

Design Guidelines for Collaboration and Participation with Examples from the LN4LD

Citation for published version (APA):

Burgos, D., Hummel, H. G. K., Tattersall, C., Brouns, F., & Koper, R. (2009). Design Guidelines for Collaboration and Participation with Examples from the LN4LD: Learning Network for Learning Design. In L. Lockyer, S. Bennett, S. Agostinho, & B. Harper (Eds.), *Handbook of Research on Learning Design and Learning Objects: Issues, Applications, and Technologies* (1 ed., Vol. 1, pp. 373-389). IGI Global. <https://doi.org/10.4018/978-1-59904-861-1.ch018>

DOI:

[10.4018/978-1-59904-861-1.ch018](https://doi.org/10.4018/978-1-59904-861-1.ch018)

Document status and date:

Published: 01/01/2009

Document Version:

Peer reviewed version

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

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**Design guidelines for collaboration and participation with
examples from the LN4LD (Learning Network for Learning Design)**

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AUTHOR NOTE

Authors thank the management and staff of the Schloss Dagstuhl International Conference and Research Centre for Computer Science in Germany for providing a pleasant, stimulating and well-organized environment for writing parts of this chapter. They furthermore thank the community members from all over the world for participating in the learning networks under study.

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Dr. Hans G. K. Hummel holds a PhD in Educational Technology (from the OUNL) and degrees in Pedagogy and Educational Psychology (from the University of Leiden, Netherlands). Currently Hans works as Associate Professor at OTEC and his main research interests are (navigation in) learning networks, learning technology specification, serious games and competence-based education. He has been involved in the design and dissemination of EML and IMS-LD, sat on the editorial board for the EML-site, and was co-responsible for the design and pilots carried out with LN4LD.

Dr. Colin Tattersall studied Computational Science before completing his PhD at Leeds University. He joined The Open University of The Netherlands late 2002 as educational technologist, where his responsibilities covered work related to standardisation and consultancy in the area of e-learning, and played a significant role in the further dissemination and advancement of IMS-LD. Colin was co-responsible for the design and pilots carried out with LN4LD. He has published scientific articles on e-learning, and is co-editor of the book "Learning Design: modelling network based education and training" (Springer Verlag 2005). Mr. Tattersall currently works as consultant with the Dutch IT consultancy firm QNH.

Dr. Ir. Francis Brouns holds a Bachelor's degree in Biology and PhD in Agriculture. Francis has been working at OUNL as programmer/system architect and Assistant Professor. She is currently investigating critical facilities for lifelong learning networks.

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Design guidelines for collaboration and participation with examples from the LN4LD (Learning Network for Learning Design)

ABSTRACT

This chapter presents some design guidelines for collaboration and participation in blended learning networks. As exemplary network we describe LN4LD (Learning Network for Learning Design), which was designed to promote learning and discussion about IMS-Learning Design. ‘Lessons learned’ from pilot implementations of this network over a period of five years are phrased as guidelines for future learning network implementations. The chapter focuses on the positive influence of incentive mechanisms and face-to-face meetings on active participation. These successful interventions are explained from theories about self-organization, social exchange and social affordances. Repeated measurements show the levels of both passive (accessing and reading information) and active participation (posting, replying and rating) to significantly increase as a result of both interventions. Both the use of incentive mechanisms and face-to-face meetings can therefore be considered as valuable elements for future models for collaboration in learning networks, and for establishing an international community of ‘learning designers’.

INTRODUCTION

Today’s lifelong learner is in a constant need to update knowledge and competences, given certain personal or employment-related motives (Aspin & Chapman, 2000; Field, 2001). **Online, distributed lifelong facilities** can be designed that cater for these needs at various levels of **competence development**. However, merely introducing such facilities will not suffice. Potential learners should also be motivated to actually use and actively contribute (Fisher & Ostwald, 2002). So called ‘free-riding’ or lurking’ is one of the main problems in online learning (Olson, 1965). Our work aims to derive design guidelines for these facilities to foster collaboration and dissemination.

The factors and mechanisms that motivate people to codify and share knowledge for the benefit of others have been identified as a priority area for individual companies (Smith & Farquhar (2000). They represent the most commonly discussed topic amongst practitioners

and academics at conferences on knowledge management (Prusak, 1999). To some, the encouragement of employees to contribute knowledge and collaborate is even more important than the more technical (interoperability) issues related to its capture, storage and dissemination (Boisot & Griffiths, 1999). What might then motivate an individual to collaborate and participate actively in a learning network, to respond to others' questions, to contribute content, complete activities, carry out assessments?

This chapter will address some critical design issues in setting up lifelong learning networks, and will focus on the (successful) introduction of two mechanisms to increase (active) participation in such learning networks (i.e., reward systems and complementary face-to-face meetings). For this purpose, we use an exemplary lifelong learning network on the topic of learning design representation. The field of learning technology can be characterised as internationally oriented, highly specialised and fragmented, and developing rapidly. The rather heterogeneous community involved and interested in this field is in need of online, distributed facilities that cater for lifelong competence development.

Our main experiences over five years with setting up such facilities for learning about and discussing **IMS-Learning Design** (IMS-LD, 2003) will be presented, a learning technology specification currently considered as the world-wide default standard for representing (more complex) learning designs. We will distinguish three phases (initial experiences, introducing incentive mechanisms, and introducing face-to-face meetings). The chapter continues by describing some preliminary experiences (period: 2001-2004) in setting up facilities to promote learning in the area of educational modeling languages (next section 'Initial experiences'). Self-organization and Social exchange will be introduced as theories that provide us with guidelines on how to increase **active participation**. The following sections then describe more recent experiences (period: 2004-2005) during which we carried out studies on the additional value of incentive mechanisms and face-to-face meeting for increasing participation. Finally, the concluding section provides a summary of our main experiences and findings from our studies, deriving some **design guidelines** for future learning networks about learning design representation.

INITIAL EXPERIENCES

The Open University of the Netherlands (OUNL) launched Educational Modeling Language (EML) (Koper, Hermans, Vogten, & Brouns, 2000) for public use in December 2000, as a specification that enables the modeling of both content and processes in e-learning. To

promote use in contexts outside of OUNL, a website (eml.ou.nl) was created through which the specification could be downloaded and from which newsletters were sent to subscribed participants. In the years 2001 and 2002 the amount of subscribers gradually grew towards a number around 2800. Although many subscribers regularly visited the website to download or study additional information, no channel was available to seek guidance, share experiences, offer examples, and help distribute the load of training about EML beyond the originators of the specification.

In order to open up possibilities for guidance and exchange, the subscribers were migrated onto another platform (www.learningnetworks.org) offering forums to post and receive messages, implemented in VBulletin (2004). The new facility was promoted in 2003 and 2004, but the number of subscribers only slightly grew to a little over 3000. The amount of page views per day (passive participation) numbered several thousands, which we considered to be quite satisfactory. However, the number of contributions made (besides those made by the originators of the facility) by posting or replying to posts (active participation) remained extremely low (i.e., 20 and 11 respectively), which we considered to be quite disappointing.

We concluded that making communication channels available alone does not guarantee that participants will take a more active role. These initial experiences with participants not contributing, but merely ‘lurking’ the network, led us to take a different approach towards implementing a learning network based on ideas around self-organizing systems and ‘seeding’. In the meantime, EML had been adapted to become an internationally standard known as IMS-Learning Design (IMS-LD, 2003). The first pilot implementation of the learning network therefore became known as LN4LD (Learning Network for Learning Design). We used a combination of PHP-Nuke (2004) to implement the learning network-layer of the facility, and Moodle (Dougiamas, 2007) to implement the learning activities and forums.

Learning Networks (Koper & Sloep, 2003) are designed as two-mode networks represented as a graph with nodes, where the nodes are “LN members” and “Activity Nodes”, organized in such a way that the network can self-organize (Koper, Pannekeet, Hendriks, & Hummel, 2004). Activities can be anything that is available to support learning, such as a course, a workshop, a conference, a lesson, an internet learning resource, et cetera. Activities can or can not be modeled according to IMS-LD, and when they are modeled with LD are usually referred to as “units-of-learning”.

Self-organizing social systems

In literature on building effective learning environments there is some dispute about the amount of structure that is needed for effective learning. Some researchers (Mevarech & Kramarski, 2003, p.450) stated that for effective problem-solving during collaboration there "... seems to be a need to structure the learning in small group interaction in advance in a way that will prompt students to elaborate the problem, reflect on the solution process, and really construct relationships between prior and new knowledge". However, by which means and to which extent collaboration should be structured in advance, whether this should be face-to-face or computer-supported, how individual and group support could be balanced, how groups should be formed, and what 'collaborative tools' could be applied in collaboration remain largely unresolved issues. Wiley and Edwards (2003) investigated the potential of **Online Self-Organizing Social Systems (OSOSS)** in which students provide each other with peer feedback without any guiding authority, such as learning through **Collaborative Problem Solving (CPS)**. According to Nelson (1999) the attributes of the ideal CPS learning environment are conducive to collaboration, experimentation, and inquiry, an environment which encourages an open exchange of ideas and information. Wiley and Edwards focus their research on web-based CSCL infrastructures, that are considered as a 'fertile primordial soup' from which OSOSS can just 'simply' emerge without a central authority adding content, commentary, structure or user support in advance. We took an intermediate stance by adding some initial content and structure to 'seed' the information space for others to add and elaborate, based on the concept of '*courses as seeds*' (De Paula, Fisher & Ostwald, 2001; De Paula, 2003).

Before launching **LN4LD** (in July 2004), we 'seeded' the learning network with five initial learning activities containing forums, assignments, additional information, and some self-assessment questions. Activities were offered as Moodle courses. When specific discussions arose, each member was allowed to create new activities, like the instigators did for 'IMS Learning Design and meta data'. It was possible to rate activities (in PHP-Nuke) and individual postings or replies (in Moodle, like is depicted in Figure 1). We further identified the various stakeholders in the field of learning design representations by means of learning technology. The international community of professionals interested in this topic was divided into subgroups for learning designers (or teachers), for learning providers (or vendors), for system developers (or programmers), and for PhD students, to improve shared interest and focus. The **LN4LD** was mainly directed towards the first subgroup of learning designers.

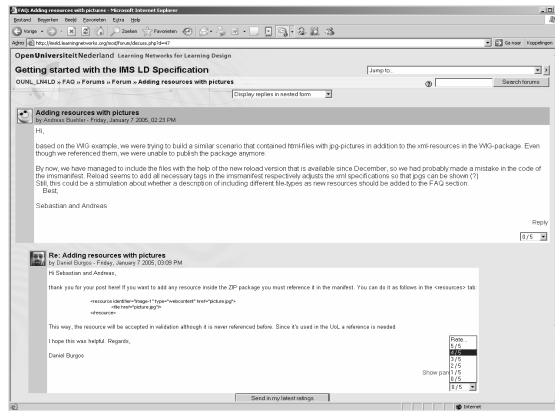


Figure 1. Rating in a Moodle forum

Central to the notion of a Learning Network (LN) is the idea that all LN members are in a position to contribute, within the constraints of any policies that may be operating. In this respect not only **the usability** aspects of a facility, such as a LN, are of importance but also **sociability** (Preece, 2000). Sociability requires careful communication of the purpose and policies (values) of the community. Therefore, we have explicitly stated requirements for joining or leaving, codes of practice for communication, rules for moderation, issues of privacy and trust, amongst others).

Relating to the general design issues of clear policies, high usability and understandable structures, we learned from this initial setup that there remained a lot to be improved. **Policies** should not only be stated very clearly, but should also be very visible and placed on a central spot in the LN. We first intended to have participants submit a real life problem to get access to the activities, but this entry policy appeared too high a threshold. A description of policies was contained in a separate document, but only a minority of learners actually found and read it, so no new activities were added. The initial two-layered architecture (PHP-Nuke/Moodle) was not transparent too most participants, indicated by the observation that the majority (80,8%) could not find the way towards the Moodle-layer. Measures we have later taken up to improve the **usability** were: adding more dynamic content (initially very text-oriented), adding lower level content (initially information about IMS-LD appeared more appropriate for a small group of advanced users of this specification), adding worked-out examples, and decreasing the complexity of the navigation. Regarding to **structure**, we learned from the initial setup that there might have been too many assignments and forums. There were simply too many parties going on for too few participants. David Wiley (personal communication, September 20, 2004) argues that budding communities of practice might be nipped in the bud by providing too many facilities, leaving no room for the community to self-organise their

own structure and facilities. He proposes starting with a minimal set, consisting of: 1. one or two forums, 2. identifiable contributions (accounts), kudos (rewards), and 4. fire alarms (punishments). Although this minimal set appears present in the LN4LD, forums and content appeared too complex to start with. In the next section we discuss how we introduces a “token economy” to allow users to earn points for making contributions in order to attain a certain reward (kudo).

Initial participation data in LN4LD

We view learner participation from the **information ecology perspective** (e.g., Card, Robertson, & York, 1996). As Guzdial (1997) notes, participation and exchange can be studied at a high level of aggregation to understand information spaces in terms of searching, making (contributing) and using (consuming) information. In learning ecologies, activity can be monitored without knowing whether actual learning is taking place. Our aggregated analyses focused on reading, writing, and rating in forums as indicators of participation.

An initial, small group of 104 registered users was monitored during the first three months after launching **LN4LD** (July-September 2004). A more elaborate treatment of this study has been published as Hummel *et al.* (2005). Again, passive participation was much higher than active participation. We counted 12,011 page views, and people downloaded 427 items. Only 25 articles were posted in both Nuke and Moodle forums. Besides the instigators, no other users created new activities themselves. Exchange of information on the level of active participation in LN4LD was still quite disappointing, although it was a substantial improvement when compared to its VBulletin predecessor. For instance, when we take the (number of active posts / number of registered users) ratio as a measure we observe an increase from 5% to 50% over both facilities.

Possible problems underlying the disappointing numbers of participants and low level of active participation were identified: relative invisibility of policy statements; various usability issues in registering and navigation (due to the rather complex two-layer Nuke-Moodle infrastructure); lack of suitable content (content was found to be at a rather complex level and mainly text-oriented); complex structure (too many assignments and forums for too little users).

INTRODUCING INCENTIVE MECHANISMS

After the first study period of three months, we continued monitoring participation in LN4LD during the following period of three months (October 2004-January 2005). Within a second,

improved pilot implementation (now available at <http://imsld.learningnetworks.org>) of the LN4LD, we carried out experimentation with an incentive mechanism aimed to increase active participation.

Social Exchange Theory

Experimentation during this second phase was heavily inspired by Social Exchange Theory, which informs us that participants will contribute more when there is some kind of **intrinsic or extrinsic motive (or reward)** involved. This theory (Thibaut & Kelly, 1959; Constant, Kiesler, & Sproull, 1994) comes from economics' rational choice theory, suggesting a relation between a person's satisfaction with a relation (i.e., with the learning network) and a person's commitment to that relation (i.e., his willingness to actively participate). It furthermore suggests four main mechanisms to motivate and encourage participation: (1) **personal access**, or anticipated reciprocity: learner has a pre-existing expectation that he will receive actionable and useful (extra) information in return; (2) **personal reputation**: learner feels he can improve his visibility and influence to others in the network, e.g. leading to more work or status in the future; (3) **social altruism**: learner perceives the efficacy of the LN in sharing knowledge as a 'public good', especially when contributions are seen as important, relevant, and related to outcomes; (4) **tangible rewards**: learners negotiate to get some kind of more tangible asset (financial reward, bond, book, etc) in return. Other distinctions have been made between: individual (access, reputation, reward) versus interpersonal factors (altruism) (Deci, 1975; 1985); hard (e.g., access, money) versus soft (e.g., satisfaction, altruism) rewards (Hall, 2001); quantitative versus qualitative gain, intrinsic versus extrinsic factors, and others. In each of the above cases, incentive mechanisms for knowledge sharing should match the spirit of what has to be achieved (Sawyer, Eschenfelder, & Hexkman, 2000). If this is finding and exchanging information about LD, research suggests that incentives to gain extra personal access to more information about LD can be expected to render best results.

Participation data when introducing an incentive mechanism

To test this assumption, we introduced an incentive mechanism in **LN4LD** (participants could earn extra access by making contributions). We divided the three-month period into three consecutive periods of one month each and monitored our participants. The incentive mechanism was being introduced and only available during the middle period of one month. The sample used for this study consisted of all 125 individuals who had enrolled and accessed

the Learning Network during the experimental period. Seventeen countries were represented as the origin of these participants. A more elaborate treatment of this study was published as Hummel *et al.* (2005).

The mechanism allowed participants to earn points for contributions, with the reward scheme including both quantitative and qualitative components. On the quantitative side, points could be earned for: (1) forum postings (20 points for each, labelled ‘pointsforpost’); (2) replying to posts (10 points for each, labelled ‘pointsforreply’); and (3) rating of posts (3 points for each, labelled ‘pointsforrate’) (see Table 1). With respect to the quality of postings, contributors received additional points for: (4) each time their contribution prompted a reply (5 points for each reply to a post, labelled ‘pointsforreplyrec’); and (5) each time the originator’s posting was rated (3 points * rating value, labelled ‘pointsforraterec’), whereby the ratings ranged from 1 (very poor) to 5 (very good).

A simple interrupted time series with removal design (Robson, 2003) was applied with (active and passive) participation as the independent variable. The main research aim of this experiment was to measure the hypothesized increase **in active participation**, but we also monitored data on **passive participation**. Both types of participation contribute to the collective behavior of the Learning Network, and were considered worthwhile to be studied. Although both types of participation increased significantly after introducing the reward system, in this paper we will restrict ourselves to data on active participation.

Table 1. Total active participation points for each period (A-C) and parameter, for all participants (n=125)

Points X Period	Total points	Points forpost	points forreply	points forrate	points forreplyrec	points forraterec
A.	117	60	20	3	10	24
B.	566	220	120	42	100	84
C.	141	40	30	12	35	24
A-C.	824	320	170	57	145	132

Table 1 shows that most **active participation** points were earned by making postings to forums (320 points in total, with 220 of these being in period B). Over time, the total amount of active participation points was divided as follows: 117 points in period A, 566 points in period B, and 141 points in period C. The average total points for active participation earned by active participants (n = 17) is 48.47 and by all participants (n = 125) it is 6.6. The repeated

measures ANOVA, using time of measurement as a within-subjects factor, reveals that 'period' indeed is a very significant factor in explaining the average total amount of points ($F(2, 122) = 14.17, MSE = 24,966.08, p < .001, \eta_p^2 = .104$), even with the majority of participants not actively contributing. When we include 'scoring' (either 'those who did not score' or 'those who did score') as a between-subjects factor, (period * scoring) appears to be an even more significant factor ($F(2, 122) = 31.21, MSE = 24,966.08, p < .001, \eta_p^2 = .204$) in the linear model. So, even if we look at the total community (of which about 85% remained passive), the introduction of the incentive mechanism still introduced clear and significant effects on active participation.

INTRODUCING FACE-TO-FACE MEETINGS

Since August 2004 until late 2006, the LN4LD was maintained under the umbrella of the 6th framework UNFOLD project, an initiative sponsored by the European Commission to improve the further dissemination and uptake of IMS-LD in Europe. The initial LN4LD implementation had been adapted for use as the CoP (Community of Practice) for learning designers (now available at: <http://imsld.learningnetworks.org>). In the third phase under study in this article (the next period of six months, between January and July 2005), UNFOLD organized a number of face-to-face meetings in relation to the LN4LD. Although this blended learning approach was not deliberately designed to study the effects on participation, the introduction of face-to-face meetings offered opportunities for further study on this issue. In the context of our research on participation, we measured the influence of this blend on the participation data and appreciation of the LN4LD during this period. During this third phase, face-to-face meetings were set up and carried out by the UNFOLD project in February (Valkenburg, The Netherlands), in April (Barcelona, Spain) and in June (Braga, Portugal). An average attendance of 70 persons for each meeting, with people coming from more than 15 countries, could be observed. During this period, also a number of short presentations about LD was given in various conferences on related topics taking place in Paris, Sheffield and Madrid. However, these presentations were not organized on purpose like the UNFOLD meetings, and not directly related to the LN4LD.

Social affordances in blended learning

Social interaction and **active participation** are crucial issues for the quality of both the real world and virtual **collaboration** of communities. An important pitfall would be to assume that

interaction and participation will simply occur when the possibility of asynchronous communication becomes available. It goes without saying, that this will not be the case. Besides this, when designing means of communication we can not just translate all mechanisms for face-to-face learning groups (e.g., didactical guidelines that appear useful for classical instruction and interaction in real life) to **distributed learning groups** (e.g., these very same guidelines may appear quite useless there). **Asynchronous communication** offers specific possibilities but also specific barriers, that are non-existent in face-to-face settings. Setlock, Fussell and Neuwirth (2004) have noticed several differences between face-to-face and virtual groups who carry out the very same tasks.

The potential of teamwork or other types of face-to-face collaboration for online learning has already been demonstrated by various studies in a variety of domains, both for individual online learning environments (Pearce & Ravlin, 1987; Pawar & Sharifi, 1997; Barlow, Phelan, Harasym, & Myrick, 2004), as well as for **Computer-Supported Collaborative Learning (CSCL) environments** (Gunawardena, Lowe, & Anderson, 1997; Gunawardena, Carabajal, & Lowe, 2001). The interaction between learners (both in face-to-face settings and in CSCL) can lead to further elaboration and refinement of individually constructed schemas, since it incites learners to explicate the actual level of schema development and demands them to explicitly compare their own schemas with schemas of others as to defend or criticise (Jeong & Chi, 2000).

Warketin, Sayeed and Hightower (1997) have found that creating a feeling a closeness and trust can be achieved by interlacing real and virtual encounters. ‘Spatial and temporal proximity’ in learning networks can be influenced by interlacing distributed and face-to-face learning. Other researchers echo this beneficial influence on participation when combining virtual and face-to-face communication and events. For instance, Biesenbach-Lucas (2003) and Thoennesen (1999) noticed the positive influence of face-to-face lessons on threaded online discussion. Meyer (2003) found additional face-to-face meetings to have an added value for motivation and higher-order thinking during online discussions. Coppola, Hilz and Rotter (2004) compared face-to-face groups with virtual communities. They **seeded** the community with ‘swift trust actions’ to show that a blended learning approach achieves a richer and more profound basis for **collaboration**. Based on these research findings, we hypothesized that a blended approach, combining **online activities** and face-to-face meetings related to them, could indeed improve active participation in a learning network.

According to the ‘ecological approach’ to CSCL (Gaver, 1996; Kreijns, Kirschner, & Jochems, 2002), social interaction would be stimulated when specific characteristics of the

real world environment would be related to or get included in the asynchronous communication. Kreijns (2004) defines 'social affordances' as the facilitators originating from the real world context which can stimulate interaction in a virtual, collaborative environment (e.g., the image of a door on the screen reminds us of 'something that can be opened', and will increase the odds the user wants to, or at least knows how to, access this space). Such 'social affordances' would stimulate social interaction in the virtual environment, and compensate for some of its barriers. He stimulated informal and casual conversations in CSCL by simulating impromptu encounters to bridge the time-gap imposed by asynchronicity. According to his research, social affordances can be expected to increase when face-to-face meetings in the real world become part of the historical awareness in a community's virtual environment (e.g., "Ah, that's a posting from the guy I met at a conference fifteen years ago. Let's reply him about ..."). According to this ecological approach, such social affordances would, in their turn, stimulate the amount of active participation in the virtual environment.

Participation data when introducing face-to-face meetings

Table 2 shows the participation data during the period in which face-to-face meetings were organized.

Table 2. Participation data about actions

Activity Nodes 270605	Actions	Actions	Actions	New actions	% of new	% of new
	100105	210305	270605		March-June	January-June
Advanced Issues with IMS Learning Design		253	395	142	56	
Change Proposals IMS LD Specification		674	812	138	20	
Experience a running Unit of Learning		1.319	1.531	212	16	
Getting started with the IMS LD Specification		3.033	4.294	1.261	42	
How to modify a Unit of Learning		1.342	1.703	361	27	
IMS Learning Design and Metadata		1.015	1.198	183	18	
Online Educa Madrid Mayo 2005 (en castellano)			477	477	100	
PROLEARN/UNFOLD Heerlen September 2005		73	271	198	271	
Runnable LD Example Units of Learning		3.269	6.252	2.983	91	
Understanding the basics of IMS Learning Design		2.041	2.795	754	37	
UNFOLD CoP Meeting in Barcelona April 2005		143	1.055	912	638	
UNFOLD CoP Meeting in Braga (Portugal) June 2005			286	286	100	
UNFOLD hands-on meeting in Valkenburg 2005		3.496	3.893	397	11	
UNFOLD Paris Workshop March 2005		27	80	53	196	
UNFOLD Presence at Alt-i-lab June 2005			54	54	100	
UNFOLD Presence at Campus Virtual June 2005 (en castellano)			38	38	100	
UNFOLD presence at the Online Educa Berlin 2004		289	313	24	8	
UNFOLD session at the EADTU 2004 conference		421	422	1	0	
UNFOLD Workshop at EUCEN Conference 2004		158	159	1	1	
	3.750	17.553	26.028	8.475	48	594
Without logins		13803	8475			
			22278			
With logins	3.750	20.063	30.235	14.653	73	706
		16313	10172			
			26485			

We did not differentiate between active (postings, ratings) or passive participation (page hits, downloads) during this phase, but just logged all activities. The table shows an increase in the amount of activities (activity nodes), related to the UNFOLD meetings and related events. The table also shows a substantial increase in activity after the introduction of face-to-face meetings.

Data analysis shows the increase of participation from January-March 2005 to be 48% of participation between March -June 2005. Participation went from 3,750 actions till January to 17,553 actions in March and to 26,028 actions in June, meaning an increase of 8,475 actions from March and 22,278 actions from January.

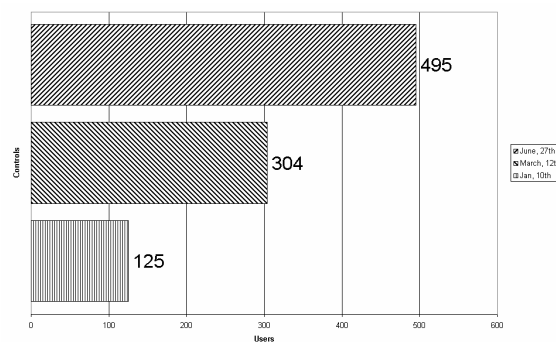


Figure 2. Growth of registered users (January, March, June 2005)

Concerning the amount of registered users, Figure 2 shows progress from 125 members in January to 304 in March and 495 in June. This means an increase of a 243% in March and a cumulative one of a 396% in June. All these figures show a continuous, gradual increase of percentages and raw numbers on both actions taken and registered users during this last period of study. This growth has continued after the last period under study, and late 2006 about 3,000 registered users could be counted.

Of all participants, about half (44,4%) answered that they participated regularly in the online forums, and about half (47,2%) expressed to prefer forums over email. A vast majority (88,8%) feels to benefit most from face-to-face meetings (especially hands-on work and discussions in a group with experts around to help), but realizes this is not always a feasible option due to the geographical spread of most participants.

Appreciation data from questionnaires and interviews

A number of evaluation activities were carried out under the umbrella of UNFOLD: face-to-face and online evaluations, website usability trials, log analysis of web servers, phone

interviews, and benchmarking studies. Generally speaking, participants expressed appreciation for the setup of the blended learning network. We noted a consistent increase in both the usage of the LN4LD (and the uptake and use of IMS-LD during the period of study, the latter still centering on using LD-tools (and not yet on a wider use with actual learners).

During the face-to-face meetings, we requested the participants to fill in a questionnaire and conducted a small number of short interviews with some core-participants, in order to collect more qualitative data on the appreciation of the blended approach. For more detailed information about these instruments, we refer to Burgos (2006). A total of 78 valid (complete, blind, understandable; response rate of about 80%) questionnaires were collected and analyzed from active participants, learning design professionals that are playing a significant role in the field of learning design representation and within the LN4LD. Additionally, a total of 16 qualitative interviews was conducted with a selected group of these participants. These were carried out by phone, by one of the UNFOLD facilitators (of which one is the first author of this article). Both the questionnaires and interviews consisted of questions about the state of IMS-LD, the organization of the meeting, the content of the meeting, and about the participation in LN4LD. Answers to the questionnaires were to be provided as either a selection from multiple options, ratings (on five-point scales) or open suggestions.

In this section we will focus on describing the main qualitative findings from the questionnaires and interviews that relate to the participation in LN4LD. The information collected by the questionnaires could be complemented by more detailed interviews with some members of the community, who were considered to be key UNFOLD members. The goal was to get a deeper understanding and evaluation of what could be obtained from the questionnaires alone. The basic topics that were addressed during the interviews were the same. The procedure was based on a structured questionnaire for the interviews. Based on this structure, the interviewer encouraged the interviewee to elaborate, for instance by posing follow-up questions in the light of answers obtained.

First of all, respondents underline the huge differences that exist between real world and virtual types of communication, and between synchronous and asynchronous communication. All types are considered to have specific possibilities and barriers. Most respondents consider the combination of types in a blended approach to be most optimal. For example, one of the respondents stated:

“I am addicted to chats, because they are good for shy people like me. But F2F and online activities help each other. We also need F2F contact with demos once in a while, because they are richer, good for

meeting people, and you can better explain your point of view in direct interaction. Then later in the forums and the chats, we can get more in depth to further address issues”.

Generally speaking, respondents indicate the positive contribution of face-to-face meetings in the real learning network to the virtual learning network. They consider these types of communication as mutually dependent. Although most participants just share a general interest in a topic and do not consider themselves being experts on the topic of IMS-LD, being involved in a heterogeneous community of practice on this area allows them to play their role and learn from participants that are more expert on the topic. We must note that the reported willingness to participate (91.7%) is much higher than the actual participation observed in the total community, which is probably caused by the fact that the group of respondents (active participants) can not be considered as a representative sample.

As specific advantages of face-to-face communication were mentioned the following clusters: the possibilities for more precise discussion; chances for a more efficient learning curve; the availability of direct contact and feedback; the opportunity to meet the experts; an higher level of motivation and interaction; more direct interaction which was seen as fundamental to establish contacts; and the enrichment of virtual contacts.

As specific advantages of virtual co were mentioned the following clusters: catering for geographical spread; enabling freedom of time (sources always available); the reduction of emails; in the long run probably most cost-efficiency; more opportunities for user interaction with more participants; permanent availability of a high number of resources, possibilities to keep up-to-date; allowing more time for thinking; and allowing for types of communication that are not possible during face-to-face meetings.

Most used facilities for **asynchronous communication** within **LN4LD** appear to be the group forums and personal emails. Together, these facilities provide a bi-directional and open access channel for both information consumption and information contribution in a learning network. When asked about their preference, 58.3% of the respondents indicated a preference for forum communication. When comparing email to forums, personal emails are said to provide more protection against criticism from others, provide feedback faster, allow for more time to answer, and to be easier to follow. Forums on the other hand are considered to be less intrusive and better structured (flow of discussion by threading), to archive discussions in the past, to be easier to ignore, and to allow for more brainstorming.

When asked about their preference for either face-to-face or online *communication*, 46% of the respondents indicated a preference for online communication, 31% for face-to-face communication, and 23% for their combination (see Figure 3). When asked about their

preference for either face-to-face or online *events*, 48% of the respondents indicated a preference for face-to-face communication, 25% for online, and 25% for their combination (see Figure 3). So, for events the preference clearly shifts from online towards face-to-face.

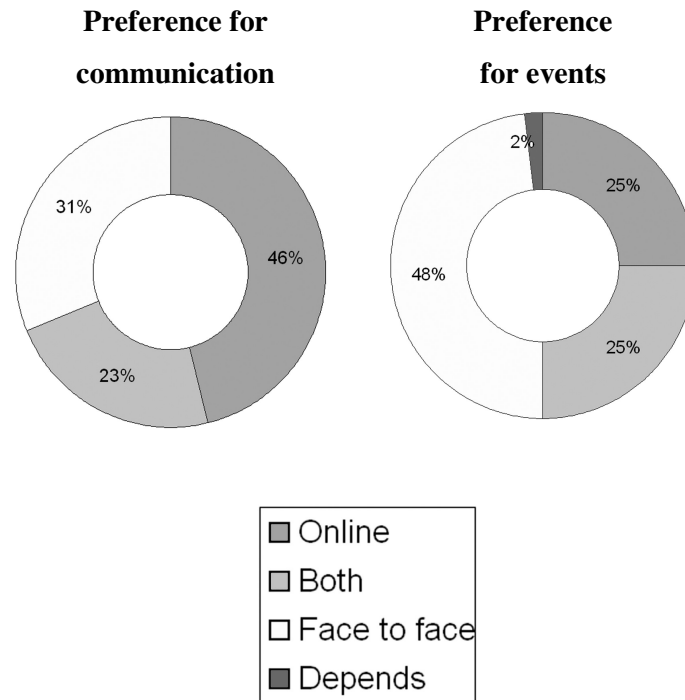


Figure 3. Preferences (online versus face-to-face) for communication and events

When asked about their participation online, especially during online events, 56% of the respondents indicated they did and 44% of the respondents indicated they did not participate in these events. Main reasons provided were the lack of time, no real engagement with the project, or lack of clear focus of the event. It is worthwhile to note though that of the 44% stating they did not participate, 36% showed interest in participating in future online events. All respondents that participated in the Unfold online events feel these events helped them find information, exchange ideas, share work, debate questions and learn more about the field.

CONCLUSIONS

We presented some preliminary data on participation while setting up initial pilot implementations of a learning network for learning design (LN4LD), and described the set-up and results from two studies that monitored **collaboration** and **(active) participation** by adding an incentive mechanism and face-to-face meetings, respectively. A number of general **design guidelines** for setting up effective learning networks could be derived from these studies.

These guidelines can be based on relevant theories about self-organisation, social exchange and social affordances.

From the initial implementations we derived some design guidelines, and concluded that *usability*, simple *structure*, and clear *policies* are necessary requirements. The functional demands of facilities for collaboration and participation should always have priority (**design guideline 1**). More specifically, we found that users should not be overburdened by complex structures and too many facilities. Simply ‘*seeding*’ the network with a minimal set of assignments and forums was found to cater best for the emergence of structure and activity (**design guideline 2**). We also concluded that additional policies were needed for effective exchange and active contributions (**design guideline 3**). Finally, for scoping and focused collaboration, it appeared useful to identify stakeholders and divide them into subgroups of shared interest (**design guideline 4**).

Introducing an *incentive mechanism*, in line with the general purposes of the learning network, appeared to significantly increase the level of collaboration and participation (both active and passive) (**design guideline 5**). Interlacing virtual activities with additional *face-to-face meetings* on the same topics yielded another substantial increase in both activity level and amount of users registering (**design guideline 6**). Adding incentives and meetings can therefore be considered as worthwhile ‘add-ons’ to online, distributed learning networks in general.

Although these are promising findings about *what* happened (according to our ecological approach) and what could be designed to improve communities, they do not explain what caused these changes in behavior (*why* it happened). The questionnaires and interviews with some of the active participants in the community provide us with some initial, more qualitative impressions about what participants appreciate and feel is important in such (blended) learning networks. Most respondents indicated the added value of a blended approach, where the advantages of face-to-face and virtual communication and events can be used, and where practical barriers of each could be overcome. A serious limitation of this last study was that some of the appreciation data were difficult to interpret.

Future research will have to find out how exactly we should blend these types of communication. We should furthermore carry out more qualitative research into the actual drivers for people to register and actively participate in learning networks. More qualitative analysis of logged data (e.g., by using diary methods) or additional interview techniques to analyze personal motivations might provide a fruitful approach for this work.

Limitations of the studies described are also related to the relatively small group size of the community members being questioned, and to the absence of any form of certification. Participants were widely distributed geographically and did not learn in the context of a single or formal organisation, where their progress could have been more easily assessed against organisational standards. Similar results might not materialize for participants (students) entering more formal or larger communities. Therefore, replications of these findings on a larger scale and for various forms of (formal) learning, incentives and topics are also needed.

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KEYWORDS

Participation: The level of activity in a learning network that can be either passive (consuming information) or active (contributing information).

Collaboration: Any activity that includes the social exchange of information between people that work together.

Blended learning: mix of (blend) regular and distance education or training. Blended learning is education that includes both physical presence and interaction with fellow students and

teachers at certain times and places, as well as electronic learning environments that can be accessed at any point of time and place.

Learning networks: Two-mode networks represented as a graph with nodes, where the nodes are ‘participants’ (actors, members, learners) and ‘activities’. Activities can be anything that is available to support learning, such as a course, a workshop, a lesson, an internet learning resource, and others. Central to the notion of a learning network is that all participants are in a position to contribute.

Incentive mechanisms: A treatment or measure to motivate and encourage people (i.e., to participate in a learning network)

Face-to-face meetings: Meetings where people are physically present together in a space (i.e., to learn and discuss about a certain topic of joint interest)

Social exchange theory: Theory that informs us that participants will contribute more when there is some kind of intrinsic or extrinsic motive (or reward) involved. It suggests a relation between a person’s satisfaction with a relation (i.e., with the learning network) and a person’s commitment to that relation (i.e., his willingness to actively participate).

Social affordances: Properties of a CSCL environment that act as social-contextual facilitators relevant for the learner’s social interactions.

Self-organization: a characteristic of complex and adaptive systems that display emergent behaviour. A structure that self-organises gets its smarts from below; agents residing on a scale start producing behaviour that lies one scale above them (e.g., ants create colonies, learners create learning communities)