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ONLINE INSTRUCTOR ROLES AND EFFECTS OF ONLINE MENTORING IN CSCL ENVIRONMENTS IN COMMUNITIES OF PRE- AND IN-SERVICE TEACHERS

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INTRODUCTION

Theories of social learning argue for the social aspects of learning and propose that cognition is a situated activity rooted in social, cultural contexts and interactions. However, learning is not the plain assimilation and accommodation of new knowledge, but it is the process by which learners become part of a knowledge community (Jonassen & Land, 2000; Lave, 1991; Rogoff, 1990; Scardamalia & Bereiter, 1994; Vygotsky, 1978). In this understanding, learners are seen as being active participants in the teaching and learning process in which interaction and negotiation of meaning are indispensable.

Harasim (1989; 1991) stated twenty years ago that the emergence of the new communication technologies provides for new ways of designing and delivering education to learners. However, she also noted that instructors are inadequately trained and not prepared for teaching and learning in an online environment (Harasim, 1991). She suggested, as have others, that one method for designing online learning is to utilise the tenet of collaborative learning when launching online group learning projects. Accordingly, the methodological inventory in both quality teacher training and teachers' professional development has broadened to include learning communities. These communities enable supportive interpersonal relationships, which enhance in- or pre-service teachers' professional growth. McLaughlin (1997) argues that in such communities, professionals and future professionals "learn new practices and unlearn old assumptions, beliefs and practices" (as cited in Le Cornu, 2005, p. 356). Lieberman (2000) adds that such communities support teachers to engage in (new) pedagogical practices that are inevitable for effective teaching and learning processes in our century.

In the present study, we used the *Mentored Innovation Model* (*MIM*) (Dorner & Kárpáti, 2008; Kárpáti & Molnár, 2005) and its adjusted form as the instructional context for the training of pre-service and in-service teachers' communities. MIM is rooted in theories of social learning - more precisely it is strongly related to Vygotsky's (1978) ideas on *social mediation* and Engeström's (2001) principles on *activity theory*. Accordingly, it entails social mediation that encompasses both *social mediation of individual learning* and *participatory knowledge construction* (Salomon & Perkins, 1998).

Social mediation of individual learning refers to the facilitating social agent who helps to create a better system for learning, whereas learning seen as participatory knowledge construction means the participation in a social process of knowledge construction. In the latter case, knowledge is located in the relations and activities of the participation, which in the case of the MIM are the innovative educational program and the professional development experience.

As opposed to the traditional (dialogical) model for innovation (where the researcher and the teaching staff are assigned the role of the exclusive 'source of information', and teachers, similarly to course participants, are required to acquire certain skills and pedagogical methods, or content), MIM is based on the collaboration of professional teachers around shared objects. MIM is integrated in school practice and has a spiral structure (contrary to the traditional dialogical model that is linear) where cycles of exploration, learning and creation of new knowledge are iterated on higher levels.

The e-moderators or facilitators focused on various features that characterise social mediation, including intensive interaction, rapid feedback, highly personalised and situationally contingent guidance, encouragement, and the elicitation of responses from the participants in the form of explanations, suggestions, reflections etc., (Kozulin & Presseisen, 1995, p.7) in the MIM.

THEORETICAL BACKGROUND

In current professional terms, a mentor is defined as a person who "mediates expert knowledge for novices, helping that which is tacit to become more explicit" (Dennen, 2002, p. 817). Mentoring has been traditionally seen as a formal process in which a more experienced person offers assistance and gives advice to the less experienced for the purpose of growth and development (Hew & Knapczyk, 2007; Kram, 1983; Le Cornu, 2005; Levinson, Darrow, Klein, Levinson & McKee, 1978). It has been referred to as a "hierarchical, one-on-one" relationship in "business and industry, higher education, and schools" (Murphy, Mahoney, Chen, Mendoza-Diaz and Yang, 2005, p. 344). However, there has been a tendency of reconceptualising the mentoring process (Le Cornu, 2005). A shift from the hierarchical, one-to-one, expert-to-novice transfer into making mentoring a reciprocal and mutual process has emerged. Bona, Rinehart and Volbrecht (1995) claim that with the emergence of "co-mentoring" both parties (the mentor and the mentees) are seen as co-constructors of knowledge (p. 119). Jeruchim and Shapiro's (1992) definition also stress the importance of the complementary relationship between mentor and mentee. Le Cornu (2005) argues that a mentoring attitude that is involved in the complementary relationship underlines the importance of growth experienced by both parties.

Also in teacher training and teachers' professional development, the view on mentoring has included learning communities that enhance in- or pre-service teachers' professional growth. Le Cornu (2005) lists various names that refer to such communities: teacher research groups (Grimmett, 1995), learning circles (Collay, Dunlap, Enloe & Gagnon, 1998), and teacher networks (Lieberman, 2000). In such communities, the expert-novice transfer and the hierarchies attached to it are reduced, the relationships are more equal, symmetrical and collegial (Lieberman, 2000).

Collaboration, the idea of co-construction of knowledge and mutual engagement of participants, is viewed as a special form of interaction (Dillenbourg, 1999; Dillenbourg, Baker, Blaye, & O'Malley, 1996; Engeström, 1992; Lipponen, 2002, Rochelle & Teasley, 1995; So & Brush, 2008). However, productive interaction that results in cognition and active learning processes does not automatically occur (Berge, 1999; De Smet, Van Keer & Valcke, 2008; Dillenbourg, 1999; Liaw & Huang, 2000; Northrup, 2001; Rourke, 2000), neither does collaboration automatically produce learning (Dillenbourg, 2002). Häkkinen, Mäkitalo & Arvaja (2004) when formulating their concerns regarding the constraints of computer-supported collaborative learning (CSCL) research (despite its accomplishments and positive results) they referred to the mistake of taking social interaction for granted in CSCL settings. They added that many studies in the field found that interaction threads are short and the interactions lack deeper knowledge processing (they rather stay on the surface-level processing). Berge (1999) is of the view that interactions in CSCL settings must be organised. De Smet et al. (2008) add that the current CSCL-debate concentrates to a great extent on identifying what contributes to productive interactions. They stress that guiding students in online learning scenarios is as important as it is the classroom support in face-to-face settings. Thus, the role of online instructors offering guidance and moderation in discussion is vital (Bonk, Wisher, & Lee, 2004).

A facilitator or e-moderator (Salmon, 2003) is often labelled as a 'guide on the side' for a group of learners in an online setting. The terms 'facilitating' and 'e-moderating' have been referring to the process of the online instructor's effort to help learners engage in active and meaningful interactions that contribute to their knowledge advancement. This activity is of high importance, since participants often do not attach much significance to the role of online discussions in their knowledge advancement and process of online learning. In the recent decade, a number of studies have investigated the facilitators' roles in online discussions

(Anderson, Rourke, Garrison & Archer, 2001; Berge, 1995; Green, 1998; Goodyear, Salmon, Spector, Steeples & Tickner, 2001; Hootstein, 2002; Mason, 1991; Salmon, 2003). They basically agree that there are four roles that facilitators take in CSCL environments: (1) pedagogical/instructor role, (2) social role, (3) managerial role, and (4) technical role.

The instructor or pedagogical role of the facilitator is to offer professional help to the online learners in their growing understanding of the course content and facilitate their knowledge building in order to complete assignments and reach learning aims set prior to the process (Goodyear et al., 2001; Green, 1998; Hootstein, 2002). The social director or social host role of the facilitator entails establishing a friendly and comfortable social learning environment in which learners can achieve their best while engaging with each other in effective interactions (Berge, 1995; Hootstein, 2002; Mason, 1991; White, 2004). The managerial role of facilitators covers the understanding of online processes, the organisational and administrative duties such as setting the agenda, the objectives of the discussions, establishing time parameters, procedural rules and decision-making norms (Berge, 1995; Green, 1998; Hootstein, 2002; Mason, 1991). Anderson et al. (2001) adds to the above responsibilities the effective utilisation of the medium and the establishment of a netiquette for the community of learners. The technical role encompasses making the participants feel comfortable in the online environment, which includes transmitting knowledge and experience about how to use software facilities, manipulate e-tivities and generate online learning environments (Berge, 1995; Salmon, 2003).

RESEARCH DESIGN, HYPOTHESIS AND TOOLS

Hypotheses

The present study focuses on the online instructor roles as human mediators in the online mentoring, teaching and learning process and on the effects of the online mentoring process in CSCL environments in communities of pre- and in-service teachers. We investigate the online instructors' activity, more precisely, their participation in the online interactions, the influence of their activity on participants' engagement, the patterns of interaction, and their varying facilitating styles. When examining the effects of the online mentoring process, we consider pre- and in-service teachers' online learning experience and the interrelation of the components of the online mentoring, teaching and learning events.

Based on the above-described research focus the following research questions have been identified:

- What are the elements that influence participant satisfaction and self-perceived learning success in the online mentoring, teaching and learning process in the CSCL environment? How are these elements interrelated? What are the barriers and drivers of learner satisfaction?
- What are the effects of the online mentoring, teaching and learning process in the CSCL environment – with special focus on the facilitator's activity (her/his roles and facilitative approaches)? What types of mentoring functions did online facilitators provide?
- What is the nature of a model for mentoring and facilitating online learning in a CSCL environment in the communities of pre- and in-service teachers?

The current study uses a *mixed method* research strategy, as suggested by current CSCL research. We rely on hypothesis testing i.e. theoretical assumptions are formulated *a priori*, and hypothesis generating i.e. data-driven findings based on *a posteriori* analyses. The

employed research instruments contribute to the collection and analyses of quantitative data however, as an overarching research design, the multiple case study approach is used.

Applying mixed method strategies implies that researchers are willing to use and experiment with methodologies that are not part of their repertoire and that they are unreserved towards a method (Strijbos and Fischer, 2007). This led to the inclusion of our previous "scientific assumptions" concerning new methodologies in one of our hypotheses.

H1 Online communication has a direct impact on participant satisfaction and self-perceived learning success experienced in the online mentoring, teaching and learning process in the CSCL environment.

H2 Facilitator's activity has an influence on online communication in the mentoring, teaching and learning process in the CSCL environment.

H3 Perceived social presence and online communication are interrelated phenomena and mutually impact each other in the mentoring, teaching and learning process in the CSCL environment.

H4 Facilitator's activity has an impact on perceived social presence in the mentoring, teaching and learning process in the CSCL environment.

H5 Online communication in the mentoring, teaching and learning process in the CSCL environment impacts participants' cognitive presence.

H6 Developing and testing a mixed method research strategy in a CSCL environment through in-depth multi-perspective analyses allow for fine-tuning survey results.

Research design and tools

The quantitative approach prevailed in the choice of research instruments, which are as follows: the ICT-metrics tool, the participant satisfaction and communication questionnaire, social network analysis (SNA), and content analysis. Both the ICT metrics and the satisfaction survey rely on data obtained directly from the participants. In the macro-level analysis of interaction patterns, SNA relies on quantitative (surface-level) data gained from the *a posteriori* analysis of evolving interactions in the online learning process. Content analysis allows for an *a posteriori* micro-level analysis of online interactions – the texts created by the participants in the online learning process. As an overarching research design (multiple) case study approach (Creswell, 2007; Merriam, 1998; Stake, 1995; Yin, 1994) was utilised.

Sample

The cases involved were undertaken by using multi-site design. It involved sites provided in the framework of the international Calibrate project of which the validation team was led by the Centre for Multimedia and Educational Technology (MULTIPED), at the Faculty of Sciences, ELTE University, Budapest, Hungary, and sites provided by the Department of English Language Pedagogy (DELP) of the School of English and American Studies, Faculty of Arts, ELTE University, Budapest, Hungary. The total number of cases was eight, out of which two were designed and implemented at the MULTIPED site, and six were undertaken at the DELP site.

Participants of the MULTIPED sites

In Calibrate 1, 23 Hungarian in-service teachers worked in collaboration with their colleagues, pupils, facilitators and educational researchers within the framework of introducing the European Learning Resources Exchange (LRE). In Calibrate 2, 20 in-service teachers collaborated. In Calibrate 1, the community of in-service teachers collaborated in small domain- and subject-specific groups (Mathematics, Science, Humanities and Foreign

Languages), while in Calibrate 2, all the in-service teachers constituted one large group of professionals.

Participants of the DELP site

The participants in each case were undergraduate students of the School of English and American Studies participating in an English Language Teaching (ELT) methodology course organised in the following semesters: Spring 2007 (n=20), Fall 2007 (n=20), Spring 2008 (n=18; n=18), Fall 2008 (n=21) and Spring 2009 (n=19). In Spring 2007, Fall 2007, Fall 2008 and Spring 2009 the undergraduates attending the course came from different programs: the majority participated in the American studies program (and as an additional agenda decided to do the teacher training modules as well), the remainder attended a pre-Bologna college-level teacher training programme. In Spring 2008, two cases were organised parallel to each other. One of the groups involved exclusively graduates who had previously obtained their first diplomas in the pre-Bologna college-level-program, the other group was constituted of undergraduates.

RESULTS

Elements and their relations impacting participant satisfaction and self-perceived learning success in the online mentoring, teaching and learning process in the CSCL environment

Results, based on data source and methodological triangulation, revealed in both communities that online communication impacted processes in the learning networks and thus had a direct effect on participants' global satisfaction and learner success. Hence, online communication that is related to teaching presence (Anderson et al., 2001), social presence (Rourke, Anderson, Garrison, & Archer, 1999) and cognitive presence (Garrison, Anderson, & Archer, 2001), was identified both as the most influential indicator of the participants' global satisfaction and as a central criterion of the online mentoring, teaching and learning processes maintained in the framework of the MIM in the CSCL environments.

The facilitator's activity i.e. teaching presence was identified as a component having direct significant impact on participants' global satisfaction and as a relevant indicator of satisfaction and learner success. The analyses revealed that similarly to online communication, it was related to all the components of the MIM. Based on the results, we also claimed that the facilitator's activity, her/his teaching presence had a clearly identifiable effect on the online communication in the mentoring, teaching and learning processes.

Results also showed that the communities of pre- and in-service teachers were the most satisfied with the facilitators' activity focusing on scaffolding. Scaffolding (help) offered by the facilitator thus proved the strongest indicator of satisfaction in the variable group referring to the facilitator's activity. Accordingly, effective scaffolding and provision of feedback were a must in online mentoring, teaching and learning processes.

Analyses of data gained from all the three sources revealed that higher frequency of communication and a higher level of sense of community were related. This supported the assumption that social presence and online communication were strongly interrelated phenomena.

As concerns the relationship between the facilitator's activity (teaching presence) and perceived social presence, we found a less obvious relationship. The findings of the study only partially supported this hypothesis. In the community of in-service teachers, only the results of the content analyses supported the facilitator's impact on perceived social presence. In the case of the pre-service teachers, results based on only two tools, the survey and the

SNA, demonstrated that the facilitator through her/his social director role influenced the degree to which participants perceived each other and their instructors as 'real', and she/he thus contributed to experiencing the feeling of 'nonmediation'.

Satisfaction regarding the quality of the teaching and learning experiences – as an indicator of perceived cognitive presence – was rated with the highest values in the variable group concerning global satisfaction in both communities. This variable was the strongest indicator of satisfaction demonstrating that participants were the most satisfied with the quality of learning that took place in the CSCL environments in the framework of the MIM. In the presented scenarios, survey results thus supported that effective online communication contributed to the participants' cognitive presence, and to the facilitation of their knowledge advancement.

Based on the results of the SNA and descriptive statistics, we formulated our findings in relative terms regarding the success of knowledge transmission and mediation of information in the observed and mapped networks. The SNA did not provide specific additional data related to the pre-service teachers' cognitive presence. Content analyses of interactions in the community of in-service teachers did not support our claim that online communication contributed to the participants' growing understanding of the content, and to their knowledge building so that discussions progressed beyond info sharing to higher levels of knowledge construction. Nevertheless, we added that when lower cognitive engagement, participants might not profit much from the discussions. However, this did not necessarily apply to the whole mentoring, teaching and learning experience in the framework of the Calibrate project, since moderated online interactions captured only part of the online activities in-service teachers were involved. Consequently, results of the content analyses did not contest our previous finding that in-service teachers were the most satisfied with the quality of learning that took place in the CSCL environments in the framework of the MIM. As opposed to this, results revealed that in the communities of pre-service teachers, online communication had a clearly identifiable effect on participants' cognitive presence. Based on the above, evidence of online communication impacting participants' cognitive presence was limited.

Barriers and drivers of participant satisfaction

We utilised the Kano model in the study of participants' satisfaction with the online learning experience in order to decide the relative priority of improving components of the MIM.

We clearly identified the online communication component as a one-dimensional attribute, which leads to linear increase of participant satisfaction. Results concerning the participants' skills and competencies involved in the general computer usage and their Internet abilities were identified as must-be attributes. Hence, online communication and effective facilitation are inevitable constituents of the online mentoring, teaching and learning process, and they lead to higher participant satisfaction and feeling of learner success. At the same time however, successful participation is also dependent on the participants' skills and competencies concerning general computer usage and their Internet abilities. Their absence would lead to extreme dissatisfaction.

In the present study, there were neither attractive attributes (that are in general unexpected by the participants, their presence could lead to satisfaction but there would not be a decrease in satisfaction with their lower level) nor indifferent attributes (those that the participants would not especially be interested in) identified.

The effects of the online mentoring, teaching and learning process in the CSCL environment – with special focus on the facilitator's roles and facilitative approaches

'Guide on the side' vs. 'resource provider' or 'master teacher'

In the first round of analyses, we differentiated between 'guide on the side' and 'resource provider' or 'master teacher' facilitator approaches. We identified the 'guide on the side' facilitator as an online instructor who attended to a socially active community and maintained horizontal group architecture. The 'resource provider' or a 'master teacher' facilitator even if she/he applied collaborative instructional design, relied on a stronger instructor presence and a more directive facilitation. This approach was characterised by a vertical structure of the workflow and hierarchical group architecture where the socially less active facilitator and eventually a few members obtained the 'top positions'. Under such circumstances, the participants' performance acknowledged by the facilitator had a strong impact on participants' satisfaction with the learning experience.

Directive facilitation vs. interactive facilitation

Based on further participant activity analyses, we claimed that since the facilitator's activity, the participants' perceived social presence and the online communication were directly/indirectly interrelated, online facilitation in the mentoring, teaching and learning process should be more than mere direct instruction focusing on on-task communication. It should also encompass providing a comfortable learning experience and the online instructor's social engagement. However, we found that successful professional scaffolding and the facilitator's pedagogical or instructor role aiming at effective 'instruction' were not necessary accompanied by socially active facilitator behaviour.

Consequently, in line with previous research findings (Young, Bullough, Draper, Smith, & Erickson, 2005; de Lièvre, Depover, & Dillenbourg, 2006), we differentiated between directive facilitators who aimed at mainly direct instruction, and interactive facilitators. The former approach was based on reactive tutoring or facilitation where the instructor reacted exclusively to the online learners' requests, whereas the latter type of instructor facilitated in a proactive manner. Proactive facilitation encompassed the facilitator's own initiative for entering the participants' learning process by not only supporting on-task professional discussions, but also providing a comfortable learning experience by acting as a socially engaged member of the learning community.

Facilitation approach and network interaction structure

In the present study, we found that more facilitator messages, a more intensive participation in the online interactions did not necessarily guarantee balanced group-level communication patterns and a mutual, intensive, community-level interaction. Neither did reduced facilitator activity hamper intensive communication and evolving collaboration in a network. Instead, we argued that if the amount of incoming and outbound facilitator relations was in balance i.e. the instructor received and created the same amount of messages, or the facilitator's activity was characterised by slightly more outgoing linkages than incoming ones, then in these networks more intensive and broad-based participation would evolve. This generated mutual interactions and higher level of sense of community that were prerequisites of group collaborations. Accordingly, interactive facilitators, who facilitated in a proactive manner provided better for the preconditions of collaborations. If however, the facilitator's activity shifted to either extreme – facilitator outbound communication dominated participant contributions, or the instructor was the recipient of most of the incoming linkages – then this most probably hampered the development of balanced interaction patterns and the horizontal

flow of information among participants. Hence, the preconditions of collaboration were not met. Analogously, the case when the incoming and outbound facilitator communication was in balance but the facilitator established strong links exclusively with the same (in most cases a limited number of) participants would not have been ideal either. This type of interaction pattern was characteristic of reactive or responsive facilitation. We must however note for the sake of completeness and validity, that in those groups where participant activity stayed low throughout the mentoring, teaching and learning process, the facilitator's mentoring efforts of any kind did not result in an interactive mentoring event. Thus, we assumed that the importance of group composition (the ratio of active and rather passive communicators) was a success factor in online scenarios.

We also found that in densely knit networks, less intensive teaching presence reliant on a wide range of facilitator assets and on the usage of pedagogical expertise was associated with increasing or higher levels of cognitive engagement and deeper levels of information processing. Social presence in such communities manifested itself in socially meaningful interactions, sense of community and emotional presence, which allowed for a formation of individualised impressions. As opposed to this, in loose networks, very intensive teaching presence based on an assistive (directive) role in order to provide instructional support, prevailed. In these cases, social presence was characterised by interpersonal interactions with socially appreciative nature where despite group commitment less emotional presence was typical.

Less intensive teaching presence characterised by a wide range of facilitator assets or a limited variety of facilitator assets either resulted in direct instruction and content provision maintained by skilful scaffolding of online interactions, or generated facilitation focusing on reinforcement. Both approaches supported the evolving of socially meaningful interactions. Intensive teaching presence focusing on reinforcement was however associated with social passivity and the lowest level of cognitive engagement.

Cognitive engagement and network ties

In the present pedagogical scenarios, low-level cognitive engagement and surface-level information processing were linked to loosely knit networks where participants formed working pairs or triads (mostly together with the facilitator). Responsive or reactive facilitator behaviour was characteristic of these interactions. As opposed to this, increasing cognitive engagement or high levels of cognitive presence evolved in densely knit networks where discussions were maintained on a group-level with 5-6 participants. Interactivity (mutually established relations) and a proactive manner of communication prevailed in these networks. Interestingly, we found increasing cognitive engagement in loosely knit networks with working pairs or triads. In their case however, the social presence and the facilitator's teaching presence resembled that of the densely knit communities.

We also claimed that in the presented pedagogical scenarios, the weak ties were not adequate for transmitting complex knowledge and mediating new information. However, this finding did not necessarily contest the paradigm according to which weak ties make a network robust (Csermely, 2005), but based on our results we added that especially in the case of small networks (with 5-8 members) defining the minimum requirement concerning the strength of weak ties was vital. In the presented scenarios, one-directional linkages and links providing for one-time information exchange were identified as the 'minimum' strength. These, according to our claims, were inadequate for sharing in-depth expertise or knowledge. Consequently, we also argued that the higher activity level of the participants and the more intensive communication would contribute to evolving group-level discussions, and presumably provide the 'backbone' for collaborations.

The nature of a model for mentoring and facilitating online learning in CSCL environments in the communities of pre- and in-service teachers

We found different models for mentoring and facilitating online learning in the in-service and pre-service teachers' communities. In the in-service teachers' communities, the 'guide on the side' facilitator attended to a socially active community of professionals and maintained horizontal group architecture, whereas in the pre-service teachers' communities in general, the facilitator acted more like a 'resource provider' or a 'master teacher'. The difference in the facilitation manner lies in the character of the pedagogical scenarios. In the Calibrate 1 and the Calibrate 2 cases, communities of professionals collaborated in processes of pedagogical innovation. Collaborative activities were based on their professional (teaching) experience, and the scope of their activities was more of a pedagogical innovator rather than that of an active course participant. Nevertheless, the analyses of interaction patterns showed that also the structure of the two Calibrate groups differed. In Calibrate 1, network density was substantially formed around the facilitator, in Calibrate 2, a less central role was identified. Accordingly, in the latter case a 'guide on the side' facilitator was identified who acted like an interactive mentor, while in the former community, due to the facilitator's role as the 'crucial cog', she/he was characterised as a 'guide on the side' facilitator who operated in a directive manner.

In the ELT Methodology cases, teacher trainees participated in a blended type of university course as part of their curriculum. The course applied collaborative instructional design but in general, relied on a stronger instructor presence and a more directive facilitation. The reported analyses of interaction patterns and communicator roles in the networks of pre-service teachers supported this claim. As the interaction patterns revealed, participants established the strongest ties with the facilitator. This demonstrated that interactions (interacting pairs or triads) leaned towards the facilitator's central role. Consequently, the majority of pre-service teachers experienced more often reactive or responsive mentoring, where the facilitation included the instructor's immediate reaction to the participants' demand for help and request for mentoring feedback, but the need for a socially active 'social director' facilitator was not met. Results of the content analyses also verified that the majority of participants experienced intensive or very intensive teaching presence based on a directive-instructional approach. However, we provided limited proof for the claim that such an instructor presence necessarily generated a socially less active behaviour.

Pedagogical implications of the findings

Online communication is a crucial element, which may be on-task or off-task, and could take the form of one-to-one, one-to-many, or many-to-many interactions. Agents involved in the design and conduction of online mentoring, teaching and learning processes should devote attention to well-designed, purposeful online communication that aims at facilitating interactions which contribute to participants' growing understanding of the course content and knowledge construction. Facilitators' teaching presence is thus an overarching magnitude in the context of educational presence in the online mentoring, teaching and learning processes which involves course design and organisation, facilitating discourse (including social aspects of communication and community building) and direct instruction at the same time (Anderson et al., 2001). Accordingly, online instructors shall be trained and prepared in the framework of formal education in order to be able to utilise the tenet of collaborative learning when launching online group learning projects.

Beyond facilitators' teaching presence flexible tool mediation provided by the actual means of communication – in the present study CSCL environments – are to be considered since it is the online communication tool, which supports various sorts of online activities.

Being able to operate the tool itself is strongly related to the participants' skills and competencies involved in the general computer usage and their Internet abilities. Consequently, we claim that ICT skills analyses and sufficient (formal or informal) preparation for the online mentoring, teaching and learning process are indispensable. Their lack would contribute to participants' dissatisfaction and an unsuccessful and inefficient learning experience, which would lead to a high number of dropouts. Finally, since ICT skills and competencies are crucial prerequisites for the online mentoring and learning experience it is a must for facilitators that beyond their pedagogical or instructional roles and acting as social directors they are efficient in their technical roles or technical assistant roles (Hootstein, 2002) as well.

RESEARCH METHODOLOGICAL IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Triangulating data sources and methodologies proved an effective way of investigating the referred research topic and questions. Results of the SNA and content analysis provided assistance in the further thick description and validation of the results of the survey on participant satisfaction and self-perceived learning success. Accordingly, our hypothesis that developing and testing a mixed method strategy in a CSCL environment through in-depth multi-perspective analyses allows for fine-tuning survey results was supported.

As regards further research suggestions for the current study, course objects or learning objects (e.g. in the form of pre- and post-tests) should be considered in order to see whether results of the self-perceived learning success, the participation, the interaction patterns and the content of the interactions were related to learning outcomes. However, instead of individual task performance measure, assessment of group performance is suggested (Dillenbourg, 1999) by eventually employing control group studies.

In general, more studies conducted in the Hungarian teacher-training and teacher professional development context are needed to investigate on one hand, the online instructor roles and effects of the online mentoring, teaching and learning processes, on the other hand, the applicability of these research tools and the mixed method strategy. Analogously to the international studies in the field of CSCL research, such pedagogical scenarios should be based on case studies involving smaller study groups or small-groups, which are suitable for the in-depth analyses of underlying mechanisms involved in online experiences alike. On the basis of these robust data best practices and strategies should be integrated in the formal training of online instructors i.e. university teacher training curricula.

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