BORDERLESS LEARNING EXPERIENCES - THE DEVELOPMENT OF DESIGN GUIDELINES FOR COLLABORATIVE DISTANCE LEARNING ENVIRONMENTS

Suzanne Verdonschot, University of Twente, The Netherlands
Kitty Kwakman, University of Twente, The Netherlands

Abstract
This study aims at the development of design guidelines that aid the educational designer in creating learning environments for collaborative learning at distance. Using a multiple case study design in which learners' experiences with distance learning environments are gathered, a theoretical model was constructed. This model was used to draft a set of design guidelines following a specified theoretical format. Each guideline consists of a core description, a consideration showing the limitations of the guideline, and an overview of possible interventions that a designer can use to improve collaborative learning at distance. The set of guidelines is qualified as main yield of this study, whereas also experts qualified this set as useful and valuable.

Problem statement, goals, and relevance
The need for participation in the knowledge society we are heading for (Drucker, 1993) requires organisations to enable their employees to contribute to the process of generating and applying knowledge (Kessels & Keursten, 2001). In world-wide organisations, the process of generating and applying knowledge, thus learning, will be practised by employees dispersed all over the world. A useful concept in this respect is distance learning as distance learning allows learners to learn anytime and anywhere. Distance learning is often referred to as e-learning as new technology plays a vital role in the learning process. However, both theory and practice show that contact and interaction between people are key ingredients for learning and knowledge construction to take place (Harrison & Kessels, 2004; Scardamalia & Bereiter, 1992). Thus, it is widely recognised that distance learning processes need to be collaborative in order to yield valuable results. This poses severe concerns for educational designers on how to create a learning environment that stimulates collaborative distance learning. What learning activities have to take place? How to involve participants in such learning activities? How to make sure that collaboration takes place and that people learn from that? Educational design theory provides some guidelines for setting up collaborative distance learning processes that may guide the design of a learning environment (see for instance Johnson & Aragon, 2002; Kirschner, Valcke & Sluijsmans, 1999). However, these guidelines are quite diverse and do not take account of learners' experiences within learning environments. Moreover, the involvement of learners - as important actors within the learning environment - in formative evaluations of these environments is underexposed (Rossi, Freeman & Lipsey, 1999). The lacking perspective of learners within current design theory was taken as a starting point to start an evaluation-based study into learners' experiences with collaborative distance learning environments. The assumption was that getting insight in learners' experiences would offer rich knowledge on how learning processes for collaborative distance learning look alike. This knowledge would guide the kind of activities that designers should undertake in order for these learning experiences to occur. The study aimed at developing a consistent set of guidelines that support educational designers in designing learning environments for collaborative distance learning. The research question that guided the research at hand is as follows:

> What design guidelines, based on learners' experiences can be formulated for creating a learning environment in which employees can learn collaboratively at distance?

Theoretical background
A literature review has been executed in order to define the concept of collaborative distance learning. A definition of the process of collaborative distance learning is needed because many visions exist on the meaning of this concept that is at the heart of the research at hand. Furthermore, literature is used to explore the concept of design guideline. Theory on the content of these guidelines and on their format is both used as a framework to trace relevant learner experiences and to develop design guidelines out of these.

Collaborative distance learning defined
Collaborative distance learning is considered to be "a social learning process aimed at individual learning - joined by learners that are not in physical proximity - that happens through negotiation of meaning and the creation of valuable output." This definition offers insight in the ingredients that the learning process is supposed to consist of. What characterises this definition is a focus on individual learning. This view is adopted from Veldhuis-Diermanse (2002) who considers the individual learning process lying at heart of the collaborative learning process.
Furthermore the collaborative distance learning process appears to be characterised by a process of negotiation of meaning (Kirschner, 2002; Lowyck, Pöysä & Van Merriënboer, 2003). This is a process not pointed towards reaching consensus about meaning but it is pointed towards the exchange of ideas that helps people to understand what fellow learners *mean* by something they have *said*. Note that the writing process becomes more and more important for the negotiation of meaning between learners when the learning process is taking place at distance (Tsui & Ng, 2000; Veldhis-Diermanse, 2002). This writing-process then serves as a tool to clarify and voice learners' thinking, emotions and argumentation. Five indicators derived from Slavin (1995) characterise the process of negotiation of meaning (see also Veldhuis-Diermanse, 2001): 1) helping each other, 2) discussing with each other, 3) exchanging ideas, 4) exchanging experiences, and 5) exchanging information.
Valuable output is the third characteristic of the collaborative learning process. Valuable output is considered to exist of new knowledge that is developed (which is for instance shown in a tangible product), and that is valuable in the perception of the learner.

Content and format of design guidelines on collaborative distance learning
Design guidelines are characterised by their format and by their content. The format describes how they have to be formulated in order to really support the educational designer. The content refers to the subjects they touch upon.
With regard to the format, CILT (2003) and Van den Akker (1999) state that design guidelines are intended to select and to apply the most appropriate substantive and procedural knowledge for specific design and development tasks. A design guideline needs to address the following four aspects in order to guide the designer in selecting and applying the most appropriate knowledge:

- An elaboration on the context for which it has been developed;
- An argumentation for the existence of the particular guideline.
- The limits of the guideline;
- (An) Intervention(s) that could be done within that context.

A search for design guidelines within the literature for learning environments for collaborative distance learning[1] shows that existing guidelines seemed to be very diverse and did not at all resemble the format of a design guideline as described above. Nevertheless, the content of these guidelines reveals important aspects of learning environments for collaborative distance learning. A content analysis of these guidelines resulted in a set of fourteen themes that represent the major topics that are important for educational designers to use in the design of collaborative distance learning environments. Besides, it is assumed

[1] For the criteria based on which guidelines in literature were found to be useful we refer to Verdonschot (2003).

that those themes can serve as a framework for collecting experiences of learners in collaborative distance learning environments. The following list presents the themes:

User friendliness of the environment: The extent to which technology within the learning environment is well functioning. This theme stresses the importance of a technological environment not becoming a burden for its users.
Development of the environment: The extent to which the technological environment is able to develop during the course of time. This has both to do with the development of the environment due to use by learners and with adaptations a system must make in order to meet secondary users-needs.
Group cohesion: The extent to which learners have built up a social connection with fellow learners.
Position of individual within the group: The extent to which individuals recognises themselves as autonomous and as persons able of attributing something to others in the group.
Didactics: The extent to which the learning environment takes care of instructional strategies.
Learning situation mirrors the work environment: The extent to which the learning environment resembles aspects of the daily working environment.
Involvement of the outside world: The extent to which people outside the learning environment are involved in the learning process in order to enrich the learning process with their views and opinions.
Initiative: The extent to which learners are encouraged to take initiatives and to feel responsible for these initiatives, so that they feel ownership.
Motivation: The extent to which the learner feels enticed to contribute to the learning process within the environment.
Motivation by passion (a specific form of the theme 'motivation'): The extent to which the learner is intrinsically motivated by interests, motives, and passions.
Role of time: The extent to which time is used properly within the learning environment.
Negotiation of meaning: The extent to which learners are supported in the process of exchanging frames of reference and opinions in order to create new knowledge.
Reflection: The extent to which learners are encouraged to look back both on actions undertaken and on the way they interact with fellow learners.
Willingness to invest. The extent to which learners want to contribute to the learning process based on what they expect to get in return.

Method
A case study was carried out to trace experiences from learners involved in learning environments for collaborative distance learning. All experiences labelled as positive or negative learner experiences were analysed in an inductive way, using directions from grounded theory to construct a theoretical model that explains the collaborative distance learning process (Glaser & Straus, 1967). This model forms the basis for the development of design guidelines.

Selection of the cases
Three learning environments for collaborative distance learning that were qualified as *good practices* were selected as information rich cases (Patton, 1990). Three criteria have been laid down in order for qualifying cases as good practices, see Figure 1.

The people joining the learning environment are - at least for a period - distributed over different locations.
The learning process takes place in a designed learning environment. A designed learning environment can be recognised by:
It being supported by an HRD-employee or another mediator;
Interventions that are taken and
Goal(s) that are set.
The learning is characterised by negotiation of meaning and the creation of valuable output.

Negotiation of meaning is characterised by five indicators of negotiation:
Helping each other;
Discussing with each other;
Exchanging ideas;
Exchanging experiences and;
Exchanging information.

Valuable output is defined as one of the following three forms of output:
New knowledge;
Something tangible or;
A set goal that is reached.

Figure 1. Criteria for qualifying cases as good practices

The selection of cases happened through the personal network of the researcher. Eventually three cases were selected that met all the criteria. The first case is a workshop with open enrolment organised by organisation A (case A); the second case is formed by a learning group of young potentials at organisation B (case B) and the third case consists of a learning group of young managers from organisation C (case C). Figure 2 offers key characteristics of these three cases.

	Case A	Case B	Case C
Goal	To explore the concept of community of practice and to construct knowledge related to this topic based on the experience of participants.	To complete an assignment on employment branding successfully and at the same time work on personal learning goals.	To accelerate and deepen the learning process of the business course on leadership skills that follows on the distance learning project.
# Participants	20	5	20
Duration	6 weeks	6 months	5 months
Distribution of learners	Distributed over different locations, however some learners are colleague's work on the same site and were in physical proximity all the time.	Most of the time learners are distributed over different locations. There are three meetings in which learners physically meet.	Most of the time learners are distributed over different locations. The learning process ends in a business course in which learners physically meet. Some learners are colleagues who work on the same site and were in physical proximity all the time.
Negotiation of meaning	While working on projects, cases and stories.	While doing a research on the topic of employment branding.	While sharing difficult situations in the form of cases from the learners' personal work environment.
Output	Individuals produced tangible products. The group created knowledge on communities of practice.	A presentation on employment branding for the sponsor. The group created knowledge on employment branding.	The group created knowledge on how to improve personal action at work. A leaflet with learning stories is produced as well.

Figure 2. Overview of key characteristics per case

Selection of participants

Purposive sampling is also used to select information rich participants within the three cases (Patton, 1990). Using the intensity sampling strategy participants were selected from whom it was expected to manifest the phenomenon of interest intensely either because they participated very actively (participants selected in case A, B and C) or because they were very passive during the process (participants in case C). So, three participants were selected from case A and B, whereas nine participants were selected from case C.

Instrument

Standardised open-ended interviews (Patton, 1990) were used for tracking down personal learner experiences from the participants. The goal of the interview is to track down positive and negative experiences. The instrument consisted of open questions based on the themes that are supposed to be central in experiences of learners in collaborative distance learning environments (see the section on theoretical approach). Questions are therefore open and pointed at specific moments during the learning process in which the particular theme caused a positive or negative experience. Questions that belong to the themes serve as clues to trace moments within the learning process that the learner did particularly enjoy or not.

Procedure

First the contexts of the three learning environments under study are explored. This exploration also consisted of taking a look at the electronic environment that was used to

support the learning process. Insight in the electronic environment served during the interview as important background information. The interviews took place either at the workplace of the participants (case A and case B) or at a conference hotel (case C). Individual interviews were held with respondents from case A and B. Focus groups (three respondents per group) were held with participants from case C. Interviews took about one and a half hour. All interviews were recorded on tape and literally transcribed.

Data-analysis

First the data that was obtained during the interview is reduced to mere positive and negative experiences. With help of *ATLAS.ti* (1997), all positive and negative experiences are submitted to cross-case analysis (Patton, 1990). In order to find categories that appear to be central in learners' experiences, the inductive process as described by Merriam (1988) is followed. Analysis of the bundles of positive and negative experiences led to ten dimensions that belong to five variables. These variables and dimensions are explored by investigating how negative and positive experiences relate to them. The variables and dimensions serve as input for the theoretical framework that is developed.

Results

Five key variables

The literal transcriptions of the interviews contain positive and negative experiences. In total 219 positive and negative experiences are found (within Case A: 95, within Case B: 57, and within Case C: 67). Table 1 shows the percentage of negative and positive experiences per case.

Table 1. **Percentage of negative and positive experiences per case**

Label	% quotations Case A	% quotations Case B	% quotations Case C
Negative	22%	19%	27%
Positive	78%	81%	73%
Total	100%	100%	100%

Analysis of all experiences revealed five main subjects around which experiences concentrate. These subjects are described as five variables that appear to be central within the learning environment for collaborative distance learning. The first variable is the **individual learning process**. The individual represents the perspective from which we looked at the learning environment (we used *their* individual experiences). The individual seems to be central within the learning environment as learning processes do not take place without individuals. Furthermore **fellow learners** are a variable within the learning environment. Fellow learners, looking at the learning environment from the individuals' point of view are all other learners involved in the learning process. A third variable within the learning environment is the **facilitator,** as the one who initiates interventions within the environment. The fourth variable is the **technological environment** comprising all applications used within the environment. The fifth variable is **organisational fit**. This refers to the extent to which the learning environment manages to make use of the broader environment in which it is situated.

Dimensions belonging to key variables

Taking the five variables as a starting point, a second phase of inductive analysis has been executed. Each variable appears to have one or more dimensions. Four dimensions characterise the individual learning process: *direct gain; challenge; clarity* and *personal preference*. These four dimensions need to be promoted by the other four variables out of which the collaborative distance learning process exists. Two dimensions were revealed belonging to the variable fellow learners are *attractiveness* and *visibility*. Attractive and visible fellow learners promote the individual learning process. Two dimensions that showed tot belong to the facilitator are *planning* and *stimulation.* One dimension with regard to the

technological environment was found: the *preconditions* of the technology used. The position of technology within the environment as merely pre-conditional can be misleading. Learner experiences that relate explicitly to technology are pointed at necessary prerequisites that learners find important with respect to technology. However, other experiences exist that relate to technology, but that relation seems to be more indirect. These experiences have, in general, more common ground with other variables. The dimension that belongs to the fifth variable of organisational fit is *organisation-specific properties*. The organisational context influences the learning environment. Limiting conditions with respect to technology, the goals that are striven for, the way groups are composed, and the learning culture within the learning environment, are all examples of factors that are determined by the organisational context in which the learning environment is located to a large extent.

The four variables fellow learners, facilitator, technological environment, and organisational fit are positioned around the individual learning process in a theoretical model (see Figure 3). Together they constitute the collaborative distance learning process that is assumed to result in individual learning gain and valuable output for the organisation. The variables that came out of this study are visualised in the grey part of the figure. These variables are not meaningful in itself but are meaningful when viewed as variables that serve the individual learning process in order to result in a collaborative distance learning process.

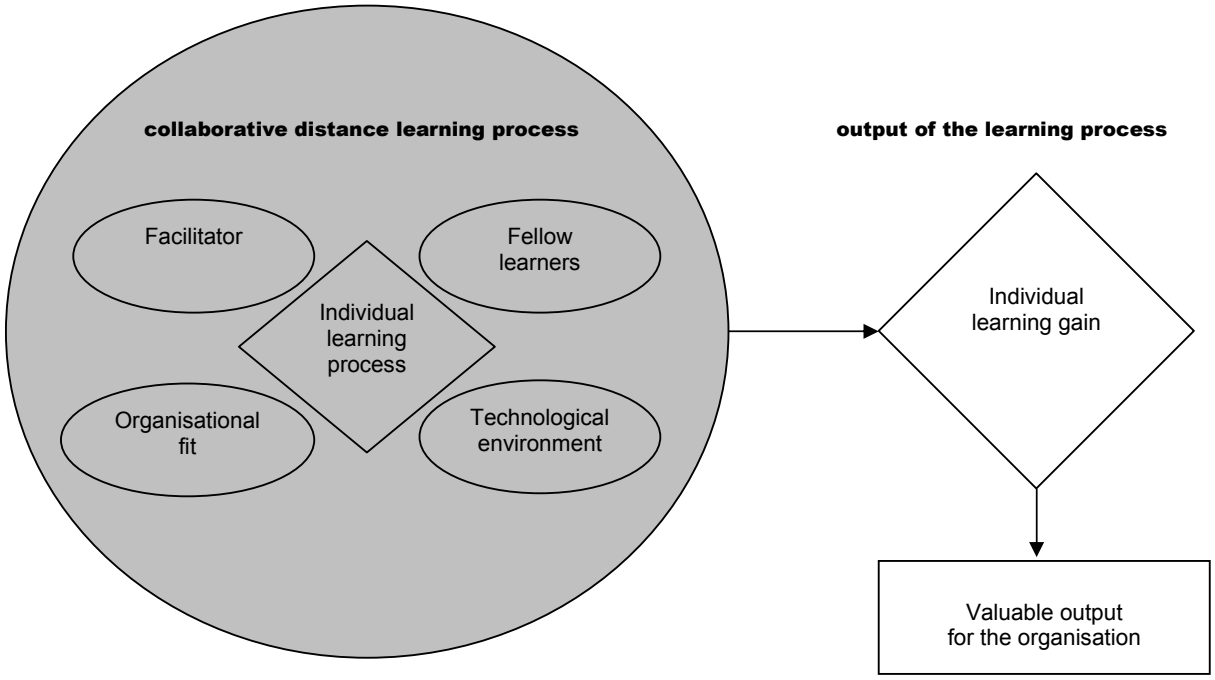

Figure 3. Model that visualises the collaborative distance learning process and its output

Hypotheses connecting variables, dimensions and learner experiences
The model does not show *how* different dimensions influence the individual and collaborative learning process. Therefore, the relationship between the learners' experiences and all different dimensions (that evolved around the five variables) was explored further. In Table 2 the concentrations of experiences per variable are shown[2] with the symbol √.

[2] For the calculations used to determine the concentrations see Verdonschot (2003, pp. 79-80).

Table 2. Concentrations of experiences within the two categories of experiences

Key variables	Dimension	Negative	Positive
Individual learning process	Direct gain		√
	Challenge		√
	Clarity		√
	Personal preference		√
Fellow learners	Attractiveness		√
	Visibility		√
Facilitator	Planning	√	√
	Stimulation	√	√
Technological environment	Preconditions	√	
Organisational fit	Organisation-specific properties	√	√

The table shows that experiences concerning the individual learning process and fellow learners are mainly positive whereas the technological environment only returns with reference to negative experiences. Experiences relating to the facilitator and to organisational fit are either negative or positive.

Based on the insight that positive experiences revolve around other aspects of the learning process than negative ones, nine hypotheses were developed that explain how the variables and dimensions of the theory hold together. The hypotheses are based on the assumption that presence of positive experiences is supposed to promote the individual learning process and valuable output, whereas the absence of negative experiences will prevent damage to the learning process. The hypotheses are formulated as follows:
Optimal use of fellow learners, facilitators, the technological environment and the organisational context leads to a learning process that is delineated by direct gain, challenge, clarity and personal preference.
The presence of individual positive experiences related to the individual learning process supports the process of collaborative learning at distance.
The evasion of individual negative experiences related to the individual learning process prevents damage to the process of collaborative learning at distance.
The presence of attractive and visible fellow learners stimulates the learning process.
The presence of a facilitator that plans and encourages, supports the learning process.
The evasion of erroneous behaviour of the facilitator regarding planning and encouragement prevents damage to the learning process.
The utilisation of chances that stem from the organisational context, in the learning environment that is a part of the context, supports the learning process.
The elimination of threats that stem from the organisational context, in the learning environment that is a part of the context, prevents damage to the learning process.
The elimination of imperfections in the technological environment prevents damage to the learning process.

Conclusion
Based on the model and hypotheses a set of ten design guidelines has been developed that each relate to one of the dimensions. All guidelines are formulated following the format as described in the theoretical part of this paper and thus provide information about context, limits, and interventions. The argumentation for the existence of a guideline derives from the research and is thus not explicitly elaborated.
All guidelines are pointed at a corporate context in which a group of learners work towards individual and organisational output by going through a collaborative learning process in which learners are, most of the time, not in physical proximity of each other. In formulating the guidelines, we assume that meeting each other physically is not always possible.

Furthermore it is assumed that in the learning environment both synchronous (e.g. teleconferences, net meeting, video conferencing) and asynchronous (e.g. the electronic environment) communication is used. The limits of the guideline are described with help of the insights that have been gathered during the research. The limits of the guidelines are described as 'consideration'. Within this consideration possible pitfalls or seemingly contradicting aspects are explained. Interventions that could be done to promote the particular guideline are described elaborately. Descriptions of possible interventions are primarily inspired on the interventions taken within the cases that were studied.

Generally, all guidelines consist of a core guideline, which describes in short the aspect that should be taken into account in the design process. Then, the consideration is presented. At last a variety of examples of interventions are given. An example of a complete guideline can be found in the appendix. Figure 4 shows the core of all ten guidelines. The complete set of design guidelines can be asked for by the author, or found in Verdonschot, 2003).
In the design guidelines not all aspects within the learning environment are equally stressed. Since positive and negative experiences are pointed at different aspects of the learning environment, the designer is encouraged to create as much positive experiences as possible and to avoid the creation of negative experiences. Moreover, although the guidelines are based on the fact that some dimensions are connected with negative learner experiences and some dimensions with positive ones, the guidelines have all been formulated in a positive way. So, the core guidelines are closely related to the ten dimensions and prescribe in global terms what the designer could do in order to promote the learning process.

Added value of the design guidelines
Returning to the main research question we conclude that the research at hand has succeeded in answering it. A set of ten design guidelines has been developed and two experts, who have formatively evaluated them, have qualified the set of design guidelines as both useful and value adding to existing design guidelines.

1. Interventions within the learning environment should be pointed at direct gain for every individual.
2. Learners within the environment are challenged by activities that make an appeal to their capacities.
3. Provide clarity within the learning environment.
4. Make sure learners can find their way in the learning environment by catering for their personal preferences.
5. Arrange a group of learners that is attractive for each other.*
6. Arrange that individual learners are visible for each other.
7. Arrange a facilitator who is responsible for planning the activities within the learning environment.
8. Arrange a facilitator who stimulates the learners in the environment to undertake learning activities.
9. Take care of good facilities in the technological learning environment, and also take care of support for learners with respect to technology.
10. Make use of organisation-specific properties of the environment in which the learning environment is located.

* The complete design guideline belonging to this core guideline is shown in the appendix

Figure 4. Complete set of core design guidelines

Existing (sets of) design guidelines for the design of collaborative distance learning environments vary in their focus and level of abstraction. And also, none of the existing design guidelines are directly based on learner experiences. The design guidelines this research resulted in, are formulated on the same level of abstraction and the set as a whole is coherent due to the developed theory on the basis of which the design guidelines have been developed. Furthermore they are directly based on learner experiences. The set of design guidelines is expected to support educational designers or HRD-professionals in designing collaborative distance learning environments. The design guidelines serve as a stimulus for action and discussion at the beginning, during or at the end of the design process.

References

ATLAS.ti. (1997). *The knowledge workbench: Visual qualitative data analysis, management and theory building*. Version WIN 4.2 (Built 058). Berlin: Scientific Software Development.

CILT (2003). *Center for innovative learning technologies*. Retrieved May 22, 2003 from: www.cilt.org.

Drucker, P. F. (1993). *Post-capitalist society*. Oxford: Butterworth Heinemann.

Flick, U. (1999). *Introduction to qualitative research*. London/ Thousand Oaks / New Delhi: Sage.

Fraser, B. J. (1998). Science Learning Environments: Assessment, Effects and Determinants. In B.J. Fraser & K.G. Tobin (Eds.), *International handbook of science education, part one*. Dordrecht/Boston/London: Kluwer Academic Publishers.

Glaser, B.G. & Strauss, A.L. (1967). *The discovery of grounded theory; strategies for qualitative research*. Chicago: Aldine.

Harrison, R. & Kessels, J.W.M. (2004). *Human Resource Development in a knowledge economy, an organisational view*. London: Palgrave Macmillan.

Johnson, S.D. & Aragon, S.R. (2002). An instructional strategy framework for online learning environments. In T.M. Egan & S.A. Lynham (Eds.), *Proceedings of the Academy of Human Resource Development*. Bowling Green: AHRD.

Kessels. J.W.M. & Keursten, P. (2001). Opleiden en leren in een kenniseconomie: Vormgeven van een corporate curriculum. In J.W.M. Kessels & R.F. Poell (Red.) *Human resource development, organiseren van het leren* [Human Resource Development: Organising learning]. Groningen: Samsom.

Kirschner, P.A. (2002). *Three worlds of CSCL: Can we support CSCL?*. Inaugural lecture. Heerlen: Open Universiteit Nederland.

Kirschner, P.A., Valcke, M. & Sluijsmans, D. (1999). Design and development of third generation distance learning materials: From an industrial second generation approach towards realizing third generation distance education. In J. van den Akker, R.M. Branch, K. Gustafson, N. Nieveen & Tj. Plomp (Eds.), *Design approaches and tools in education and training*. Dordrecht: Kluwer.

Lowyck, J., Pöysä, J. & Van Merriënboer, J. (2003). Conditions of ICT-based design for learning communities. *Technology Instruction, Cognition and Learning*, 1(2), 153-182.

Merriam, S. B. (1988). *Case study research in education, a qualitative approach*. San Francisco / London: Jossey-Bass.

Patton, M.Q. (1990). *Qualitative evaluation and research methods*. (2nd edition). California: Sage.

Rossi, P.H., Freeman, H.E. & Lipsey, M.W. (1999). *Evaluation, a systematic approach* (6th ed.). California: Sage.

Scardamalia, M. & Bereiter, C. (1992). An architecture for collaborative knowledge building. In E. De Corte (Ed.), *Computer based learning environments and problem solving* (pp. 41-66). Berlin: Springer-Verlag.

Slavin, R.E. (1995). Cooperative learning, theory research and practice (2nd ed.). Boston: Ally and Bacon.

Tsui, A.B.M. & Ng, M. (2000). Do Secondary L2 Writers Benefit from Peer Comments? *Journal of second language writing,* 9(2), 147-170.

Van den Akker, J. (1999). Principles and methods of development research. In J. Van den Akker, R.M. Branch, K. Gustafson, N. Nieveen & Tj. Plomp (Eds.) *Design approaches and tools in education and training*. Dordrecht: Kluwer academic publishers.

Veldhuis-Diermanse, A.E. (2002). *CSCL Learning? Participation, learning-activities and knowledge construction in computer-supported collaborative learning in higher education.* Doctoral dissertation Wageningen University.

Verdonschot, S.G.M. (2003). *Borderless learning experiences. The development of design guidelines for collaborative distance learning environments*. Master's thesis University of Twente.

Appendix: Example of a design guideline

Design guideline concerning fellow learners

Arrange a group of learners that is attractive for each other. It is not realistic to bring a group of learners -chosen at random- together and to expect a fruitful learning process to take place. Generally said, attractive learners are learners who stimulate each other's learning process.

Consideration

From the case study research, it appeared that during the learning process learners are not always aware of what they prepare to invest and how that relates to what they receive back from their fellow learners. Sometimes they are only able to identify attractive learners after the process has finished.

Therefore, do not expect the attractiveness to be a phenomenon that expresses itself obviously within an environment. Learners often need help to discover the attractiveness of fellow learners. This is elaborated upon in the design guidelines on visibility.

Not all fellow learners need to be attractive to each other. It is hard to say how many attractive fellow learners an individual needs. The attractiveness becomes clear when learners are willing to invest in activities because they get something out of it thanks to others. Learners are not likely to invest in a learning process when they do not expect to get something in return. The number of fellow learners an individual needs, depends thus on the 'return of investment'.

Possible interventions:

Expectations from the individual learner about his fellow learners need to be realistic in order to prevent the learner from getting disappointed. Realistic expectations can be created within the environment by making expectations explicit.

- At the beginning of the learning-process learners can be asked to make their expectations with respect to the learning process, the results, the fellow learners and the facilitator explicit. The expectations can be compared and a strategy can be developed to meet these expectations. Make sure that these expectations are watched closely both during and at the end of the learning process.

Whether learners are attractive to each other, depends on what they have to offer each other. This can change during time. A learner experiences attractiveness when he seems to be prepared to invest in an activity because he expects to get something out of it. Attractiveness can exist in the following situations:

- A learner has knowledge in a domain another learner wants to learn more about.
- The knowledge of one learner stimulates the other and the other way round.
- Learners share a knowledge domain, which makes it attractive to deepen knowledge about this domain.

A group of learners that consists of learners that are attractive to each other, needs to be composed carefully. Some tactics that can be used:

- Using the facilitator's network and invite people from whom it is expected that they have to offer each other something.
- Let learning groups compose themselves.
- Compose heterogeneous groups in which learners are likely to have to offer something to others and to get something out of it themselves. Nevertheless, make sure it is not so heterogeneous that learners are not able anymore to relate to one another's issues.
- Within the (bigger) learning group, make smaller groups after a while and offer the learners the opportunity to decide with whom they want to collaborate more intensively. A strategy that can be offered to learners in order to let them find out their preferences in the group can be the core quality strategy from Daniel Ofman. Using this strategy learners are stimulated to make their core quality clear, the pitfall that belongs to this quality, their allergy, and their challenge. This can help in the process of forming groups.

Appendix. Example of a design guideline (Cont'd)