8-10-2009

Enhancing the Framework for Virtual Collaborative Learning: Comparison of two Case Studies

Helena Bukvova
Technische UniversitÃ¤t Dresden, helena.bukvova@tu-dresden.de

Steffen Gilge
Technische UniversitÃ¤t Dresden, steffen.gilge@tu-dresden.de

Eric Schoop
Technische UniversitÃ¤t Dresden, Eric.schoop@tu-dresden.de

芽|Sprouts Working Papers on Information Systems ISSN 1535-6078

Enhancing the Framework for Virtual Collaborative Learning: Comparison of two Case Studies

Helena Bukvova
Technische Universität Dresden, Germany

Steffen Gilge
Technische Universität Dresden, Germany

Eric Schoop
Technische Universität Dresden, Germany

Abstract
This paper describes and discusses 'Virtual Collaborative Learning' (VCL), a blended learning arrangement developed and used at the Chair of Information Management since 2001. Based on the experiences of the authors with the VCL setting and concentrating on international learning arrangements in higher education, this paper explores two possible ways of setting up VCL projects. Aiming at the further improvement of the framework model, it will be discusses how the determination of the factors 'roles', 'tasks' and 'communication tools' influence supports VCL aims best.

Keywords: blended learning, e-collaboration, virtual collaborative learning, CSCL, CSCW

Permanent URL: http://sprouts.aisnet.org/6-67

Reference: Bukvova, H., Gilge, S., Schoop, E. (2006). "Enhancing the Framework for Virtual Collaborative Learning: Comparison of two Case Studies," . *Sprouts: Working Papers on Information Systems*, 6(67). http://sprouts.aisnet.org/6-67

Enhancing the Framework for Virtual Collaborative Learning - Comparison of two Case Studies -

Helena Bukvova, Steffen Gilge, Eric Schoop
Technische Universität Dresden
Chair of Business Informatics, especially Information Management
{helena.bukvova|steffen.gilge|eric.schoop@tu-dresden.de}

1. Introduction

The idea of collaborative learning is based on constructivist principles – instead of classic frontal education, which attempts to "transfer" knowledge from teacher to student, learners are expected to create knowledge through interaction in small teams (cf. Alderman 2000). Within these groups, the learners have to collaborate and cooperate in order to solve a common problem (cf. Bair 1989), whereas the tasks assigned to the groups have to be complex, ill-structured and authentic, in order to imitate real world problems that the learners are likely to encounter in later real world situations (cf. Balász 2005, pp.63; cf. Klauser et al. 2004, pp.7). It is essential for collaborative learning to appear, that each team member takes over active responsibility for the group result and the educator intelligently fulfils the passive role of a tutor. Further, when designing a collaborative learning arrangement, it has to be kept in mind, that it can take place either in a real or in a virtual environment. In virtual collaborative learning (VCL) settings, the participants predominantly use modern information and communication technologies (ICT) to support their interactions. The participants may therefore use a range of tools for both synchronous (e.g. chat, telephone conference, video conference) and asynchronous (e.g. threaded forum, document pool, e-mail) communication.

Placing collaborative learning into the virtual environment helps on the one hand to increase the flexibility of participants by allowing them to contribute to the teamwork independently of time and space. Thus members of the group can interact from geographically disjunct locations, making VCL suitable for international learning settings. On the other hand the concrete design of a VCL setting is harder to set up for the educator due to the wider range of factors to be taken into mind (e.g. technological setup, social issues in virtual communities and coordination of multiple [international] partners).

A framework model for planning VCL settings, developed at the authors' chair and introduced in chapter 2, can foster the educator's design process, while leaving enough

space for adaptation of the VCL setup to the surrounding educational environment. The authors see especially the ROLES and TASKS assigned to the individual students and their groups and the COMMUNICATION TOOLS allowed for interpersonal interaction as important adjusting screws in this adaptation process.

Based on the experiences of the authors with the VCL setting and concentrating on international learning arrangements in higher education, this paper explores two possible ways of setting up such a special arrangement. Aiming at the further improvement of the framework model and the enhancement of the above mentioned adjusting screws, it will be determined which of the two sets of adjusting screws supports VCL aims best.

2. Framework for Virtual Collaborative Learning (VCL)

Since 2001, the Chair of Information Management at Technische Universität Dresden has focused on VCL settings in teaching practice (cf. Schoop et al. 2005), striving to achieve following VCL aims (cf. Alderman 2000; cf. Balász 2005, pp.38):

- enhancing knowledge exchange among and explicating latent knowledge of the participants,
- enabling the learners to solve complex problems,
- enabling the learners to improve their skills in project, time and self management,
- deeper understanding of the learners for different perspectives of a common topic,
- higher effectiveness in comparison to learning in autonomous settings,
- improvement of social skills through positive relationship among the participants and
- better assessment of learning progress through direct individual feedback.

Consequently, since 2001 a total of 18 VCL sessions has been performed in different settings (geographically conjunct and geographically disjunct team members; VCL in higher education as well as lifelong learning). In order to support the systematic implementation of these VCL sessions a framework has been developed (see Figure 1), which can be divided into 3 stages that cover the whole process of the organisation of a VCL session:

- pre-processing (*analysis, concept*)
- processing (*preparation*, *implementation*)
- post-processing (*evaluation*)

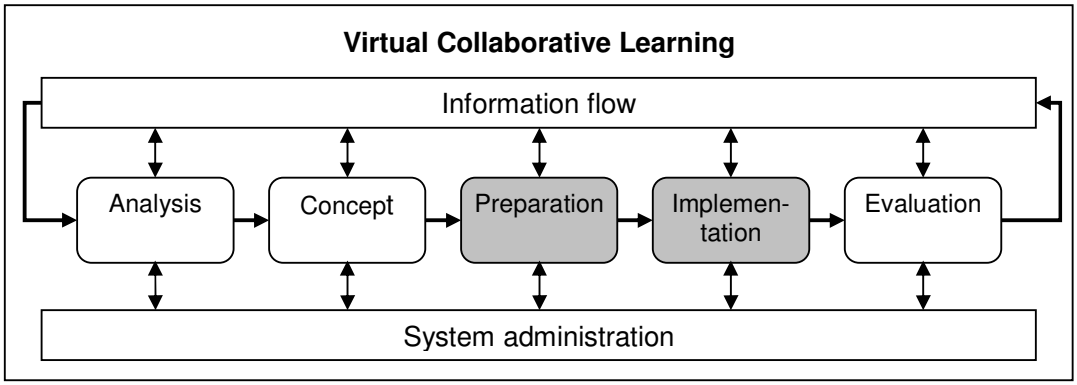

Figure 1: Framework for Virtual Collaborative Learning (cf. Balász 2005, p.75)

With each VCL session this framework is being further tested with the goal of achieving higher fulfilment of the VCL aims named above. Current research has involved the stages of *preparation* and *implementation*, concentrating on the TASKS assigned to the students, the ROLES within the groups and the COMMUNICATION TOOLS allowed. Table 1 compares the two sets analysed for this paper.

Table 1: Comparison of two sets of VCL factors

		Set 1	Set 2
❶	**Tasks**	- tasks given only on the group level - no collaboration among the groups required	- tasks given on the individual level (communication between individuals allowed) - tasks on the group level - tasks on the session level (collaboration amongst the groups necessary)
❷	**Roles**	- mainly activity oriented roles (focus on distribution of tasks)	- mainly expertise oriented roles (focus mainly on interdependence within the group)
❸	**Communi-cation**	- only communication tools on the provided platform allowed (i.e. text-based chat, forum and document pool)	- any ICT tools allowed

❶ Within the set 1, the learners were assigned tasks on the group level only. Each group received a specific problem to solve throughout the VCL session. There was practically no communication amongst the groups. Although within the groups, the interaction was generally very high, there was an isolation of the single teams, hemming the exchange of knowledge among all VCL participants. Set 2 introduces individual tasks, which have to be handled by each participant separately (although coordination/collaboration

between the individuals may be allowed), serving both as a later input into the group task as well as assessment criteria of individual contribution. Further set 2 recognises session tasks, which are problems that can only be solved if the groups work together. Individual tasks and session tasks in particular serve to support interaction amongst all participants of the session. Thus social skills, knowledge exchange and the awareness of different views on one topic should be enhanced.

❷ Both sets support the use of roles. A role describes the responsibilities of an individual within the group as well as within the VCL session. However, set 1 uses mainly roles concerned with a specific set of activities that have to be performed (e.g. researcher, critic). This activity orientation helps the group with the distribution of tasks among the team members. Set 2 turns to describing areas of expertise assigned to each role (e.g. media expert, didactics expert). Choosing the roles so that expertise areas are strongly inter-connected and all of them necessary for the solution of the problem should strengthen the group coherence, leading to increased interaction and better feedback among the participants.

❸ Although the tutors do not actively influence the VCL and its outcomes, they still play an important role as coaches and passive advisers. Hence it is necessary for them to be able to closely monitor the progress of the learners. In order to achieve this, set 1 only allows the use of text-based communication tools (forum, chat, instant messaging and document pool). Set 2 places no such restrictions, however the teams have to protocol all communication outside the platform (e.g. telephone or video conference) and all synchronous communication. This allows the learners to choose the media they consider most suitable, thus improving the efficiency and effectiveness of the communication as well as of the learning itself.

3. Comparing the two Case Studies

The above described sets have been used in two VCL sessions. Set 1 has been employed in a tri-national VCL session in the winter semester 2005 and set 2 was tested in a bi-national VCL session in the spring semester 2006. Both sessions have been embedded in a blended learning arrangement.

In the following, these sessions will be described and evaluated with regard to the level of achievement of certain VCL aims. Following aims were expected to have been influenced by the change in the sets:

- knowledge exchange and explication,
- different perspectives,
- learning effectiveness,
- social skills and positive relationship and

- individual feedback.

After both VCL sessions, the learners have been asked to evaluate the session on the basis of a questionnaire. Table 2 shows an overview of indicators (measured using scales from 1-low level to 10-high level) likely to demonstrate the level of achievement of the aims and its direction of influence.

Table 2: VCL aims and indicators of achievement

Aim	Indicators
1. knowledge exchange	- perceived difficulty of the VCL (+) - perceived competence of peer feedback (+) - acceptable amount of information in the posts (-)
2. different perspectives	- awareness of different perspectives in own communication (-) - awareness of different perspectives in the communication of others (-)
3. learning effectiveness	- perceived level own learning achievements (+) - perceived effectiveness (+)
4. social skills, positive relationship	- perceived level of relationship to other team members (+) - development of positive relationship (+) - suggested size of the group (-)
5. individual feedback	- perceived speed of peer feedback (+) - perceived helpfulness of peer feedback (+)

Case Study 1: VCL eBusiness 2005

The VCL session conducted between November 23rd and December 12th 2005 dealt with the topic of eBusiness. It was a part of the blended learning course "Principles of eBusiness" at Technische Universität Dresden and belonged also to the TEMPUS TACIS project "Integrative Qualification in eGovernment" (project no.: SCM T037A05-2005). A total of 40 students participated in the VCL - 11 from Germany, 17 from Lithuania and 12 from Russia. The language in use was English. Students were organised in seven groups, every group containing approximately equal number of participants from each country. The project was based on set 1.

Each group received a task that had to be solved within three weeks. Although there was a common cover story for all participants, no overall task was assigned on the session level. Nor did the students get any specific individual tasks. The following activity based roles were assigned within every group by the students themselves: leader, critic, researcher and writer (critic and research represented more than once). The learners were required to use the communication tools provided by the platform (text-based

forum, chat conference, instant messaging and document exchange). The response rate to the evaluation questionnaire was 42.5% (17 questionnaires) with similar response rates from each country. Further, the Russian and German students attended an on-site discussion concerned with the VCL project.

The results of the questionnaire on "VCL eBusiness 2005" are shown in Table 3. The indicators show positive influence of the VCL on knowledge exchange. The students considered the VCL comparatively difficult, thus getting opportunity to test their knowledge in a demanding situation. In general, they also considered the posts of other team members rather competent and only 35% complained about lack of information in the posts. The students however encountered problems with the awareness of different perspectives, 59% finding it difficult to present their views and 76% being unable to understand different perspectives of others. There was also a positive evaluation concerning the learning achievements in the VCL and its effectiveness. In the area of social skills the students have been able to create positive relationship to their colleagues; however they did not believe they got to know them well. The students considered groups of 3-4 participants most suitable for the VCL, showing also acceptance for slightly larger groups. The participants considered the feedback they have received quick and helpful. In the discussion the students have complained about restricted use of communication tools, which they considered an obstacle to efficiency and effectiveness of communication within the VCL. They also pointed out that they felt isolated from other groups.

Table 3: Results of the questionnaire on "VCL eBusiness 2005"

Aims	Indicators	
Knowledge exchange	difficulty	6.29 out of 10
	competence	7.64 out of 10
	information	35% of students complained about lack of information in posts
Different perspectives	awareness others	59% of students had problems to present their views
	awareness own	76% of students had problems to understand different views of others
Effectiveness	level of learning	7.30 out of 10
	effectiveness	7.88 out of 10
Social Skills	level of relationship	4.24 out of 10
	positive relationship	6.70 out of 10
	group size	3-4 ideal, 5-10 also acceptable
Individual feedback	speed	7.52 out of 10
	helpfulness	7.30 out of 10

VCL eLearning 2006

The VCL session took place between May 1st and May 22nd 2006. The participants were students of Technische Universität Dresden and University of Szczecin, Poland, attending the blended learning course "Authoring and tutoring processes in eLearning". Of the total of 20 participants, 5 were from Germany and 15 from Poland. The common language in use was German. The students were divided into five groups, each containing three Polish and one German participant. The project used set 2.

Besides tasks for every team (development of online material) there was a common cover story and an overall session level task for all groups. In this tasks, the media experts from each team had to work together to develop a media design for all the groups, didactic experts had to develop a didactic strategy and topic experts had to structure the topic of the whole session. The leaders were given an individual task concerned with project management preparation. Participants of each team had to cover one activity based role - leader/writer - and three expertise based roles: didactic expert, media expert and topic expert. The students were allowed to use any communication technologies in addition to those offered on the platform (forum, chat conference, instant messaging and document exchange). However, they were asked to protocol any communication outside of the platform. After the VCL, all participants received the same evaluation questionnaire like in "VCL eBusiness 2005". The response rate was 100% (20 questionnaires). All students also participated in a discussion about the VCL. There was also a separate debate with the German students.

Table 4 shows the results of the survey on "VCL eLearning 2006". The students seem to consider the difficulty level only slightly higher than in "VCL eBusiness 2005". The perceived competence of peer posts was considerably higher, which can be accounted to the expertise orientated distribution of roles, allowing the participants to profile themselves in a particular area. There seemed also to be fewer problems with lack of information in posts. The level of knowledge exchange in the VCL eLearning appeared higher than in VCL eBusiness. Similarly, the students saw comparably less problems with acknowledging different perspectives. This can be also assigned to the expertise oriented roles, which help to explicate and direct the different points of view. Although there is a rise in perceived effectiveness, the participants of 2006 believed they have learned less than those in 2005. The students of the "VCL eLearning 2006" not only felt comfortable with their colleagues, but they also believed that they got to know them well. However, they have shown preference for smaller groups (3-4). Although these participants have had to solve a session level task, they did so in small groups of experts (4-5). Placing the task on this level thus failed to make the students more comfortable with large groups. There has further been a very positive assessment of the speed and

the helpfulness of peer feedback. The students have made use of communication tools outside of the platform (particularly telephone conference), however they felt uncomfortable about having to protocol such communication. Not all students used the opportunity to collaborate with members of other groups. However, experts who had organised themselves into thematic groups (e.g. the didactics group) tended to first consult problems with their fellow experts before addressing the tutor.

Table 4: Results of the questionnaire on "VCL eLearning 2006"

Aims	Indicators		
Knowledge exchange	difficulty	6.55 out of 10	↗
	competence	8.60 out of 10	↑
	information	15% of students complained about lack of information in posts	↓
Different perspectives	awareness own	20% of students had problems to present their views	↓
	awareness others	35% of students had problems to understand different views of others	↓
Effectiveness	level of learning	6.94 out of 10	↘
	effectiveness	8.10 out of 10	↑
Social Skills	level of relationship	7.26 out of 10	↑
	positive relationship	8.90 out of 10	↑
	group size	3-4 ideal	↘
Individual feedback	speed	8.90 out of 10	↑
	helpfulness	8.70 out of 10	↑

4. Conclusion

The use of VCL at the Chair of Information Management, Technische Universität Dresden has been very successful, particularly in international settings. However, there is still a need for further enhancement of the systematic framework and in particular the adjusting screws TASKS, ROLES and COMMUNICATION TOOLS to further improve the fulfilment of VCL aims. The presented change within the framework from set 1 to set 2 of the adjusting screws appears to have led to a higher knowledge exchange, better acceptance of different perspectives and better peer feedback. The framework is going to be tested in further scenarios to assure its effectiveness.

References

Alderman, B. (2000): Get real! Collaborative Learning in Higher Education. In: TEXT, Vol. 4, No. 1. URL: http://www.gu.edu.au/school/art/text/april00/alderman.htm [2006-06-26].

Bair, J.H. (1989): Supporting Cooperative Work with Computers: Addressing Meeting Mania. In: COMPCON – Computer Society of the IEEE, San Francisco, USA, pp. 208-217.

Balász, I. (2005): Konzeption von Virtual Collaborative Learning Projekten: Ein Vorgehen zur Systematischen Entscheidungsfindung. PHD-Thesis. Dresden.

Klauser, F., Schoop, E., Wirth, K. , Jungmann, B., Gersdorf, R. (2004): The Construction of Complex Internet-Based Learning Environments in the field of Tension of Pedagogical and Technical Rationality. In: Bogaschewsky, R., Hoppe, U., Klauser, F., Schoop, E., Weinhardt, Ch. (Eds.): IMPULS EC Research Report 10, Osnabrück.

Schoop, E., Michel, K.-U., Miluniec, A., Kriksciuniene, D., Brundzaite, R. (2005): Virtual collaborative learning in higher education and it's potentials for lifelong learning - an empirical approach. In: Lifelong E-Learning. Bringing e-learning close to lifelong learning and working life: a new period of uptake. EDEN 2005 Annual Conference, 20-23 June, 2005, Helsinki, Finland. Proceedings p. 112-117.

芽|Sprouts

Working Papers on Information Systems | ISSN 1535-6078

Office:
Sprouts
University of Amsterdam
Roetersstraat 11, Room E 2.74
1018 WB Amsterdam, Netherlands
Email: admin@sprouts.aisnet.org

芽|Sprouts