The role of discussion boards in e-collaborative learning environments (CSCL) – What kind of support can they provide?

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ABSTRACT
The focus of this paper is on the role of discussion board use in e-collaborative learning (CSCL) and the support they may provide for learning. Research has shown that support has to include the social dimension as well. The paper starts with a conceptual discussion and explores qualitative results by a content analysis based on a previously conducted quantitative analysis on CSCL. As a research platform, 4 CSCL courses at the master’s level were conceptualized for applying different e-collaborative learning approaches.

Keywords
E-collaboration, discussion boards, social support

THEORETICAL FRAMEWORK ON E-COLLABORATIVE LEARNING AND DISCUSSION BOARDS- WHAT METHODOLOGICAL, PEDAGOGICAL AND SOCIAL CHALLENGES ARE TO BE ADDRESSED?

The theoretical background for the application of CSCL
The theoretical background for the application of computer supported collaborative learning (CSCL) is well documented and has empirically proven educational validity (Carlén & Jobring, 2005; Kreijns, Kirschner, & Jochems, 2003). CSCL’s educational rationales make use of the idea of Vygotsky’s zone of proximal development (1978) and Piaget’s cognitive development theory (1973, 2003). According to Vygotsky, the level of potential development is determined through problem solving under expert guidance, or in collaboration with more capable peers (Rosenshine & Meister, 1994). Hence, in collaborative online learning the focus is not only on the teacher, but also on the students’ peers and the technology, which supports communication and interaction. From Piaget’s point of view (socio-genesis), individual cognitive development
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is seen as a process of equilibration as a reaction to external disturbance (cognitive conflicts) induced by social interactions, for example interaction with peers. Another perspective added to Vygotsky’s ZOP is the findings of van Lier (1996). His ZOP-learning model for language acquisition shows that even if advanced learners exchanged information or knowledge with less advanced learners, everyone benefited, including the advanced learners. His conclusion is based on the fact that it “…encourages the creation of different kinds of contingencies and discourse management strategies.” (Johnson, 2003, p. 181).

In general, the following aspects are seen as supportive for learning through applying CSCL: Cognitive elaborations (Reigeluth, 1999), the presentation and handling of the task from multiple perspectives (Gerstenmaier & Mandl, 1995; Mandl & Zumbach, 2008, p. V), and, finally, the construction of common knowledge, which leads to shared knowledge (Derry & DuRussel, 1999).

What is the nature and imperative for the use of discussion boards applied in CSCL?

If one looks to the description of synchronous online learning, the following general definition can be applied to learning with discussion boards too. It seems that discussion boards have similar functionalities for collaborative learning, such as synchronous online learning and f2f learning. “Learning takes place largely through interactions among students. Students learn by expressing their questions, pursuing lines of inquiry together, teaching each other and seeing how others are learning” (Stahl, Koschmann, & Suthers, 2006, p. 410). If students participate in a web-based discussion board, they can read and write entries at any given time. The discussion can be accessed from almost anywhere, provided that a computer with an Internet connection is available (Harris & Sandor, 2007, p. 383). Discussion boards in a CSCL-environment therefore seem to be a suitable solution for both the students and teaching institution to allow for maximum learning flexibility, as regards both time and place (Dixon, Kuhlhorst, & Reiff, 2006, p. 16). At first glance, thinking about the functionality of discussion boards in online-learning should either provide an additional communication channel or replace the entire synchronous collaborative or virtual f2f communication and interaction between the teacher and the students themselves. One overall recommendation regarding discussion board use is that, “…an online discussion strategy is imperative for student learning. Many distance learning courses experience high attrition rates resulting from factors such as students feeling isolated, unmotivated, overwhelmed or unchallenged.” (Du, Havard, & Li, 2005, p. 216). It is for this reason that models, methods, and practices for successful CSCL in general – and for applying discussion boards more specifically – are indispensable.
Models, methods, practices, and characteristics for CSCL and the application of discussion boards

Models
Models for online learning have generally been developed to avoid the failure of CSCL courses and specifically to reduce inefficiency, low learning outcomes, and enhance student retention.

CSCL-models are not exclusively based on good pedagogy to support learning processes. A certain number are rather managerial, administrative, or strongly cognition-oriented, while others also address the challenge of virtual socialization. Discussion boards are one element of asynchronous online learning settings. Hence, it may be assumed that the more general models contribute, guide, and suggest strategies for the appropriate use and analysis of discussion boards as well. Five often cited or popular models are presented in chronological order:

France Henri’s analytical model
France Henri’s (1992) analytical model may be described as a comprehensive model based on the findings of cognitive psychology. It aims to dive deeper into the different levels of meaning in messages by emphasizing five dimensions of the learning process: participation (the extent of usage), interaction (how particular events lead to particular responses), social (not expressly for discussion purposes but can motivate students’ participation), cognitive, and metacognitive dimensions (skills for reasoning and self-awareness). Henri’s model provides information about the participants as learners and on how they handle given topics and content. She states the following about the social dimension of CMC “… the social dimension gives rise to elements of meaning …” (1992, p. 118).

Oliver and McLoughlin’s model
Compared to Henri’s model, Oliver and McLoughlin (1996a) suggest some changes in order to be able to explore more deeply aspects of interaction on live interactive television (LIT), which is close to synchronous CSCL environments. The model recognizes five kinds of interactions: social, procedural, expository, explanatory, and cognitive. Oliver and McLoughlin’s model has been used to analyze different kinds of communication and interaction in distance learning as well as in traditional teaching. If one looks more closely at these dimensions, one has to admit that all dimensions are strongly designed for instructional purposes and from a teacher’s perspective. Even if the social dimension is mentioned, it focuses on student (S) –teacher (T) communication, concerning the students’ fulfillment of tasks or assignments. Consider the following example (Oliver & McLoughlin, 1996b, p.116):
T: Hello Mandy, how are you?
S: Very well thank you.
T: Great to hear from you, what are you going to do for us?

**Gilly Salmon’s model**

While the model designed by Gilly Salmon (2004) is also comprehensive, it focuses strongly on virtual socialization and self-regulation processes in CSCL settings. Salmon’s model is divided into hierarchical steps. Generally, Salmon calls the instructional online activities “e-tivities”. Access and Motivation – as the first step – helps new students to become familiar with the online setting by learning how to use the course software. Online Socialization is the second step and involves building a foundation for a vibrant online community by using short e-tivities that cultivate trust between students. The third step, Information Exchange, is mainly characterized by students’ own exchange of information. During this step, instructors should utilize online e-tivities that promote discovery learning. In step 4 Knowledge Construction is the targeted activity and, finally, step 5 involves the Development of new Cognitive Skills that enable students to learn to monitor and evaluate their thinking.

**Haythornthwaite and Andrews’ approach**

Haythornthwaite’s approach (2000, 2002, 2003) is located in social network theory. In a recent book edited with Andrews (2011), they propose that “… building e-learning platforms should be an ‘active process of continuously balancing the social and the technical in the service of learning’” (p. 142). They argue further that a new framework is needed for CSCL (online learning), which they describe as a new culture for learning; that is, they do not propose a single or several models for CSCL. Therefore this paper uses theories derived from the magnitude of her empirical, research-based results on social network theory, which generates the guidelines for a working online community, in this case a well-functioning, virtual learning group needing social support, task support, and support through mutual information exchange.

**Harasim’s (2012) “Interaction Learning Model”**

The core of Harasim’s (2012) “Interaction Learning Model” is the cognitive processes, which supports CSCL. It describes the steps from idea generating through democratic participation, to idea organizing, and finally to the intellectual convergence, which is indicated by the learners’ shared conclusions. One can say that the model describes the ideal type of cognitive processes in CSCL.

It may be observed that not all of these models specifically stress or analyze the use of discussion boards, but rather provide general guidance (macr-

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1. The whole approach cannot be presented here because of text limitations.
level) for the conduction of online courses that are in one way general roadmaps for collaborative online teaching. Nevertheless, one can derive the didactical structure for a discussion board, the syllabus, and its related questions oriented on the stages of Salmon’s or Harasim’s models. Preferably, the other two models are designed for the analysis of discussion boards, whereas one has to admit that the collaborative dimension for peers is missing in Oliver’s and McLoughlin and Henri’s model.

Practices, strategies, and methods for discussion boards use in different subjects and context

Regarding discussion board use, the paper will examine common practices and regard discussion board use on a micro-level and strategies on a meso-level. One of the most successful and most frequently employed practices of discussion board use is a weekly “read and discuss”-formula (Palloff & Pratt, 2007, p. 133). Every week, students are given a discussion topic with several readings and sources for students to work through in order to facilitate discussion on the topic. Another quite similar possibility would be to “structure the course around the readings,” allowing the content “in the readings to create the discussion” (Palloff & Pratt, 2007, p. 133). Although this formula has proven useful in practice, it cannot be employed on all subjects, especially in “science, math, art or music, which do not lend themselves to the reading and discussion format, may look very different” (Palloff & Pratt, 2007, p. 133). Palloff and Pratt mention the possibility of a “mini-lecture” conducted by the instructor here “to explain a procedure or theory” (2007, p. 133). In many science classes, students may be required to conduct experiments at home due to the lack of a class laboratory. To circumvent these difficulties, instructors can implement a “virtual lab” in which students can conduct the experiments online in a simulated environment or provide lab kits for students to use at home; students can record the results and discuss them with their fellow students (or the instructors) afterwards. One assumption is that all methods known from f2f learning situations can be implemented as discussion-boards based on a slightly modified form. For example, Palloff and Pratt report a successful implementation of a fishbowl discussion (2007, p. 138–139). Another proposal is a multistage discussion approach by Northover (2002) based on the idea of Kolb’s reflective cycle, where students’ discursive and reflective activities are given attention. The authors Akin and Neal (2007) present in their paper steps for asking and writing sound questions as well as explaining ways to structure these questions for useful discussion board application. Their model, called CREST, covers the cognitive nature of the question (C), the reading basis (R), the experiential possibility (E), and the style and type of question (ST). Their model is aimed at creating effective and reflective discussions. The paper of Lowes, Lin, and Wang (2007) examine strategies that enhance online discussion board conversations – teacher student related and student – student collaboration as well. They look at the nature of online interactions, stressing the role of the facilitator in online discussions and characterizing roles as cheerleading/affirming (offering praise and encouragement),
new information (introduce new ideas or information), and questioning/challenging (raise questions that expand on previous posts).

To sum it up, the practices, strategies and methods used focus on a) different roles of teachers and students b) the didactical structure of the discussion board with respect to the subject matter and context and c) the cognitive and collaborative activities enabled and supported by the given structure. Empirical research shows that discussion boards are not stand alone tools; they do not work without teachers or facilitators, neither do they work in a purely self-directed manner through collaborating students (Kienle & Ritterskamp, 2007). Kreijns et al. (2003, p. 346) calls it a pitfall for social interaction in CSCL use.

Characteristics' of e-discussions in collaborative learning – and its assumed added value

One central question, which still persists, is the difference of f2f and virtual discussions: what is the core challenge of these kinds of discussions, and is there an ‘added value’ of discussion board use? Instead of looking for the pros and cons, the paragraph tries to highlight the specifics of different kinds of discussions. Even if the information presented above outlines several affinities between learning f2f and discussion board functions, one has to deal cautiously with the empirically proven differences which can lead to challenges or in contrast as a supplier of asynchronous CSCL with respect to pedagogy and learning efficiency. Based on various discussions about the added value of CSCL (see e.g. Northover, 2002; Harasim, 2012; Hillen, 2012), it can be concluded that:

- a discussion board can provide a medium for the sharing and development of ideas
- students can experience learning as a collaborative activity

More specifically, there are activities, which are not possible in traditional real time, f2f classroom, and virtual f2f (collaboration) settings:

- discussion boards are accessible at any time, so reflections on the other’s contribution can be made even if synchronously posted
- contributions can be composed and well-considered before posting

As mentioned above, CSCL is facing challenges. More specifically, the discussion itself can be conducted and evaluated differently by students. This discrepancy leads to various consequences, which empirical research has shown (Ellis, Goodyear, O’Hara, & Prosser, 2007, pp. 85–97). Discussion board use can lead to either:

- a rather superficial use – just to fulfill the task (Ellis et al., 2007, p. 86) or
- a deeper understanding and knowledge construction
If online discussions are not able to support reflective learning, then their efficiency will be low, because reflection is necessary for learning processes. Hence, specific skills should be established, and applied for discussion board use. To support or develop these:

- a dialogical structure should be proposed
- different roles should take over during the discussion (moderator, reflector, scribe …)
- scaffolding – fading should be applied by the facilitators

In the described case study, role taking was used as well as the scaffolding – fading approach. Through role taking, the students had to take over more responsibility for the discussion themselves: starting as a discussant in order to find challenging questions for a good discussion and the like. This kind of involvement can contribute to reduce the unreflective use of discussion boards. Even if the management of the discussion board is taken seriously and is considerably applied, there are still aspects missing compared to discussions, which take place f2f.

FORMS OF SUPPORT NECESSARY FOR CSCL,
WHAT IS SOCIAL SUPPORT ABOUT IN CSCL?

The social dimension as a challenge
 – and what indicates social support in CSCL?

“Online communities face several challenges among which some are technological and some social.” (Charalambos et al., 2004, p. 136). Some of them are quite technical, for instance needing to manage a large number of student interactions e.g. “… database elements available in WebCT enable the instructor to record, manage and support the activities and interactions of a large number of students.” (Du et al., 2005, p. 212). One assumption is that social relations are difficult to establish because of distance and time. “Social relations within a class, and the willingness of learners to collaborate with each other, have an important role to play, but the constraints of time and distance are obstacles to fostering such social relations among students enrolled in on-line courses.” (Chang, 2012, p. ii). However, social interaction is a basic requirement of CSCL.

The study of van Leeuwen et al. (2013, p. 1380) made the distinction between “… cognitive and social activities, which are the two categories generally considered important for teachers to support students’ learning process.” The model designed by Kreijns et al. supports the idea (2003, p. 342) of two social interaction functions. Social interaction supports cognitive processes in a group, which leads to learning performance (educational dimension) as well as social interaction supporting socio-emotional and social processes, which leads to the group’s social performance (social-psychological dimension). Because of the importance of social interaction, support has to be given for
communication between the students themselves e.g. if they take over different roles (role taking as method) for solving tasks by using the discussion board; therefore, not only teacher-student communication is to be considered. Social support in CSCL covers efforts to create an environment that enables students to communicate with other learners and instructors on mostly non-academic issues, including messages that aim towards better social interaction. Examples of social support include, but are not limited to, messages for thanking others for their help, offering help, offering easy contact if further information is needed, wishing someone good luck on their examinations, and celebrating special days like Teachers’ Day (Küçük, Genç-Kumtepe, & Taşcı, 2010, p. 50). In the presented study, such artefacts were found, which in addition expressed empathy (emotional support) for the peers to solve the task collaboratively.

The factor that indicates social support is described by Rourke, Anderson, Garrison, and Archer (2001), who call it ‘dependence creating’, one of the three types of responses that create social presence in computer-mediated communication environments.

Unfortunately, there is a tragedy with social support: sometimes students themselves ‘restrict’ these kinds of conversations after receiving “… a reminder by other students to keep personal issues out of the forum environment.” (Küçük, Genç-Kumtepe, & Taşcı, 2010, p. 51). As a possible solution to this problem, it has been suggested that cafés, lobbies, or social arenas (Palloff & Pratt, 2007, p. 146) are installed as add-on forums in CSCL. A similar approach is suggested by Rovai (2007). He creates separate discussion board forums for socio-emotional activities. Kreijns et al. (2003) evaluate this separation as not useful. An important challenge in computer-mediated environments is to maintain both social organization and community spirit at satisfying levels (Charalambos et al., 2004, p. 136). Strong feelings of community increase the flow of information, the building of support, commitment to group goals, cooperation among members, and satisfaction with group efforts (Dede, 1996).

“Learners feel supported by each other, which in turn produces the conditions for taking risks in the learning process. If learners have the opportunity to develop trust in each other, then challenges will become part of the culture of the group. They can share ideas and comment on peers work in an environment of trust, empathy, collaboration and enjoyment. Learning is more meaningful when it is fun.” (Mesh, 2010, p. 167). Finally, the fact that there is a social dimension to information itself, as Brown and Duguid call it (2000), should not be neglected. “Communities bound together by texts and a shared disposition towards those texts, as ancient philosophical and religious communities remind us, predate not only the net and the telephone, but even the printing press.” (Brown & Duguid, 2000, p. 190). Factors that bind communities in computer-mediated environments are collective goods, such as an instant network of contacts with useful skills (social network capital), per-
sonal and distributed intelligence, mutual trust, just-in-time answers to questions (knowledge capital), and psychological support from others who might share common experiences (communion) (Smith, 1992 cited in Charalambos et al., 2004). However, research on group learning shows that asynchronously distributed learning groups (DLGs) utilizing computer supported collaborative learning (CSCL) environments often lack the social interaction needed for these dialogues (Kreijns et al., 2003).

**Preliminary research objective**

"By enabling social interaction via an electronic medium unrestrained by space, time and place, web technologies actually expand and transform the social interaction space of collaborative learning. Students can work together, achieve shared understanding, and cooperatively solve problems in the new web-mediated environment." (Cecez-Kecmanovic & Webb, 2000). Empirical research has shown that computer-based communication can enhance the interaction between learners and increases critical thinking in online discussions. Online discussions are used as a means to support collaborative learning (Derry et al., 2000). There is evidence that social support takes place in virtual networks where communication takes place by CMC (Bambina, 2007, p. 19ff.). But these kinds of virtual networks have been established with the objective to provide social and emotional support because of e.g. eating disorders, alcohol abuse, and the like. The question emerges if social support takes place even if the primary goal is given by a formal learning community? As mentioned before, a learning community needs task orientation and information exchange as well social support in order to be functional.

The research question can therefore be formulated as follows: What is the role of discussion boards used in different e-collaborative learning courses and what makes them a place for social support beside information exchange and task support?

**Operationalization and categorization of ‘support’ for the study**

The following defined forms of support are derived from the above discussion. As reference models have been selected: Henri’s model (1992) and Oliver & McLoughlin’s model (1996), which is a further development of Henri’s model. Oliver & McLoughlin’s model recognizes five kinds of interaction: social, procedural, expository, explanatory, and cognitive (these are task and information oriented). The work of Salmon (2004) and Haythornthwaite (2000, 2002, ,et al., 2004) has also been taken into account. This has been done for the reason that both CSCL approaches stress interaction and communication in CSCL. The models of Henri (1992) and Oliver & McLoughlin (1996) are located in the research field of online interaction (from cognitive psychology) between teacher and students, whereas Haythornthwaite’s approach has been extracted from a social network theory perspective, which takes the relationship and ties between the students themselves into account. Salmon’s
model stresses i.e. the social dimension. Several models in general do differentiate between two main categories of messages; for example, the coding scheme developed by Veerman and Veldhuis-Diermanse (2001) identifies the following: task-related and non-task-related messages in discussion boards. Haythornthwaite’s work is based on the idea of analysing and creating social networks to establish and develop online learning communities (2002, p. 164). The construction of a community leads to the establishment of ties and relationships which depend on trust. As previously discussed, when students trust one another, this helps them to invest more time and establish closer ties to other students (Haythornthwaite, 2000). These relationship-based networks entail the exchange of tangibles (such as goods and financial aid) or intangibles (like services, information, and social or emotional support). Weaker ties based on instrumental exchanges occur frequently and are not necessarily reciprocal, whereas stronger ties include reciprocal relations as well as intimacy and self-disclosure, as Granovetter calls it (1973). When examining a learning community, there is a need to analyse the social and emotional support given between the participants (Haythornthwaite, 2002). This is because “… information exchange, social support and task support relations are the three major categories of interaction, that are important for building and sustaining learning communities.” (Haythornthwaite, 2002, p.175).

Collaborative work with information exchange: To guarantee learning, information has to be shared and circulated to increase the ability of (re-) constructing knowledge by the members of the learning community. One prerequisite for learning is the members’ perceived ‘safe’ community, as this ‘enables’ the participant to ask ‘dumb’ questions (Bruffee, 1995).

Task support: Task support is any activity undertaken in order to accomplish the objectives given by the online community and the teacher and/or the teaching objectives. Online distributed learners need means to accomplish these exchanges as well as means to deliver the end products (papers, presentations) (Haythornthwaite, 2002). But task support is more than just the technical infrastructure; it is the use of the competence of the people involved considering the idea of the proximal zone of development (Vygotsky, 1987).

Social and emotional support: ‘Although information exchange is the key to learning environments, communities are not built on instrumental exchanges only.” (Haythornthwaite, 2002, p. 172). Social and emotional support embraces all those activities and processes between the members of a network, which are not directly task and information oriented. Salmon (2004) highlights that e-collaboration is based on trust fostered and supported by e-tivities.

These dimensions were chosen as dependent variables for the former quantitative study (Hillen & Päivärinta, 2012; Lecher 2012), because they are seen as a prerequisite for e-collaborative learning (Haythornthwaite, 2000; 2002; 2003; Kreijns et al., 2003). A non-parametric test was used to test the hypoth-
thesis that the perceived dimensions differ related to the 4 different e-collaborative approaches used in the courses.

DATABASE, RESEARCH TOOLS, VARIABLES, METHODS APPLIED AND FINDINGS

Database, research tools, variables, and methods

The qualitative study used data over an entire semester from platform A (VET1) and B (VET2), which applied discussion boards (R) as teaching and learning tools (see Table 1). The verbal artefacts of VET1 and VET2 have been generated through online discussions by the students themselves.

The original database consisted of 4 online classes (see Table 1) and is based on n=53 students. The involved master-level students are from 2 different universities in Europe and are enrolled in 4 different Master program courses belonging to 3 different departments (Education-EDU, Vocational Education Training-VET, Information Systems-IS). The analysis included 1 questionnaire about the 3 dimensions of support and 1 questionnaire about the students’ attitude and general satisfaction (pre- and post-test).

The complementary approach to the previous quantitative approach, the qualitative case study, is based on the students’ expressed verbal artefacts using the discussion boards. For the analysis of the students’ written discussions NVivo is applied for elaborating on the phenomena of support e.g. of social support (see Figure 1). The analysis of verbal data of the IS course which included learning journals (J) as well as written examination results (G) is not discussed here (Hillen, 2013).

Table 1. Database (Hillen & Päivärinta, 2012)

The quantitative research tools used in the all master courses where questionnaires about the students’ perception of support: The theoretical constructs social-, information, and task support, represented the dependent variables in the quantitative study. These questionnaires where applied voluntarily after each lecture over a time period of one semester.
To explore deeper on the quantitative significant results of social support in CSCL (see Table 2) a qualitative study is added. Regarding method, a directed content analysis has been applied for the qualitative case study. This type of content analysis is guided by a more structured process than in a conventional approach (Hickey & Kipping, 1996); that is, it starts with a theory (Haythornthwaite, 2000, 2002, 2003; Kreijns et al., 2003) combined with previous quantitative research findings (Lecher, 2012) as guidance for initial operationalization and categorisation. Mayring (2000) calls it ‘a deductive approach’.

**Results of the previous quantitative study**

The first quantitative analysis was conducted by a Kruskal-Wallis test over all platforms, but not individually between these groups regarding the dependent variable: ‘social support’. Therefore, an additional analysis by single non-parametric tests was carried out – each with two platforms using an apriori-hypothesis. This test confirmed a statistically significant (p=0.018) difference between Platform A (discussion board use and on campus sessions) and C (virtual f2f communication and on campus session) regarding the dependent variable ‘social support’ (see Table 2).

<table>
<thead>
<tr>
<th>Experiment</th>
<th>N (delivered questionnaires)</th>
<th>Average rank</th>
<th>Social support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform A (VET1)</td>
<td>29</td>
<td>21,43</td>
<td></td>
</tr>
<tr>
<td>Platform C (EDU)</td>
<td>21</td>
<td>31,12</td>
<td></td>
</tr>
<tr>
<td>Total of N</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi- Square</td>
<td></td>
<td>5.643</td>
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<td>df</td>
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<td>1</td>
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</tr>
<tr>
<td>Asympt. significance</td>
<td></td>
<td>0.018</td>
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</tbody>
</table>

Table 2. Individual Kruskal-Wallis test to the dimension of social support

The average rank of the social support (21,43) perceived by the students using discussion boards (VET 1) was lower than from the EDU students (31,12) using virtual f2f communication in addition to on campus sessions. Whereas the quantitatively analysed questionnaires mirrored the students’ self-estimation of support, the case study used a qualitative analysis to look at the actual statements for the indication of support expressed by the students themselves in the discussion boards (data originality).

**Content analysis and qualitative results**

The content analysis is conducted deductively by the theories discussed above e.g. of social relations and ties for learning (Haythornthwaite, 2002; Kreijns et al., 2003; Granovetter, 1973), and that learning needs information and task support as well as a social dimension. Subsequently, the categories were expanded inductively. This was mainly based on the phenomenon of the ‘direction’ of support, which became evident in the analysis of the discussion boards: the fact that support can be offered is quite obvious, but the analysis showed that one can also ask for different kinds of support. So the categories
doubled by the direction of support: differentiated if peers (S-S) or if the teacher (S-T) or both (S-S-T) were involved (see Figure 1). The coding units were oriented in accordance with the meaning regarding the categories; for example, one sentence could involve two different coding categories. In the example shown below (Figure 1), task support (yellow) as well as emotional and social support (green) was coded. Giving social and emotional support might be a hint that there is trust in a group.

Figure 1. Content analysis of the discussion boards by a computer based tool – a cut out

Both platforms showed that all three forms of support were given and provided. The following categories found:

- Ask for Information (S-S-T)
- Ask for Task support (S-S-T)
- Provide Emotional and Social Support (S-S)
- Provide Information (S-S-T)
- Provide Task support (S-S-T)
- My experience (S-S)
- My opinion (S-S)

At first glance even if this is a qualitative study – the frequency of asking for support in VET2 (discussion boards use, 3 on-campus lectures and Skype meetings) is relatively less often coded; see Figure 2) – than in the other Platform VET1 (discussion board use and 3 on-campus lectures). One easy but little scientific enlightening explanation is that there is simply no other channel for communication than discussion boards between the 3 on-campus sessions for VET1 students. So, if questions had to be asked or support was needed, then the only opportunity for students was to use discussion boards. Hence, such a quantitative comparison is misleading and has therefore not been continued. Nevertheless, students could have decided not to ask for emotional or social support.
During the content analysis two other categories were added: my experience and my opinion. One explanation for both statements using these concepts is the students’ intention to contextualize the problems and tasks discussed, as well as create meaning out of them for the individual student himself/herself and for peers, respectively. This can be seen because those statements were exchanged only between the students (S-S) themselves as well their need for and provision of social and emotional support. It can be concluded that both asynchronous 2 CSCL discussion board-based courses (VET1; VET2) showed criteria of a functional virtual learning community where social support, information exchange, and task support could be indicated by the artifacts as well as students’ statements themselves. 3 languages were used by the students, that is, an inter-rater reliability coefficient could not be determined, because only one coder were able to conducted the content analysis of the verbal data.

Observations made on the role of discussion boards in two asynchronous online courses

When examining these results, one question re-emerged: If f2f communication is ‘channelled’ through discussion boards, what are the effects? The quantitative tracking of the discussion board use made beside the qualitative analysis will be presented to discuss the meaning of discussion board communication in two different settings. Both courses (VET 1 / VET2) used the same course structure and methodology (weekly assignments with increasing responsibility by role-taking and fading). Because of the case study’s qualitative approach, these results cannot be generalized but are descriptive findings.
Figure 3 shows the use of the discussion board (traffic) over the entire semester and reveals that the frequency and number of online discussions declined after each on-campus session (f2f), even if there were assignments to conduct and deliver online the same week. The other course (VET2) included two pre-announced (2) voiceover IP sessions (Skype). Over the course of the entire semester, students have had the same opportunity to use Skype with the same blended learning structure as VET1-students. Apparently, the frequency of students’ use of the discussion board (traffic) is different: Either the on-campus sessions did not influence the visible online discussions to the same degree, or the permanent opportunity to use Skype has lessened the need to use discussion boards during and after on-campus sessions. Because of privacy reasons no accumulated data on the extent of use concerning pre-scheduled VIP discussions is available.

Discussion, summarized findings and further considerations

The two questions which have driven this discussion and the case study, 1) What is the role of discussion boards? and 2) What kind of support can discussion boards provide? are interlinked. If we return to the question, which introduces the paper: What is the role of discussion board use in CSCL? – one has to
admit this question is not precisely enough formulated to be answered. The analyses of the models, methods, and practises have shown that the usage of discussion boards – beside the subject – is driven by the entire setting and the purpose of the course in classic classroom teaching. One proposal is that all methods related to f2f learning situations can be implemented as discussion board-based ones in a slightly modified form (Palloff & Pratt, 2007). In regard to the study one has to contextualize the use of discussion boards. One primary conclusion is that the role of discussion boards varies in accordance with the entire setting of the course (see Figure 3; 4). An integrative view is necessary to define and analyse the role. The interdependencies caused by the setting of the online course are to be taken into account when designing a CSCL course. If there is no other communication channel similar to discussion boards, their importance will increase for students in conjunction with an increase in the facilitator’s responsibility. Even if the single use of discussion boards in CSCL is a constraint for discussions, it does not guarantee its appropriate and effective use. As we have seen in the section above, social interaction is not given by a tool, which provides opportunities for virtual communication and interaction – it will not happen because it is given as Kreijns et al. discusses it (2003). This case study indicates that the more channels are used, the more discussion boards’ importance decreases (and this might influence support). The quantitative results confirmed that there is a bias to f2f communication for social support: The average rank of the social support (21,43) perceived by the students using discussion boards (VET1) was significantly lower than from the students (31,12) using virtual f2f and f2f communication (see table 2). Addressing the second question again, there is evidence from the quantitative and qualitative analyses that different kinds of support can be found in asynchronous discussion board use, that there is room and need for social and emotional support in the extent the social space’s quality, which is enabled and developed by the learning group and the facilitator. The additional coded categories (my opinion, my experience) provide a hint as to the individual meaningfulness and contextualisation of the discussions conducted by students, which are a prerequisite for reflection and, ultimately, learning. One needs to consider that the use of discussion boards needs skills: Studies (e.g. Kaye, 1992; Goodyear, 1996) showed that students do not know how to discuss online. In addition, these studies revealed that students did not even know how to discuss effectively f2f. These basic skills are necessary to acquire beforehand (or must be developed) so that facilitators and instructional designers can provide opportunities and support for the useful application of discussion boards in CSCL.

Coming back to the second part of the research question one can find the reason for a slightly different wording than the title of the paper from the discussion above. The word ‘different’ is the keyword here.

What is the role of discussion boards used in different e-collaborative learning courses and what makes them a place for social support beside information exchange and task support?
Social support is always necessary for collaborative learning independent if learning takes place virtually, blended, or in a traditional classroom setting. The question of where social support takes place depends on the opportunities provided for interaction and communication, eventually restricted virtually by the provided channels, for instance a discussion board-based online course. As discussed above, the role and the meaning of a discussion board for social support changes depending on the provided learning setting. Hence, a discussion board can become an important place for social support beside task and information exchange. At least this is the case if considered in advance and enabled by the pedagogical competence of the teacher and if appropriate room and time is provided in the CSCL course by the instructional designer.

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REFERENCES


