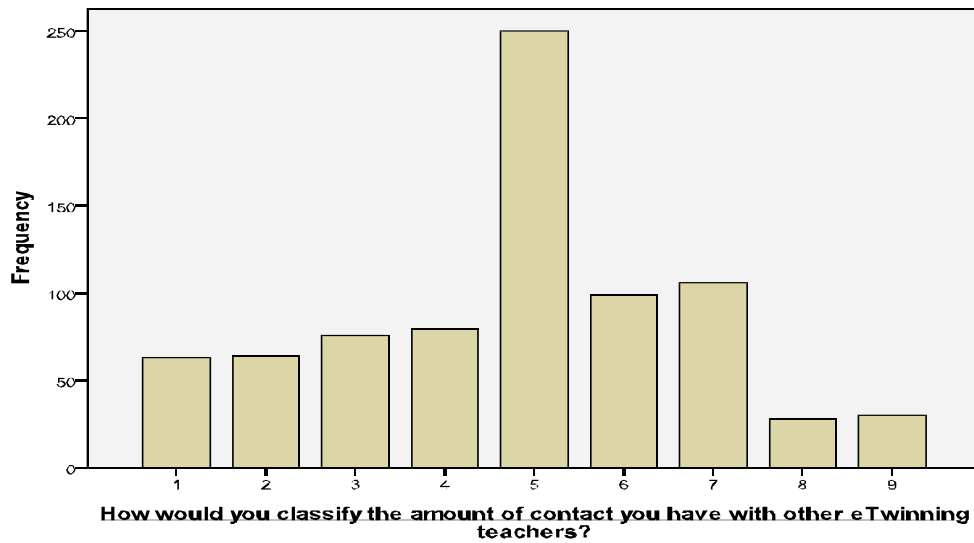


Figure 6 – Amount of contact

Most eTwinners made some new contacts in the past six months (see Figure 7) of which most were established “through the use of Internet”. “Through the use of Internet”, most likely refers to contacts that eTwinners can create using the eTwinning Desktop tools, but this cannot exclude other use of the Internet and especially social media, which is used by active eTwinners quite often (e.g. contacts could have been formed on the Facebook, too).

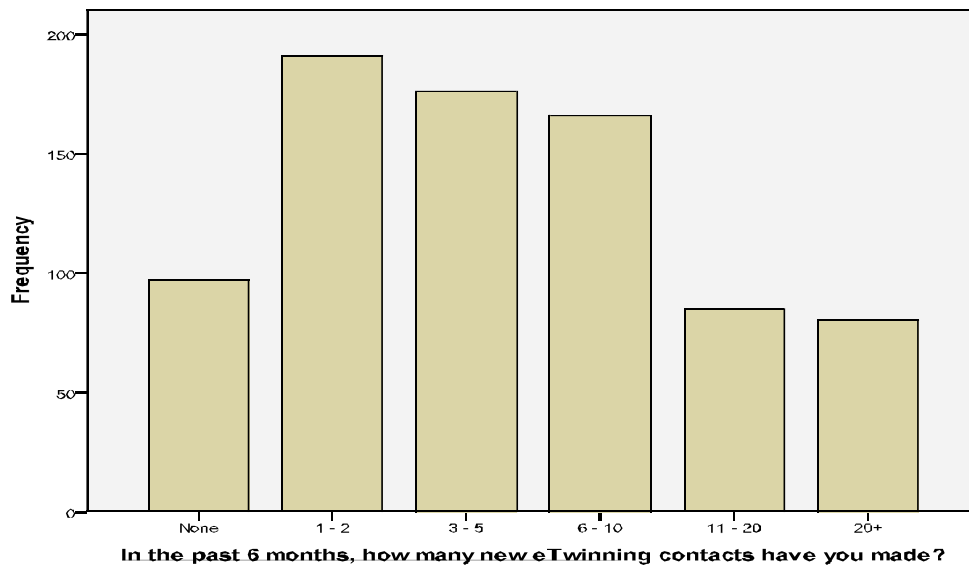


Figure 7 – New contacts made

In the past six months, 42.5% of the eTwinners had been in contact with the eTwinning National Support Service (NSS) for support. 60.1% reported having had contact with other eTwinners for support. Most eTwinners prefer a mix of support of the NSS and their fellow eTwinners (Figure 8). Yet, there seem to be to be three distinctive groups prevalent. On the one hand, there are those who prefer support from the NSS. Then there are those who prefer

support from their fellow eTwinners. Finally, the largest group prefers a mix. Interestingly, these preferences are not correlated with any other indicators measured.

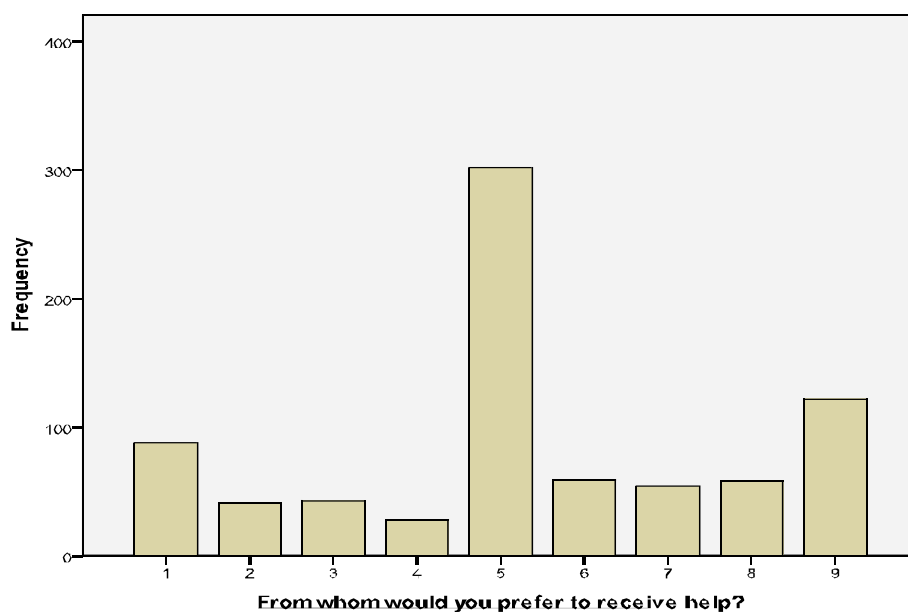


Figure 8 – preferred support ranging
(from ‘1 – Fellow eTwinner’ to ‘9 – eTwinning Support Service’)

3.2 Workshop at eTwinning conference 2010

In order to validate the idea of implementing a peer-support service in the eTwinning network, a workshop was conducted in the eTwinning Conference³ of 2010. The aim of the workshop was to validate the design of a peer-support service using Ad Hoc Transient Groups (AHTGs). In AHTGs participants that have a request are helped by other participants in a private space (‘ad-hoc’) and for only a limited amount of time (‘transience’) (Berlanga, Sloep, Kester, Brouns, & Koper, 2008; Sloep, 2008) (Figure 9). By creating many short-term moments of contact between participants of a network, an increase and larger spread of ties between participants is expected. It is expected, furthermore, that by introducing AHTGs, the sense of belonging will increase because participants will have more contacts and will perceive the community as more effective as members help each other to meet their needs.

³ http://www.etwinning.net/en/pub/news/news/etwinning_conference_2010.htm

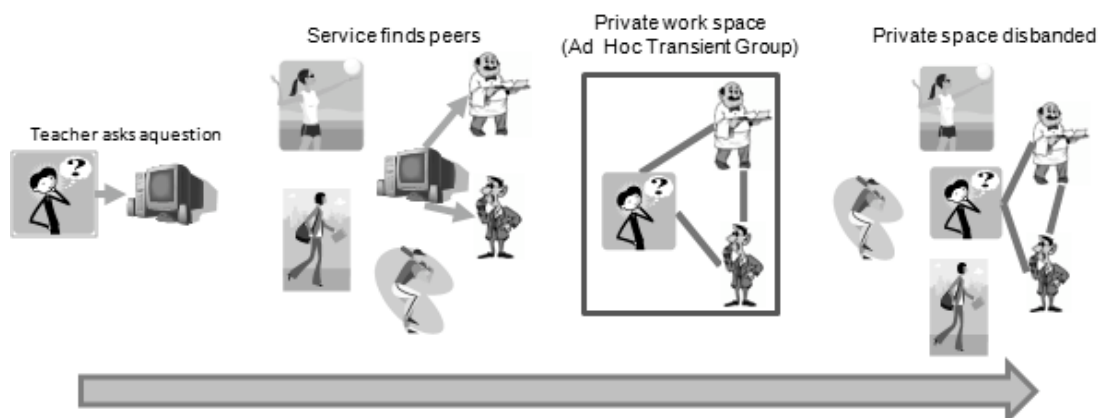


Figure 9 – General flow of the AHTGs peer-support service

In preparation of the workshop at the eTwinning Conference 2010, we constructed the initial design of the peer-support tool based on earlier determined design considerations (Fetter, Berlanga, & Sloep, 2010), namely:

- Being able to find the right participants with a matching system.
- Participants need to be accountable for their actions through ratings.
- Showing participant's previous activity and contacts to increase sense of belonging.
- The tool needs to be very usable and accessible.

We prepared four mock-up screenshots of the service representing the main functionalities of the service. Each screenshot showed a step in the process of the service and was accompanied by a short questionnaire.

In addition to these screenshots a questionnaire was constructed that asked questions about the eTwinning network, peer-support and possible improvements (see Table 3). This questionnaire was filled in at the start of the workshop. The goal behind these initial questions was twofold. First, it was for our own understanding of the people active in eTwinning. Second, we wanted the teachers to start thinking about the current situation in eTwinning with regard to asking questions and getting into contact with other teachers.

Why did you join the eTwinning network?
Is it easy to get into contact with other eTwinning teachers and if not how could we improve this?
Do you have any thoughts on how we can involve people not yet connected to the other eTwinning teachers?
Is it important for you to be able to reach other teachers in the eTwinning network?
When you have a question about anything that has to do with eTwinning, what is currently the best way to get this question answered?
With regard to getting a question answered, what room for improvement do you see?

Table 3 – Initial questions asked

The workshop was set up in line with the user-centered design approach as described by Parmar (2009). This approach holds that the use of ICT should be seen as a tool, and should be developed together with stakeholders, enabling a more user defined service that fulfils the actual needs of the stakeholders. In line with this framework, we are in the exploratory stage of the design and the workshop was an ideal place for us to test our initial design with the

teachers. Feedback was received through the questionnaires and by asking the teachers directly in the workshop to elaborate.

Multiple participants were eTwinning ambassadors and almost all participants used eTwinning on a regular basis. As the group was small (22 participants), opinions put forward cannot be generalized to the whole eTwinning population. Yet, it does give an insight into the more active eTwinners, especially with the inclusion of the eTwinning ambassadors who are in regular contact with many eTwinners.

Descriptive Results

The results reported below are a combination of the answers on the survey as well as spoken or written feedback. Due to the open nature of the workshop and survey, results are descriptive in nature.

When asked for what purpose eTwinners would use the peer-support tool, the responses were varied. This indicates the many different goals that the teachers have in eTwinning and how each has their own specific needs.

- Discussions
- Ideas
- Professional development
- Technical problems
- Related to area/curriculum
- How to use eTwinning
- How to organize a chat session
- How to get a quality label

As it is clear from the goals and needs, there is a will to collaborate with other teachers. Yet, the question how easy/difficult it is to contact others had very varied responses. Some found it very easy and some thought it was very difficult. This might reflect the different level of expertise eTwinners have with regard to the use of eTwinning and ICT in general. On the other hand it points to the possibility to improve eTwinning in this regard, as finding new contacts should be easy for all eTwinners.

Regarding how eTwinners perceive the support they get from eTwinning, responses indicate that support mainly comes from the eTwinning National or Central Support Service. In other words, support is hardly sought by asking fellow eTwinners. Nevertheless, it seems to be a need to be able to contact other eTwinners and receive their support. To this end the eTwinners suggest a number of possible communication tools like a chat or a forum. In relation, they indicate a better, more helpful website would be appreciated. This finding is interesting for the Tellnet experiments that are planned for the support tools and experiments, but also for the eTwinning Central Support Service, who is also undertaking constant developments on the platform.

The reasons eTwinners gave for joining eTwinning are in line with these varied goals and needs. The following three reasons sum up well the different angles from which the participants approached eTwinning initially.

- The future of education lies in international collaboration between teachers and their students

- eTwinning provides a way to learn and use ICT in an innovative way
- To share knowledge and experience

Overall the participating eTwinners came over as people who were social and knew exactly what did or did not want. For example, when asked how comfortable the teachers felt about rating each other or the responses from each other, it became clear that there was a rather strong opposition for such a practice among the participants. While such ratings are common in many online Q&A communities, participants were very clear that they did not feel comfortable to rate their peers. Also, they seemed generally concerned about the well-being of the eTwinning network.

3.3 New understanding gained from Social Network Analysis

The very first Tellnet data sets were generated in June and in November, 2010. The data model used for these data extractions, which are done on defined intervals during the whole lifetime of the Tellnet project, is defined in D.2.1 “Data Management of large-scale Lifelong Learning data”. Hereafter, we use the simple term “data” to describe these data extractions. This data contain, among other things, information about teachers who register on the eTwinning platform and some of their activities, such as participation in projects, number of contact that teachers have collected, their communication patterns, etc.

A number of pre-measurements conducted for the D 3.2 are used in this part in combination with social network analyses (SNA) provided by the RWTH partner. In order to understand better the current state of the network, a set of relevant questions was constructed in collaboration of the whole partnership for the use of SNA to study eTwinning. They are reported in the Annex 6.1 and they are subject to further work in the project’s lifetime. Based on these questions, RWTH has started the process of conducting the appropriate analyses that will provide new insights into the first extractions of data (June and November 2011). In the following part, a subset is selected to conduct the first SN Analysis to provide a deeper insight into the underlying relationships. Additionally, it will help to understand the baseline for future studies in Tellnet. These include:

- Identifying positive aspects for the networks’ growth and sustainment
- Identifying aspects of that might hamper future growth and sustainment
- Provide a basis for policy decisions in the future on which approach to take
- Provide a basis on which new tools and innovations can be build

The following four questions were selected for the first round of the SNA to test the analysis tools.

Question 1: When looking at the project collaboration network, is it possible to divide the network into sub-communities and if so, what is their relation to the rest of the project collaboration network?

Even if the project collaboration does not constitute the most important part of eTwinning since 2008, studying the Project collaboration network, its structure and core using the SNA measures gives interesting insights into how possible new mechanisms could be created to help other networks to grow in the future.

Through the analysis, we were able to identify 2776 separate clusters (see Table 2). These clusters are formed through eTwinners collaborating in projects. First observations show that there are four (4) gigantic clusters that create the main core of the eTwinning project collaboration network. The biggest one contains 8807 eTwinners, two separate clusters with about 3000 eTwinners and one of size of 1172 eTwinners.

Apart from the gigantic clusters, there are small clusters ($n=2772$). As seen in Table 2, 2'627 of them consist between 2 to 9 eTwinners. It seems that the small clusters are those of people who collaborate only on one project during the time they have been part of eTwinning, most likely the cluster size corresponding to the size of the project partners.

Cluster size (N eTwinners)	N times identified
8807	1
3669	1
3175	1
1172	1
100-1000	9
10-100	136
2-9	2627
Total:	2776

Table 2 – eTwinning network clusters

What we can understand from the clustering formation is that, for example, in the biggest component, there is a group of eTwinners who have collaborated with each other in a high number of projects where partnerships create complex ties between them. Moreover, we see that there four sub-communities in the core of eTwinning.

Lastly, we can calculate the modularity of the clustering. The modularity indicates the quality of the cluster, a fraction of any node's connections within its cluster (internal edges) and its connections to other clusters (Pham et al., 2011). Empirical observations indicate that a modularity greater than 0.3 correspond to significant community structures. In our analysis, we observe modularity of 0.4, therefore corresponding to significant community structures.

Question 2: When looking at the project collaboration network, how dependent is the eTwinning project network structure on a small core group of eTwinners?

The analysis was done based on the projects eTwinners participated in at the time of the snapshot, in mid 2010. eTwinners who did not participate in project collaboration were excluded from the analysis. Figure 4 shows a typical degree distribution that follows Power law⁴, therefore indicating that the project network is scale-free. In a scale-free network one can usually observe a few big hubs followed by many small clusters.

⁴ http://en.wikipedia.org/wiki/Power_law

This means that the project collaboration network is dependent on core eTwinners that can be seen as bridges (hubs) between different clusters. Nodes with a higher degree tend to have a lower clustering coefficient (clustering decreases when degree increases). That means lower degree nodes are placed in dense groups (clusters) and these clusters are connected via hubs (nodes with high degree). However, as the betweenness is quite low (less than 0.1) there are apparently no super-hubs who exclusively connect the clusters. Clusters are typically connected via several hubs. In conclusion, although eTwinning is dependent on a core group, this is a large and well connected group.

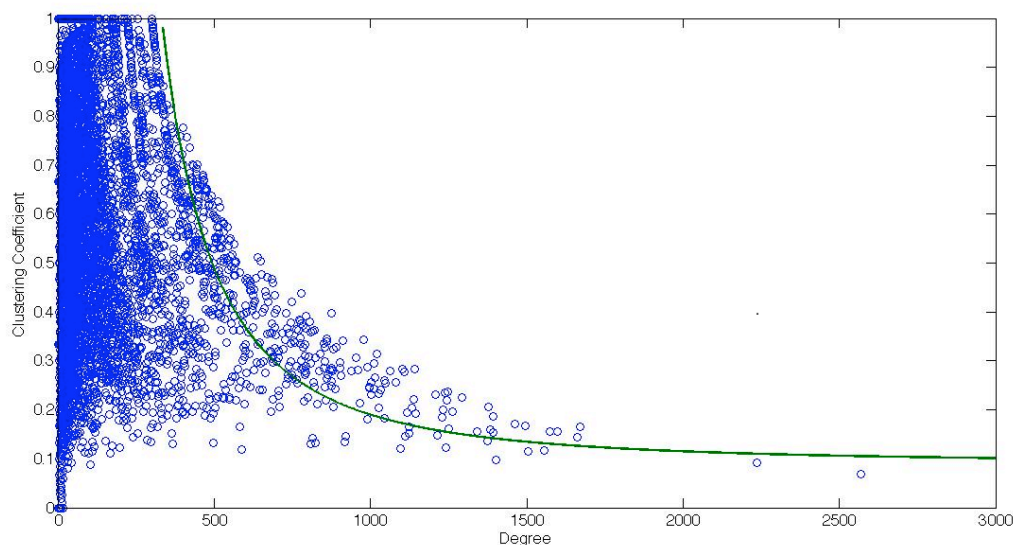


Figure 4 - Project Clustering vs. Degrees

Question 3: Over the years, how many eTwinners have gone inactive and were these eTwinners individuals who were connected through the project collaboration network?

The eTwinning platform uses different indicators to calculate “inactive” teacher, for example, if they have not logged in onto the eTwinning platform during a predefined period of time. At the time of the snapshot, in mid 2010, out of the 114’020 teachers, there are 2750 individuals who have been flagged as “inactive”, resulting to 2,4% of all participants. We can observe that during their active time in eTwinning, 1137 (41.4%) of now “inactive” teachers have been part of projects and therefore can be found in the project collaboration network, 955 (34.7%) are in the messaging network and 123 (4.4%) are in the blog network. The rest of the inactive teachers, 1123 (40.8%) did not have any recorded activity in these networks.

The degree and clustering coefficient was calculated for these teachers on those three networks. From the degree distributions, we can see that they follow Power law, the same as distribution in Figure 3. Actually, inactive teachers seem just a sample of the same distribution of the whole network. This distribution also holds up when we constructed a network based on the blogs or the emails. The fraction of teachers who have clustering coefficient equal to NaN (means that they have only a connection - degree = 1), is 17,5%

(project collaboration network), 49,01% (blog network) and 63,41% (email network). 41.4% of the inactive teachers do not have any activity in these (project, blog or email). Even for those who took part in various networks (projects, blog or email), they are quite isolated (as they have low degree and are placed in small, possibly disconnected, groups).

Question 4: eTwinners can create lists of MyContacts on their Desktop adding interesting people to the list for possible future collaboration. Is there any evidence that teachers have added people from different countries in their contact lists?

As eTwinning by nature promotes cross-border collaboration, we also find that in “MyContacts”, eTwinners overwhelmingly have added people from other countries than that of their own. If the creator of the list has a value of 0, it means that all contacts are from other countries, and 1 means that all contacts are from the same country. The mean for all eTwinners who had “MyContacts” is 0.16, indicating a strong preference to having eTwinners from other countries in the list. In Figure 5 we can observe that only a fraction of contacts are within the same country.

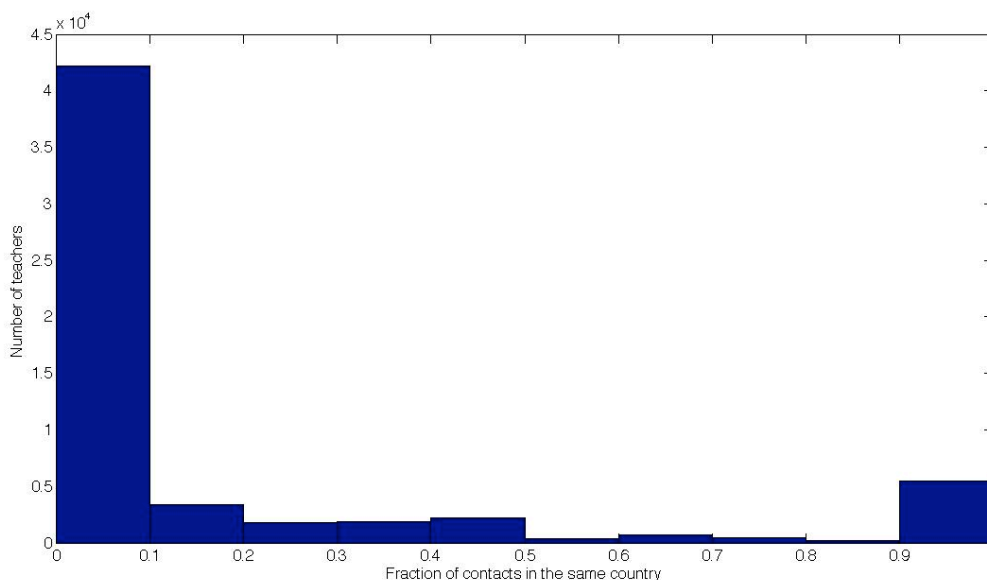


Figure 5 – Fraction of contacts in the different country than that of the eTwinner (bar on the left) and in the same country (bar on the right).

4. Discussion and conclusions

As we now have paint the picture of the state of the eTwinning, the data results can be discussed from the eTwinners’ and from the global perspective. We first discuss them separately and then combine them to give an overall conclusion and future work.

4.1 eTwinners’ perspective

In line with the strong core group found using the SNA methods, the eTwinners who responded on the sense of connectedness survey report that they have a rather high sense of connectedness, on the average, 6.65 on a 10-point scale. The fact that the respondents on the survey probably belong mainly to the core group is also reflected in the many new contacts they made in the past six months. There were only a few that reported having made no new contacts whatsoever. Regarding the new contacts made in the last six months, these new contacts were made primarily online, yet it was reported that half of their contacts are not based solely on online situations. This reflects that eTwinning is a blended network, a network which combines online interaction with face-to-face interactions in, for instance, eTwinning events (e.g. conferences) where eTwinners meet. The impression obtained is that those eTwinners who invest time and participated in school collaboration projects are likely to become part of the core group. Once they are in the project collaboration network, for example, there are many incentives and contacts to keep people active. From this we conclude that the way the core group is organized, it provides a good base for eTwinning's future improvements and sustainment.

Yet, these results need to be seen in the perspective that most respondents of the survey are probably part of the active and connected part of eTwinning. Typically, surveys have difficulties reaching those people who are inactive, and this case most likely does not offer an exception. In this research, due to the restrictions to use personal information, the data used by the project partners have been anonymised. This means that there is no way to identify a real teacher or a real school in the data without the consent of the individual. However, the results still give us a good insight into the core eTwinners and might shed some light on those that currently are not connected in any of the identified networks.

Finally, there is a clear distinction with regard to what type of support eTwinners prefer. Some prefer to receive support solely from the Central and National Support services and the others only from fellow eTwinners. Yet the majority prefers a mix of the two.

The results show that there are variety of needs and requirements that eTwinners have. To advance our future work in Tellnet, the WP4 will elaborate on eTwinning Personas. Personas, as defined by Calde, Goodwin and Reimann (2002) are "fictional, detailed archetypical characters that represent distinct groupings of behaviours, goals and motivations observed and identified during the research phase". A major advantage of this method is that it allows collaborative interaction with users of a system which could enable otherwise complex product development processes (Long, 2009). In this respect, this method is useful for Tellnet. First steps in defining these personas are explained by the IPTS in WP4. Initial personas have been constructed and will now be validated through workshops as well as the results from the future deliverable.

4.2 Global network perspective

As we can see from the numbers of eTwinning teachers, it is a large, fast growing community of schools and teachers in Europe. Most of the eTwinners remain active in eTwinning, meaning they log in at least once every 6 months. From the network point of view, to study eTwinning, evidence of collaboration between users are needed. In our case, we use the eTwinning platform to gather this evidence. In the first place, we mostly had time to look into

networks that were created through project collaboration, through contacts, use of internal messaging. Using the example of project collaboration network, we find that 73% of eTwinners are not connected through projects. This can indicate that many eTwinners do not have a high sense of connectedness, as they are not collaborating and interacting with other eTwinners through the platform. It is good to note, though, that there might be interactions that take place outside of the platform, but those we cannot account for, at least for now, in the Tellnet studies.

From the network point of view, this can raise the concern that the network is very dependent on a small core group of users. When a network depends on a small core group, it is prone to instability when one of these core members drops out (Fetter et al., 2008). While the data shows eTwinning is indeed dependent on a small core group, the SNA also shows this concern is not an issue due to multiple reasons:

1. The core group consists of thousands of people.
2. The core group consists of many communities.
3. These communities are linked together through many connections rather than only through specific eTwinners.
4. The rate of “inactive” teachers is relatively low.

Therefore, we can say that the core group of eTwinning is a strong and well connected group that provides a stable basis for future development and sustainability of the network. At the same time, however, many eTwinners remain not connected to the project collaboration network meaning that on the eTwinning platform, we cannot show any type of interaction with others through these networks. From a lurking perspective this does not have to be problematic per se (Neelen & Fetter, 2010).

4.3 Future work

As an overall conclusion, eTwinning network has established a strong core group that is well interconnected and supported. We believe that this core group will provide eTwinning with a strong base for the future. However, as this core group has been established using the snapshot of data, it also shows that a large number of eTwinners are not connected to the core network. Therefore, we can suggest that now is the time not only to expand the connections in the network, but also to interconnect the networks further. It is the vision of WP3 that eTwinning now needs to focus on the eTwinners who are not part of the core network yet and connect them to the core group as well. The use of peer-support mechanisms, such as the AHTGs tool described earlier, could improve the collaboration, sense of connectedness and social capital of the eTwinners. Therefore, the WP3 has already introduced and started testing a AHTGs peer-support service in the eTwinning network, which will be reported in the second half of the project. At the time of writing, the first pilot has just been concluded and a second version of the prototype is already underway.

With regard to reach new teachers and expand the network, it would be relevant to explore the different forms eTwinners use to interact with others eTwinners, experts or relevant stakeholders. This will give an idea of the kind of interactions, information, tools eTwinners are currently using to create their personal networks outside eTwinning, and derive conclusions of relevant improvements for the network. Finally, we strongly believe that

teachers need support, guidance and information to understand the value, opportunities and benefits their social network have for their professional development, to appreciate the benefits and added value of being part of a European collaboration network of teachers, which is not self-evident for most people.

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6. Appendix

6.1 Appendix I – Questions for SNA

Possible questions to be answered through Social Network Analysis methods in collaboration with RWTH, OUNL and EUN. Additional questions to support eTwinning Personas are reflected in D.4.1.2 « Trends and Challenges for Teacher Networking ».

To get more understanding from the data, it will be beneficial to look at it in the following ways:

1. all participants in the eTwinning action
2. eTwinners who do projects
3. StarTeacher
4. eTwinning Personas

Clustering coefficient

1. If we look at all participants in the eTwinning action, is there any way of calculating the clustering coefficient between them all? Are the connections only made by people who do projects together or are there any connections between people who do not do projects together through email or comment on other people's blog posts?
2. What is the clustering coefficient between eTwinners in all projects? Can we calculate how it has changed by year (e.g. 2006, 2007, 2008, 2009, 2010?)
3. What is the clustering coefficient between eTwinners who are part of top 50 StarTeachers? Can we calculate how it has changed by year (e.g. 2006, 2007, 2008, 2009, 2010?)

Connectiveness

Based on your comment, use connectiveness you suggested to find any info below or other similar things

1. If we look at all participants in the eTwinning action, is there any way of calculating the node-to-node distance between them all? Are the connections only made by people who do projects together or are there any connections between people who do not do projects together through email or comment on other people's blog posts?
2. What is the node-to-node distance between eTwinners in all projects? Can we calculate how it has changed by year (e.g. 2006, 2007, 2008, 2009, 2010?)
3. What is the node-to-node distance between eTwinners who are part of top 50 StarTeachers? Can we calculate how it has changed by year (e.g. 2006, 2007, 2008, 2009, 2010?)

Core and periphery

1. Regarding the projects, how dependent is the eTwinning network on a relative small core group of people? I am thinking here along the lines combining network centrality and isolates.
2. Over the years, how many people have been flagged inactive? And more importantly, what is their relation to the network? Are they isolates or are they in the center of it all?
3. When grouping by contacts or participation, I would be very interested to see whether the people working together are mainly from inside their own country, or from other countries. So in other words: Do people prefer to collaborate with teachers from their own country or from other countries?
4. Depending on the data you have, is there any way sub-communities can be identified? IF so this would be very interesting to see what these consist of and what their relation is to the rest of the network

Looking at teachers participating in projects

1. How has the number of teachers who are involved in the projects grown in terms of being part of the giant component? I.e. is the proportion of teachers who do project but who are not connected to the giant component about the same all the time?
2. Can we see any pattern of teachers first being a partner in the project and then become a founder of the eTwinning project? Do some teachers only stay as partners for ever? Do some only start projects (i.e. are founders)?
3. Looking at the data from “Mycontact”, can we see that people from “MyContacts” actually become project partners? In how many cases does this happen and over what period of time?

Looking at the **StarTeacher function**, the following questions arise:

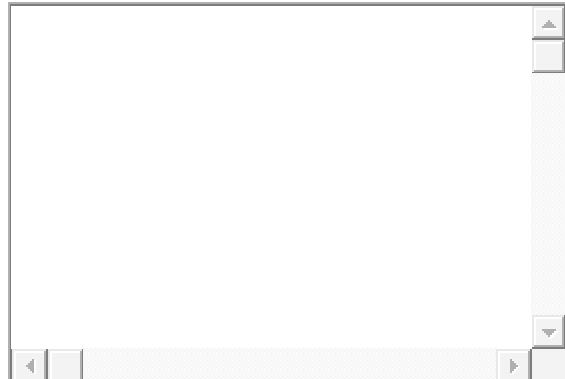
1. Can we know how long does it take, on average, for a teachers to become part of the top 50 StarTeachers?
2. Are all people in the StarTeacher graph founders of the projects? Or are they both founders and participants?
3. How are people in the StarTeacher graph connected to the other eTwinners? What is their average node-to-node distance to other eTwinners? Are StarTEachers good "connectors to other eTwinners or do they only play among themselves?

Plotting the Growth in General

1. Could you plot the growth of eTwinners registering in the eTwinning action by 3 months slots since the beginning to now?
2. Could you plot the growth of eTwinners participating in projects by 3 months slots since the beginning to now?

3. Could you plot the growth of eTwinning projects with quality labels and prizes by 3 months slots since the beginning to now?
4. Could you plot the growth of eTwinners "activities" (i.e. email communication activity, blog writing activity, comment writing activity, etc) by 3 months slots since the beginning to now?

6.2 Appendix II – Survey – eTwinning workshop



First name *As used in eTwinning

Last name *As used in eTwinning

Email *As used in eTwinning

I feel that teachers in eTwinning care about each other *

1 2 3 4 5 6 7 8 9

Strongly Disagree

Strongly Agree

I feel connected to others in eTwinning *

1 2 3 4 5 6 7 8 9

Strongly Disagree

Strongly Agree

I do not feel a spirit of community in eTwinning *

1 2 3 4 5 6 7 8 9

Strongly Disagree

Strongly Agree

I feel that eTwinning is like a family *

1 2 3 4 5 6 7 8 9

Strongly Disagree

Strongly Agree

I feel isolated in eTwinning *

1 2 3 4 5 6 7 8 9

Strongly Disagree

Strongly Agree

I trust others in eTwinning *

1 2 3 4 5 6 7 8 9

Strongly Disagree

Strongly Agree

I feel that I can rely on the teachers in eTwinning *

1 2 3 4 5 6 7 8 9

Strongly Disagree

Strongly Agree

I feel that teachers in eTwinning depend on me *

1 2 3 4 5 6 7 8 9

Strongly Disagree

Strongly Agree

I feel uncertain about others in eTwinning *

1 2 3 4 5 6 7 8 9

Strongly Disagree

Strongly Agree

I feel confident that others in eTwinning will support me *

1 2 3 4 5 6 7 8 9

Strongly Disagree

Strongly Agree

In the past 6 months, with how many eTwinning teachers did you have contact? *

- None
- 1 - 2
- 3 - 5
- 6 - 10
- 11 - 20
- 20+

How many of these contacts do you see regularly face-to-face? *

- None
- 1 - 2
- 3 - 5
- 6 - 10
- 11 - 20
- 20+

How many of these contacts are mainly online? *

- None
- 1 - 2
- 3 - 5
- 6 - 10
- 11 - 20
- 20+

How would you classify the amount of contact you have with other eTwinning teachers? *

1 2 3 4 5 6 7 8 9

Too Little

Too Often

In the past 6 months, how many new eTwinning contacts have you made? *

- None
- 1 - 2
- 3 - 5
- 6 - 10

• 11 - 20

• 20+

How many of these new eTwinning contacts have you made through the use of Internet? *

• None

• 1 - 2

• 3 - 5

• 6 - 10

• 11 - 20

• 20+

In the past 6 months, how many times have you contacted the eTwinning support service for help? *

• Never

• 1 - 2

• 3 - 5

• 6 - 10

• 11 - 20

• 20+

In the past 6 months, how many times have you contacted other eTwinners for help? *

• Never

• 1 - 2

• 3 - 5

• 6 - 10

• 11 - 20

• 20+

In the past 6 months, how many times have you been contacted by other eTwinners for help? *

• Never

• 1 - 2

• 3 - 5

• 6 - 10

• 10 - 20

• 20+

From whom would you prefer to receive help? *

1 2 3 4 5 6 7 8 9

Fellow eTwinner

eTwinning support service

How willing are you to provide help to other eTwinners? *

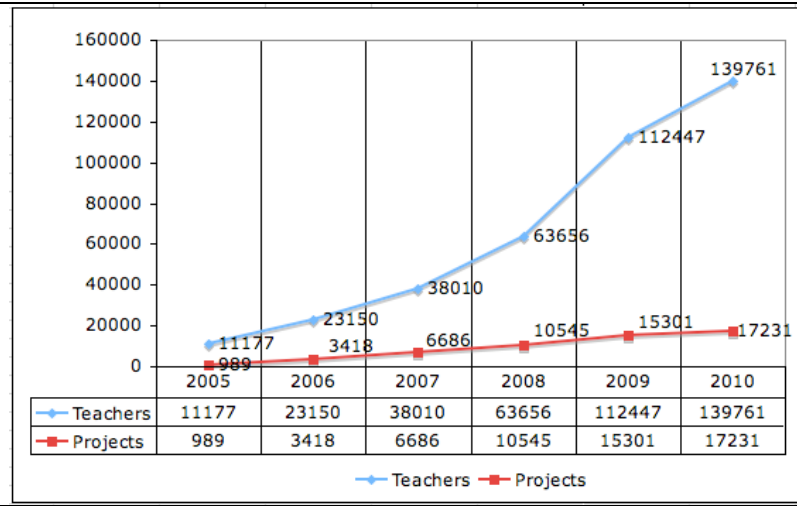
1 2 3 4 5 6 7 8 9

Very unwilling

Very willing

6.3 Appendix III - eTwinning fact sheet

www.etwinning.net; http://www.etwinning.net/en/pub/news/publications.htm



The eTwinning action is defined as the community for schools in Europe. It promotes teacher and school collaboration through the use of Information and Communication Technologies (ICT). Currently, **thirty- two** countries in Europe participate in eTwinning. Since 2005, eTwinning has been one of the most successful actions of the school education programme (Comenius) under the European Union's Lifelong Learning Programme.



Teachers from all participating countries can register and use the eTwinning online tools

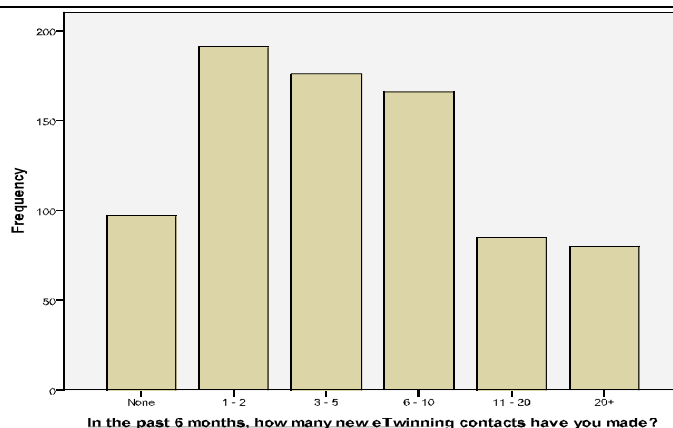
- to find each other,
- meet virtually,
- exchange ideas and practice examples,
- team up in eTwinning Groups,
- learn together in Learning Events and
- engage in online-based projects.



The eTwinning online tools are provided by the Central Support Service (CSS), the coordinating **body of eTwinning run by European Schoolnet**.

Additionally, each country involved has a National Support Service (NSS) that represents and promotes the eTwinning action by providing training and support (face-to-face, by phone and online), organising meetings and national competitions, and running media and public relations campaigns.

eTwinners (n=795) indicate that around 50% of their eTwinning contacts are based solely online. In other words, many eTwinners have multiple contacts whom they meet face-to-face as well. This is an important result, as it indicates that eTwinning should be seen more as **a blended social network rather than a full online social network.**



Country	Teachers (OECD 2007)	Visitors on eTwinning portal from October 2009-2010	Registered users on eTwinning in May 2010	eTwinning reach May 2010	eTwinning reach November 2010
Austria	100,984	43,610	914	0.90%	0.95%
Belgium	189,930	124,153	1,382	0.70%	0.81%
Czech Republic	105,818	137,322	2,935	2.80%	3.44%
Estonia	17,423	30,589	1,320	7.60%	8.91%
Finland	68,442	46,840	1,472	2.20%	2.54%
France	707,609	401,956	9,298	1.30%	1.63%
Germany	835,980	275,667	4,606	0.60%	0.65%
Greece	148,627	195,768	3,225	2.20%	2.32%
Hungary	135,030	48,746	1,003	0.70%	0.90%
Iceland	6,218	9,810	274	4.40%	6.03%
Ireland	60,718	22,049	671	1.10%	1.30%
Italy	723,870	454,420	7,365	1.00%	1.21%
Luxembourg	6,973	3,036	103	1.50%	1.62%
The Netherlands	245,876	65,108	1,684	0.70%	0.80%
Norway	89,480	26,944	1,042	1.20%	1.34%
Poland	521,037	523,791	9,895	1.90%	2.26%
Portugal	157,239	83,339	2,239	1.40%	1.66%
Slovakia	63,184	88,161	2,111	3.30%	3.87%
Slovenia	22,290	34,693	564	2.50%	3.01%
Spain	484,289	477,897	7,966	1.60%	1.89%
Sweden	140,326	61,170	1,992	1.40%	1.75%
Turkey	590,494	496,357	5,941	1.00%	2.38%
United Kingdom	788,575	184,044	8,549	1.10%	1.35%
Average:	-	-	-	1.90%	2.29%

eTwinning reach= the registered users of a country / teacher population within this country

(1) On average, the eTwinning action concerns 2.29% of the potential teaching population within the participating countries.

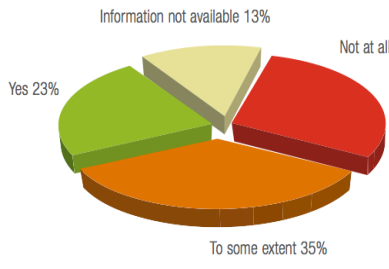
(2) According to Rogers' model of diffusion of innovation (1962), eTwinning in most countries still remains limited to teachers who are "innovators" in using ICT for cross-country school collaboration.

(3) Some countries have passed the 2.5% milestone of "innovators" (e.g., Estonia, Iceland, Slovakia, the Czech Republic, Slovenia and Finland) and are currently targeting the segment of "early adopters" within their teacher population.

(4) The indicator eTwinning reach can be used to monitor growth of eTwinning over a period of time.

(5) If the eTwinning reach indicator is interpreted alone without the context of general interest on the eTwinning portal (e.g., by using web analytics), it can give an impression that the eTwinning action is hardly well known in the countries that implement it. However, if one examines by country the number of visitors to the eTwinning Portal compared to the number of registered users, there are many more visits on the Portal from participating countries than there are registered users (in Table 4, compare figures "visitors on eTwinning Portal" with "registered users").

(7) Based on calculations regarding the number of schools present in each country, it can be seen that the ration between available schools and registered schools is quite high (up to 25%) which demonstrates that the coverage of schools is much higher than the coverage of teachers. This in turn could potentially provide an opportunity to increase the eTwinning teachers reach through local dissemination.

<p>Can eTwinning be used for formal professional development purposes in your country?</p>  <table border="1"> <caption>Survey Results: Can eTwinning be used for formal professional development purposes in your country?</caption> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>23%</td> </tr> <tr> <td>To some extent</td> <td>35%</td> </tr> <tr> <td>Information not available</td> <td>13%</td> </tr> <tr> <td>Not at all</td> <td>29%</td> </tr> </tbody> </table>	Response	Percentage	Yes	23%	To some extent	35%	Information not available	13%	Not at all	29%	<p>eTwinning has great potential to make a significant contribution to teachers' continuous professional development and lifelong learning at the European level as well as national and local level. Teachers report that For the moment, eTwinning is not a trigger for professional development, but an added value. The challenge for the future is to find the means for eTwinning to become that trigger.</p>
Response	Percentage										
Yes	23%										
To some extent	35%										
Information not available	13%										
Not at all	29%										
<table border="1"> <thead> <tr> <th></th> <th>Formal professional development</th> <th>Informal professional development</th> </tr> </thead> <tbody> <tr> <td>Formal recognition, e.g., career credits, fulfilment of professional duty</td> <td>e.g., teachers who participate in an eTwinning online course provided by NSS get accredited career points.</td> <td>e.g., teachers who participate in an eTwinning project get accredited career points.</td> </tr> <tr> <td>Informal recognition e.g., peer recognition, intrinsic motivation</td> <td>e.g., teachers' participating in formal professional development programmes become voluntary eTwinning "mentors".</td> <td>e.g., peer recognition among colleagues resulting from a successful eTwinning project.</td> </tr> </tbody> </table>		Formal professional development	Informal professional development	Formal recognition, e.g., career credits, fulfilment of professional duty	e.g., teachers who participate in an eTwinning online course provided by NSS get accredited career points.	e.g., teachers who participate in an eTwinning project get accredited career points.	Informal recognition e.g., peer recognition, intrinsic motivation	e.g., teachers' participating in formal professional development programmes become voluntary eTwinning "mentors".	e.g., peer recognition among colleagues resulting from a successful eTwinning project.	<p>Often teachers start an eTwinning project without thinking of it as a professional development activity, but in the course of the project they realise that they are gaining new skills and competences. eTwinning projects have impacted their teaching practice in numerous ways, for instance:</p> <ul style="list-style-type: none"> • Making it was fun • More interest in taking part in future projects • Improvement of ICT skills • Improving foreign languages and communication skills • Learning about other school systems • Learning new teaching techniques • Improving skill to work in interdisciplinary teams 	
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