Participant activity and facilitator strategies in an LMS-based discussion forum

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ABSTRACT

New ways of communicating challenge us to rethink the ways that we define both the acts of writing and the texts that are created. How can technology be constitutive for reflective and interactive writing during field practice in higher education? This paper reports on a study in which six student teachers wrote logs in an asynchronous LMS-based discussion forum that offered a practice of online interaction between the students, their mentors and lecturers. This resulted in discussions dominated by a two-way interaction between the lecturer and the individual student, but also the achievement of prolonged forum reflections and students’ acquisition of theory. This paper examines some of the challenges of the instructor role in collaborative online learning environments.

Keywords
learning management system (LMS), discussion forum, collaborative learning environments, facilitator strategies

INTRODUCTION

Current educational practice reflects a growing adoption of new technology to foster reflection via online collaboration in teacher education. Computer-mediated communication offers new forms of shared discourse, and enables groups that are separated in time and space to engage in the active production of shared knowledge (Gunawardena, Lowe & Anderson, 1997). Establishing written, digital meeting points between students, professional practitioners and lecturers might have the potential to aid, and even maximize, the learning experiences taking place during student teachers’ field practice.¹ In this study, the applied format is an application within the Learning Management System (LMS) itslearning, called “Diskusjoner,” which allows students, lecturers and mentors to contribute to shared, asynchronous discussions.

¹. This article is based on data from an ongoing project, SKRIVUT 2012–2015, which aims to establish and develop collaborative learning environments in different digital formats, to enhance the interplay between practice and theory in the teacher education program at Høgskolen i Sør-Trøndelag (Dons, Klemp, Nilssen & Strømman, 2013).
Even though there are several examples of teacher education researchers employing some sort of text-based computer-mediated communication with students (e.g. blogs, e-mails, chats etc.), the use of LMS-based discussion forums seems to be of limited interest in that research. The OECD report (2005), “E-learning in Tertiary Education: Where do we stand?” indicates that universities primarily use LMS for administration, and that the use of LMSs has had a limited impact on pedagogy. The NIFU report, “ICT in teacher education” states that although both lecturers and practitioners are encouraged to read and comment on student teachers’ written texts within an LMS, most of these texts are Word documents (Tømte, Kårstein & Olsen, 2013). As most Norwegian teacher education institutions collaborate with field practice schools through compatible learning platforms, the LMS-based discussion forum can serve as an important arena to facilitate reflective discussions on theory and practice, and thus needs further exploration. According to the NMC Horizon Report (Johnson, Adams Becker, Cummins & Estrada, 2013), LMSs are viewed as too rigid to help foster true innovation, as schools have to adjust learning to fit the platform design. A more innovative use of the LMS-technology might realize its potential, and this paper focuses on how group interactions can be mediated and supported through writing in the discussion forum.

Writing as a meeting point between student teachers, mentors and lecturers represents a supplement to rare visits across the two arenas, and the writing of reflective logs during field practice is mainly inspired by T.L. Hoel’s work. Hoel (2002) engaged student teachers to participate in reflective dialogues via e-mail, and sees student writing and teacher response as important mediators for reflection in field practice: “Through writing we are able to follow a train of thought, retrieve it, and develop it further by restructuring and discovering new associations” (Hoel, 2002, p.17). In contrast to e-mails, forums provide a condition for wider dialogues, debates, negotiation and agreement, which are integral to higher-order learning and critical thinking. The student teachers are encouraged to position themselves while being exposed to others’ perspectives, and the individual student’s writing to learn is embedded in an interactive discourse formed by a community of learners. This practice also relates to the ways they are expected to engage in collaborative activities and to use digital strategies in their future work as teachers.

Research in the field of computer-supported collaborative learning (CSCL) commonly bases the educational rationales on a combination of social constructivist learning and cognitive learning theories (De Wever, Schellens, Valcke & Van Keer, 2006; Hillen, 2014). Social constructivists argue that CSCL promotes the collaborative process in which knowledge is co-constructed and meaning is negotiated. Even if digital arenas offer possibilities for

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2. Here the term “logs” refers to the written reflections composed and submitted by student teachers during field practice.

3. The notion writing to learn simply means writing as a means of learning. According to Emig (1977), higher cognitive functions develop most fully only with the support system of written language.
instructors to develop new collaborative roles and learning communities, there is no guarantee that purposeful interaction between participants will take place. For all online instructors, a particular challenge lies in working out how to design and facilitate a forum best suited to its purpose.

In this study, the learning objective was to engage all participants in meaningful online dialogues on practice and theory that could contribute to knowledge construction and lifelong learning. This requires active forum participants, who post frequently and comment on others’ postings and thereby contribute to meaningful discussions. In addition, the growth of discussion threads is affected by the ways in which a forum is facilitated (Hewitt, 2005). To help evaluate the extent of the forum interaction, this paper thus addresses both the effectiveness and the outcome of writing in the forum – and examines the function of the facilitator. The data analysis is directed towards gaining a certain insight into the network activity and the different strategies used to facilitate it, and the results could help refine future approaches to the use of discussion forums with students in field practice. The presentation and analysis of the data is guided by the following research questions, the second being contingent on the first: How is the written interactivity manifested in an LMS-based discussion forum? Which strategies for facilitating the discussion forum seem to be the most effective? And, to tie these two questions to the specific context and the learning objective: To what extent can the use of the discussion forum support reflective dialogues and enhance students’ learning experiences in field practice?

RESEARCH LITERATURE AND THEORETICAL PERSPECTIVES

In a recent European study, Hillen (2014) examines written discussions in an asynchronous text-based tool (Reader) to identify what kind of support forums provide for interaction and learning. According to Hillen, learning takes place largely through interactions among students, and she suggests that students could be given different roles (reflector, moderator and scribe) because: “Through role taking, the students had to take over more responsibility for the discussion themselves (…)” (2014, p.134). In e-learning discussions, Laurillard (2002) places more emphasis on the interaction between student and teacher, advocating a continuing dialogue that will support the students in developing their reflection through feedback. Laurillard also emphasizes the importance of balancing academic knowledge and practitioner knowledge, so that students can contribute to, and benefit from, a dialogue that bridges “the process of adaptation (practice in relation to theory) and reflection (theory in the light of practice)” (2002, p.22).

4. Effective strategies is a key concept in the research-based theory on discussion forums by Lowes, Lin and Wang (2007) and Rovai (2007), where strategies that sustain the discussion and drive it forward are considered effective.
In American, Canadian and Australian teacher colleges, various discussion forums have become a locus of considerable research, both in terms of establishing virtual learning communities, designing forum activities and exploring the facilitator function. Researchers agree that the driving force behind the effectiveness of an online learning community is social presence (Garrison & Anderson, 2003; Garrison, 2007; Lowes, Lin & Wang, 2007, Rovai, 2007). Social presence has been defined as “the degree to which participants in computer-mediated communication feel affectively connected to one another” (Swan & Shih, 2005, p. 115). Lowes et al. (2007, p.191) state that participants “need to feel the social presence of other learners – put simply, they need evidence that someone is listening.” Rovai also emphasizes the notion that instructors should generate a social presence in virtual classrooms and that they need to “avoid becoming the center of all discussions by emphasizing student–student interactions (…)” (Rovai, 2007, p.77).

In addition to social presence, Garrison (2007) also highlights teaching presence and cognitive presence. Anderson, Rourke, Garrison and Archer (2001, p.5) define teaching presence as “the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes.” This implies that teaching presence begins with the designing and preparing of a course, and that it continues during the course, as the instructor facilitates the discourse and provides instruction when required. Cognitive presence refers to the notion that asynchronous discussion forums will facilitate critical reflection and discourse (Garrison & Anderson, 2003).

Mazzolini and Maddison (2003; 2007) identify three different roles the instructors might take on in establishing presence: the prominent “sage on the stage” role, a more constructivist “guide on the side role” and an ultra-low profile as “the ghost in the wings.” According to Mazzolini and Maddison (2007, p.194), research literature on facilitating discussion forums generally suggests that instructors play an active, visible part in discussions, and that the ideal degree of visibility depends on the purpose of the forum. Frequent instructor participation is often assumed to encourage student participation, but Mazzolini and Maddison found that it may also be overdone: “On average, frequent posting by instructors did not lead to more student postings, and the more the instructor posted, the shorter were the lengths of the discussions overall” (2003, p.237).

Rather than analyzing the processes that support reflection and sustain discourse, Hewitt (2005) examines how and why discussions sometimes shut down, referred to as the growth and death of threads. According to Hewitt, the longevity of a discussion thread is partially affected by the kinds of routines that online participants follow when they use a computer conferencing interface. In addition, the nature and structure of online interaction can be affected by the ways in which discussion threads are visually presented (Hewitt, 2005).
The research-based theory presented above does not offer a manual on how to design and facilitate online learning environments, but some guidelines are given. When design is generated from the learning objectives of the course, rather than from the capability of the technology, the use of technology has the potential to support student learning and serve as a knowledge-building community (Anderson et al., 2001; Laurillard, 2002). Discussion forums benefit from facilitators thinking through the balance between social presence and dominance, and between inter-student interaction and frequent instructor participation (Hillen, 2014; Mazzolini & Maddison, 2007; Rovai, 2007). Dialogues and meaningful feedback optimize learning processes (Laurillard, 2002) and reflection is mediated through cognitive presence (Garrison & Anderson, 2003).

**CONTEXT**

Within our teacher education program, the writing of reflective logs during field practice is compulsory, but logs are not graded. Although most logs are uploaded via itslearning, they are submitted solely to the mentor by the individual student. By contrast, the interactive functions within an LMS offer opportunities for increased collaboration. In this study, the purpose of applying the discussion forum was to explore how writing logs for multiple recipients could enhance students’ reflective writing, and to examine how feedback from peers, mentors and lecturers could guide these reflections towards deeper and more refined learning. Sharing field practice experiences in a discussion forum, however, goes beyond the expectations of typical field experience for student teachers. It was thus important to locate participants willing to volunteer. The outline of the study was presented in one of our classes, and the first six student teachers who wished to join were selected and assigned to conduct their field practice at the same primary school. They based their reasons for joining partly on an intrinsic motivation to write in new media, and on the possibilities for receiving feedback from both mentors and lecturers. Like most students, they were familiar with a range of social networking sites and various chat applications, but reported having no previous experience with discussion forums as such.

The two primary school mentors who participated in this project taught first grade. Responding to student teachers’ logs lies within the role of mentoring, and time resources were assigned for the mentors’ additional contributions to this project. I was one of the two participating teacher educators in the forum, together with my colleague and fellow researcher. Within a qualitative research paradigm, the researcher recognizes possible impacts of subjectivity and personal interactions (Delamont, 1992; Peshkin, 1988). An important point to note, therefore, is that the researchers’ roles, in addition to establishing a discussion forum, also included lecturing the students and monitoring their field practice. The forum facilitator role is influenced by the educational phi-

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5. So does the fact that researchers would monitor these discussions. The student teachers were informed of this, and that they would be invited to share their experiences in interviews afterwards.
losophy underlying the design of the discussion forum use. The aim was to encourage students to initiate and participate in discussions with the lecturers and mentors as “guides on the side,” a model similar to the constructivist forums described by Mazzolini and Maddison (2003).

The discussion forum

The interaction within the forum is asynchronous, and the participants can reply to each new discussion started, regardless of location and time. Each reply is added onto the end of the discussion, giving a collection of postings displayed from oldest to most recent. A discussion thread is built up of an initial posting and the replies received, forming an extended string-based “conversation” on a particular topic.

There are some key advantages to writing in asynchronous collaboration tools. First, they enable flexibility and there is no need for taking turns. Participants can produce and receive postings without the pressure of immediate response. Moreover, participants have time to digest the information and put it in the proper context and perspective. According to Hewitt (2005), a discussion forum seems to be ideal for reflection, as the asynchronous nature of the interaction allows learners to reflect in greater depth before sharing their ideas publicly.

Forum guidelines

The student teachers were required both to write their own entries and to contribute to the other discussions in the forum. The task required every student to post an entry at least four times per week, but the students were given no guidelines on how to post or on the length of their postings. They were asked to share their reflections on their teaching of writing, and their own writing to learn, areas that have the potential to generate many, and very different, discussion topics. In order to prevent a forced reflection upon predetermined categories, the student teachers were encouraged to discuss other topics of their own choice and to choose their own thread titles. The mentors also posted a common discussion topic twice.

METHOD AND DATA

The written data, e.g. the forum discussions, were collected during four weeks of the students’ placement period (October 2012 to April 2013), and individual interviews were conducted within the following month. Although quantitative and qualitative elements are combined in the following data analysis, the study remains essentially qualitative and interpretative in its approach.
Data from the discussion forum

In total, there are sixty-eight single postings in the forum, and together with the responses to the postings, this comprises seventy-four pages of written text. Examining and analyzing such a substantial amount of empirical data allows for different approaches and multiple methods. My study is inspired by Lowes, Lin and Wang’s (2007) network analysis approach, as I found it to be useful in both depicting and evaluating different patterns of interaction in the data. The purpose of this analysis is to look at the extent and nature of interactions in the forum, as patterns of interaction can provide some insight into how discussion forums work and the various strategies necessary to facilitate them. Postings, replies, threads, participant activity or inactivity, and facilitator involvement, are keywords in this network analysis. According to Scott (2013), a network analysis comprises a body of qualitative measurements for describing network structure and development, but also allows for quantitative counts of the relations within a network. Postings and threads in a forum are well-defined, easily identifiable artifacts (Hewitt, 2005), and as the first step of my analysis I counted the total number of single postings per student per session. To identify the different patterns of interaction, the reply protocol within the forum also enabled me to count the students’ replies to each other, their replies to mentors and lecturers, as well as mentors and lecturers’ replies to them.

Although network analyses are commonly displayed as nodes and ties, it is also possible to visualize the dynamics of relational data otherwise. Inspired by the research carried out by Lowes et al. (2007), I have chosen to display the countable data in tables, and to communicate the findings, and my interpretations of these, in writing. Tables provide a window into the dispersion of the interaction among the participants, and this relates to the research question regarding how interaction is manifested in the discussion forum.

As my study also seeks to examine strategies for facilitation that seem to be effective, I have examined the nature of all the responses given in the forum. The constant comparative method is a qualitative approach, built on compared concepts, and involves open coding, axial coding, and selective coding (Strauss & Corbin, 1998). Open coding is the first step, where raw data is examined, to begin to develop categories. To discover response patterns in the forum data, I have compared the replies, marked them with a series of codes, and grouped these codes into similar concepts in order to refine some categories. This interconnection of categories is referred to as axial coding. The data was then re-read, and the categories were cross-checked and defined, a process in which choices were made regarding the most important codes: selective coding. The initial process of comparing categories also involved a continual interplay between forum data and data from interviews, and a grouping of similar concepts.

Data from interviews

Individual, focused semi-structured interviews were performed (Brinkmann & Kvale, 2014), and here some of the preliminary findings of the discussion forum...
use were addressed. An interview guide followed, and the first entry was to elicit the students’ comments on the process of writing logs in a discussion forum. The interviews were transcribed, and the text subsequently coded and categorized into themes. The references to time, format and response were made in all the interviews. This allowed for an identification of categories that derived from the respondents themselves, so-called in vivo codes (Strauss & Corbin, 1998) that also relate to the patterns in the network analysis. The latter is referred to as purposive sampling. In addition, the students’ given reasons for writing – or not writing – created a fourth category: motivation.

Following this open coding, the text fragments related to these categories were compared within the single interview and between all six interviews, enabling a conceptualization of codes and a broader description of the variety within them, e.g. the differences and similarities in reasons, attitudes and perspectives related to time, format, response and motivation. The process of axial coding showed that the category of time was manifest along several dimensions in the interviews, and it was later related to subcategories as time spent on writing logs, responding to comments, reading and commenting on other students’ logs, and the individual students’ notion of time to spend on these different activities. To help capture the essence of these differences and similarities, I developed conceptual diagrams, which, according to Strauss and Corbin (1998), are important devices designed to show relationships between concepts. In the diagram the student teachers’ attitudes towards the format of discussing varies from “difficult to grasp” to “well-organized,” which, in some cases, are interwoven with the concept of time. The following citation from one of the transcripts (an interview with S1) serves to illustrate this crosscutting between the concepts of format and time:

S1: Both the system within the LMS and the discussions…I found it all confusing. Because of this, I had difficulties relocating previous discussions and this made commenting very time-consuming.

Student comments from interviews regarding the four main categories, time, format, response and motivation, will be included, to help identify some of the factors that generated interaction, and the ones that did not.

FINDINGS

The first unit of analysis is the total amount of initial forum postings. None of the six students (S1–S6) meets the requirement to post an individual entry...
every day. There is a contrast between the students posting regularly and those who, in one or more sessions, only leave one single posting in the forum. S2 posts sixteen logs in total, ten more than S6. Sess1 (i.e. session 1) and Sess2 were the most productive weeks, both with twenty-two postings in total. Sess3 and Sess4 each have twelve single postings.

The second point to note is the considerable length of the posted logs. Initial postings of 400–600 words were not uncommon, whereas replies to these postings are generally briefer. A simple word count states that the briefest single posting consists of 167 words while the longest consists of 673 words. The student teachers chose their own thread titles, which resulted in discussions regarding writing as a key competence, phonological awareness, guided writing and the pencil grip, to list a few. The content of the postings is mainly related to the classroom practices and to the 6–7 year olds’ development. The students apply specialist terms and theories and often refer to the course curriculum.

As the students reported visiting social networking sites frequently, one could expect their forum communication to exhibit similarities to the fragmented, visual and personal communication found on Twitter and Facebook. The data show quite the opposite: the online comments and replies are more formal, well-structured and professional with regard to the level of articulation and choice of words, and pictorial emoticons are rarely used. One preliminary finding is thus that the LMS-based discussion forum primarily seems to be regarded as a “school genre” by some of the students, and that an explicit purpose of discussing may be their acquisition of theory and a professional language.

The following statements from three of the students support this:

S3: I tried to learn the academic language and eventually I felt it became automatized.

S4: I learned how to write argumentative paragraphs. Writing logs makes me a better writer.

S5: I wrote for and to myself, preparing for the final exam. (...) I read the other students’ logs to see how they had solved the assignment and what kind of product they had submitted.

Here, S5’s choice of the words “exam,” “assignment” and “product” particularly signals the concept of writing to prepare for the academic texts they are required to write in different campus courses. It is also interesting to note that none of the students posted questions to their mentors and lecturers in the discussion forum (theoretical, practical or personal). These findings represent a contrast to Rovai’s (2007) research, as he emphasizes that the risk of discussions forums is that they could become exclusively questions posed by students followed by answers provided by the instructor.8
The final point to note is related to the growth of threads. A single posting normally generated one or more replies from fellow students, mentors and lecturers, creating a discussion thread. The length of the threads varies, as initial postings received from one to seven replies. The majority of initial postings received from one to three replies. Given the variation of topics up for discussion, the discussions are surprisingly brief. “Writing,” “Guided Writing” and “Reading aloud” were the thread titles of the three initial postings that triggered the most activity and seven replies. These topics were among the committed pedagogical areas highlighted by the field practice school, serving as topics for discussion familiar to both the student teachers and their mentors, and thus resulted in productive discussions.

These discussions were, however, not productive when measuring student–student interaction. The following chain identifies the participants in the thread “Reading Aloud,” initiated by one of the students: S6: M1 > M1 > S4 > L2 > M2 > M1 > L1. Only one of the other students (S4) contributed to this thread, while both mentors (M) and lecturers (L) were active participants. This indicates that a student–mentor/lecturer relationship heavily dominated the interaction, a finding in keeping with Rovai’s (2007) point. In the more brief threads, however, there are more examples of student–student interaction, as will be shown in the table below.

Patterns of interaction

Table 1 shows the number of replies posted per student to a fellow student. In addition, it shows the students’ replies to each other in the two initiated discussions in Sess3, which I will return to.

**TABLE 1. STUDENTS’ REPLIES (TO EACH OTHER).**

<table>
<thead>
<tr>
<th></th>
<th>Sess1</th>
<th>Sess2</th>
<th>Sess3</th>
<th>Sess4</th>
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<tbody>
<tr>
<td></td>
<td>Int. 1</td>
<td>Int. 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(S6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(S4)</td>
<td>(S3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S3</td>
<td>2</td>
<td>2</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(S2, S4)</td>
<td>(S5, S4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4</td>
<td>3</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(S2, S2, S6)</td>
<td>(S5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S5</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(S1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S6</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(S4)</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

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8. I later learned that the students had established a Facebook group, as an add-on forum for information and practical questions. A similar approach is suggested by Rovai (2007).
To exemplify a reading of the table, we can see that S1 posted only one reply in the forum, and this was a reply to S6 posted in the first session. The table also shows that all of the students produced and received replies or comments from each other. Three students replied only once, one student replied twice, while two of the students posted four replies in the threads of their fellow students, and are the dominant participants. There are thirteen replies in total, and this means that only one in five postings were commented on. These replies were all posted in Sess1 and Sess2. In Sess3 and Sess4, none of the students posted replies beyond the ones that were required during the intervention in Sess3.

The table shows how many times the students left a reply, indicating that there was a decrease in forum activity in Sess2, and that the students stopped commenting on each other’s postings. The decrease in Sess2 called for an intervention, and the mentors were asked to initiate two discussions in Sess3. Five of the students posted a reply to the first initiated discussion (marked as Int.1), while the second (Int.2) was responded to by the entire group. Although the intervention boosted activity in Sess3, this activity did not extend to Sess4.

These negative numbers or findings regarding forum activity give rise to the following questions: Why did the students leave such a low number of replies? Why did student–student interaction decrease? An analysis of the total interaction pattern may help shed some light on this. The next two tables thus focus attention on the student–mentor/lecturer relations by displaying the number of student replies to their mentors (M) and lecturers (L) (Table 2), and the number of replies the students received from their mentors and lecturers (Table 3).

### TABLE 2. STUDENTS’ REPLIES TO MENTORS AND LECTURERS.

<table>
<thead>
<tr>
<th></th>
<th>Sess1</th>
<th>Sess2</th>
<th>Sess3</th>
<th>Sess4</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td></td>
<td>2 (L)</td>
<td></td>
<td>2 (L)</td>
</tr>
<tr>
<td>S2</td>
<td></td>
<td>1 (L)</td>
<td></td>
<td>2 (L)</td>
</tr>
<tr>
<td>S3</td>
<td>1 (M)</td>
<td></td>
<td>2 (L)</td>
<td>2 (L)</td>
</tr>
<tr>
<td></td>
<td>1 (L)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4</td>
<td>1 (M)</td>
<td></td>
<td></td>
<td>2 (L)</td>
</tr>
<tr>
<td></td>
<td>2 (L)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S5</td>
<td></td>
<td></td>
<td>2 (L)</td>
<td></td>
</tr>
<tr>
<td>S6</td>
<td></td>
<td></td>
<td>1 (L)</td>
<td></td>
</tr>
</tbody>
</table>

There are twenty replies in total to mentors and lecturers, when leaving out the intervention in Sess3. The students did not reply at all during Sess1, and three of the students post a reply in the final session only. These three students (S1, S5 and S6) are the same students who left only one reply each to a fellow student, as shown in Table 1. The data also shows that the two students who posted the highest number of replies to their fellow students (S3 and S4) also seem
to be the dominant participants in the forum in answering their mentors and lecturers. One final point to note is that eighteen replies are addressed to the lecturers, two to the mentors. This finding is counterbalanced by the high number of questions or challenges from the lecturers, as will be shown in Table 3 below.

So far, the analysis has given us a picture of the difference between sessions. Sess1 and Sess2 have the only presence of student–student interaction, apart from the activity caused by the initiated discussion during intervention in Sess3. A combination of findings in Table 1 and Table 2 allows for an analysis that begins to give a picture of the contrasts also between the students. Although the data material enables broad descriptions and a profile of the individual student, this will not be carried out within this study. To sum up, the overall forum activity and the interactivity among the participants seem to decrease. This is particularly true if one considers the student–student interaction. An analysis of the lecturer or mentor involvement in the forum is necessary to complete this picture. This is presented in Table 3:

**TABLE 3. STUDENTS’ REPLIES FROM MENTORS AND LECTURERS.**

<table>
<thead>
<tr>
<th></th>
<th>Sess1</th>
<th>Sess2</th>
<th>Sess3</th>
<th>Sess4</th>
<th>Tot. number of replies: 122</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(M)</td>
<td>(L)</td>
<td>(M)</td>
<td>(L)</td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>S2</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>S3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>S4</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>S5</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>S6</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
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</tbody>
</table>

In the forum, there are 122 replies from mentors and lecturers to the students: 44 from the mentors and 78 from the lecturers. Each student posting usually generated replies from both mentors and lecturers, which accounts for the high number of replies. As displayed in the table, all of the students received replies, and each of them received between fourteen and twenty-five replies in total. Again, Sess1 and Sess2 are the most productive sessions, and there is also a peak in Sess4 regarding the lecturers’ involvement. The considerable amount of comments from mentors and lecturers, however, did not seem to generate more student replies. Nor did it boost student–student interaction.9
The nature of the response

Even if the purpose of the response is to promote online activity, the total number of replies to each student may impose the opposite effect, as constantly responding to responses is both time-consuming and exhausting. In the process of commenting on students’ postings, it is hard to predict and fully overlook the effect of frequent instructor postings. Even if a high rate of instructor participation does correlate with a relatively low number of student postings, the length and content of the individual student’s postings must be considered. Instructor-centered interaction patterns may aid learning and enhance reflection (Mazzolini & Maddison, 2007). Nevertheless, not all types of instructor postings enhance reflection. Hewitt (2005) discusses the possibility that “clunkers”, further described as notes that shut down communication, could affect a thread’s development. Among these are replies in which someone simply agrees with an earlier viewpoint, leaving little room for further discussion, and the reply is perceived as “the final answer.”

Identifying which types of responses that were the dominant ones in our forum discussions required me to conduct a more sophisticated analysis, which involved extracting meaning and concepts from the texts in the forum by breaking down this data. All of the participant replies were read carefully, labeled and compared, and then grouped into concept categories, a process similar to outlines of the constant comparative method (Strauss & Corbin, 1998). Categories arising from this method are generally a mix of categories that the researcher identifies as significant to the project’s focus, and categories that are derived from the language, experiences and customs of the participants.

As shown in Table 4, eight main categories were identified in the data.10 In the process of my analysis, these eight categories were given the following definitions: Affirming responses offer praise and appreciation, e.g. the mentors’ and lecturers’ appreciation of the quality the individual student’s posting. Informative responses introduce new ideas, share information or expand on the given topic. The third category comprises both the explicit questions posted by mentors and lecturers and the phrases encouraging the students. The personalized salutations comprise all the times the students are addressed either by name, or by a personal pronoun. Some of the responses express agreement or shared understanding, typically agreeing with the student’s viewpoints on a topic or choice of action in the classroom. Mentors and lecturers sometimes gave advice and these were mainly linked to classroom practice. The quoting and referring category consists of the number of times the participants were referring explicitly to another participant’s posting or using the “insert quotation” function within the forum. The final category, challenging others, refers to

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9. Mazzolini and Maddison (2003) also found that frequent posting by instructors did not lead to more student postings.
10. The first two categories (affirming and informative responses) were also significant in the research by Lowes et al. (2007), while personalized response is a category Hewitt (2005) identified in his research.
when lecturer or mentor explicitly invites the other students to join the discussion.

Displayed in the table below, the coding schema is expanded, showing the number of times each of the students (S1–S6) received each type of response.

**TABLE 4. CODING SCHEMA SHOWING EIGHT MAIN TYPES OF RESPONSES.**

<table>
<thead>
<tr>
<th>Types of responses</th>
<th>Affirming</th>
<th>Informative</th>
<th>Challenging, encouraging</th>
<th>Personal salutations</th>
<th>Agreeing</th>
<th>Advisory</th>
<th>Quoting, referring</th>
<th>Challenging others</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>12</td>
<td>7</td>
<td>8</td>
<td>14</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>S2</td>
<td>14</td>
<td>9</td>
<td>11</td>
<td>17</td>
<td>8</td>
<td>1</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>S3</td>
<td>14</td>
<td>7</td>
<td>8</td>
<td>18</td>
<td>6</td>
<td>1</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>S4</td>
<td>15</td>
<td>5</td>
<td>10</td>
<td>21</td>
<td>9</td>
<td>4</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>S5</td>
<td>12</td>
<td>4</td>
<td>8</td>
<td>15</td>
<td>7</td>
<td>2</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>S6</td>
<td>12</td>
<td>5</td>
<td>7</td>
<td>11</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

The table fails to show when, that is in which of the four sessions, the different types of responses are distributed. It also fails to show when one posting has more than one code: for instance, a posting could simply be expressing agreement, but it could also be sharing new information and raising questions. Common to most postings is the combination of the three first categories: affirmation, information and a new challenge, as well as the addressing of a student by name. As shown above, affirming response is the dominant category, and this positive feedback is evenly dispersed among the students.

**What generated interaction?**

As it is almost impossible to tell what single factor it was that triggered the students to respond, the forum data alone does not offer a complete or convincing answer to this question. The inclusion of citations from the interviews might add some more depth to the information depicted in the tables. All six students emphasize the importance of affirming responses and state that positive feedback motivated them. Here one of the students reflects:

S2: It is nice when someone points out the strengths in my log and gives me positive feedback.

As Lowes et al. state, it was “not information or questioning/challenging, either alone or in combination, that was most likely to lead to further discussion, but cheerleading plus one of these (…)” (2007, p.195). In a text-based discourse, affirmative responses are also a way of fostering social presence, and a way of guarding against feelings of social disconnection, a potential pit-
fall of online communication. This is particularly emphasized in two of the interviews:

S1: I especially appreciated the praise and emotional support.

S3: I felt I was given affirmation.

The two categories focusing on challenges or questions would be perceived as most likely to move the discussions forward, as they anticipate, and usually generate, an answer. According to Garrison (2007), social presence must be directed toward learning outcomes. As shown in Table 4, all the students received quite a lot of challenging or encouraging feedback. However, as previously pointed out, the large number of new questions and challenges may also have put some of the students off:

S1: Answering questions required me to re-read theory, causing extra work.

S6: Sometimes there were too many questions and discussions, and responding takes a lot of time.

To other students, the follow-up questions were perceived as signs of interest from mentors and lecturers, and made them revisit and elaborate on their initial postings:

S3: I felt positively obliged to respond when someone actually had taken an interest in my discussion topic.

S4: The response made me want to write even better and put in an extra effort.

The category called “personalized salutation” is one of the categories Hewitt (2005) identified in his research, and which he characterized as a “dead end note,” as personalized responses could be regarded as exclusionary by the other participants in the forum. Mentors’ and lecturers’ responses to a student might be perceived as belonging to that student. Personalization is a significant category in my study, occurring ninety-six times in the discussion threads.

Addressing students by name is a typical feature when it comes to lecturers and mentors commenting on student work (e.g. texts, classroom practice, etc.). In discussion forums, however, this practice might motivate the individual student, but might not serve as an invitation to others. Responses that are perceived as the final answer could also shut down a discussion, and this is possibly contextualized in the data by the three categories “advice”, “agreement” and “information,” e.g. information that simply adds to the topic without introducing new ideas. According to Anderson et al. (2001), the difficulty of focusing and refining discussions, so that conversation progresses beyond information sharing to knowledge construction, is a widely documented problem in com-
puter conferencing. In my study, the student who receives the most comments where fellow students simply agree, states that:

S4: Everyone always agreed with me regardless of what I wrote. It almost made me write a more provocative entry.

Finally, the students’ own perceptions of usefulness, and their perceived advantages and possible disadvantages concerning writing in a discussion forum, need to be addressed. The following citations might shed some light on the differences between the students:11

S1: Writing was sometimes a bit awkward as I felt evaluated by everyone. (…) Reciting theory is hard. Sometimes I chose not to comment because I didn’t know what to write.

S2: I feel I know how to write a reflective discussion log. The feedback kept me on the right track. (…) Starting conversations in the other students’ logs takes a lot of effort. I didn’t always read the replies given to the other students.

S3: I enjoyed the response I received from the lecturers, and you replied almost immediately. It was very motivational. (…) I particularly read the postings that had received the most replies.

S4: I read and commented on my fellow students’ postings regularly and I enjoyed it. Itslearning also allows us to see who reads and there is a number telling you how many replies you have received. Once, I pushed the update button numerous times… just to see if my mentor had posted a reply.

S5: Writing logs is time-consuming. I need to be given topics to write about and more guidelines on how to post.

S6: A discussion forum provides opportunities to discuss, I’m sure, but I prefer to discuss with people who are present. (…) I feel that I haven’t had the time and that I was tired of writing in the forum. And when I don’t reply the questions and discussions end.

Two of the students (S1 and S6) give different reasons for not writing, but both are related to the format, and social presence. While S1 states that writing for multiple recipients made her feel as if she was evaluated, S6 points to the lack of face-to-face interaction in the text-based discussions. Lecturers and mentors

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11. These citations relate to the previously mentioned categories of motivation, response, time and format. Note that this study does not try to establish causal relationships between these variables, and that there might be situations where students choose to post, or choose not to, for other undetermined reasons.
play an important role in facilitating all the participants’ social presences in a collaborative learning environment, and, according to Lowes et al. (2007), this needs a higher level of assertiveness when the learning environment is online. Anderson et al. (2001) stress that compensatory behaviour for the relative lack of non-verbal communication must be developed. As both these students received praise and affirmation, their reluctance to participate could perhaps have been met with even more emotional support and individual challenges directed towards establishing trust, which are factors also pointed out by Hillen (2014).

In contrast to S1 and S6, S2 signals confidence in forum communication. She initiates most of the discussions, but, although she sometimes revisits ongoing discussions, she seldom leaves replies for her fellow students. S3 and S4 are the two dominant participants in the discussion forum, reading and responding frequently. Both students respond positively to the asynchronous aspect of communicating, and could have been invited to co-facilitate the forum, perhaps along the lines of the role-taking approach suggested by Hillen (2014). S5, who emphasizes the need for topics and guidelines, may also have benefited from such an approach.

CONCLUDING REMARKS

By examining how online interaction is articulated within the forum, I aimed to identify which strategies for facilitating a discussion forum seem to be the most effective, and to find out to what extent the use of the forum could support and enhance students’ learning. The findings from the analysis are related to a specific setting: to a set of discussion participants interacting within a certain context. Nevertheless, the findings do provide valuable insight into how a discussion forum can be facilitated more effectively.

If posting plus reply is a measure of effective interaction, Sess2 is the most successful session. Sess2 has the highest number of student postings, and the highest number of replies from both mentors and lecturers. However, Sess1 has the highest number of students’ replies to each other. Is it possible to measure effectiveness in terms of the quantity of interaction? According to Garrison (2007), effective communication is important, but not sufficient for educational purposes. As the purpose of social presence is to facilitate quality interaction in order to achieve worthwhile learning outcomes, “social presence should not be measured simply in terms of the quantity of interaction it engenders” (Garrison, 2007, p.64). As presented above, the texts produced in the forum were mainly task-oriented and well structured, and the initial postings were of considerable length. This practice contributed to the student teachers’ professional development in various ways; it allowed for an acquisition of specialized terms and a professional language, the possibility to explore issues in depth, and simultaneously receive lots of feedback. In the interviews, the students demonstrate a metacognitive awareness of their own writing to learn (cognitive presence). The achievement of prolonged reflections, and the indi-
vidual student’s acquisition of theory, are most likely due to frequent instructor postings. This finding represents a contrast to that of Mazzolini and Maddison (2003), who reported finding limited thread length when instructors took the lead in discussions.

Nevertheless, this complex genre seemed to be difficult to maintain throughout all four sessions, possibly discouraging and silencing some of the forum participants (e.g. S1). Three of the students (S2, S3 and S4) responded positively to the academic style of the forum, while others reported that reading and responding to long, theoretical texts took a lot of effort (S5 and S6). If the goal is to enhance more brief, more focused discussions, these need to be modelled by a facilitator. It is also possible to facilitate the forum discussion by posting a small number of discussion-starters, initiating discussions. This strategy was successful in terms of engaging the students to interact in Sess3 and seems to be a fruitful approach, given that also the students themselves bring forward topics worthwhile discussing.

In spite of the interaction caused by the initiated discussion topics, the number of student–student related discussions decreased. In Sess2, each of the students received between four and twelve replies from their mentors and lecturers, which predominantly led the students to respond within their own discussion thread. This generated a two-way interaction between the individual student and the mentor or lecturer. Although this pattern may enhance individual reflection, it does not foster the development of a collaborative environment, as it seemed to provide the other students fewer possibilities to contribute. To prevent this, Rovai (2007) suggests that a principle for the online instructor to follow is to avoid responding too quickly to a posting, in order to provide an opportunity for students to respond first. As four of the students (S1–S4) emphasize the importance of immediate feedback, the response from the instructor could be as simple as signaling that postings are read, ensuring social presence. This will allow all the participants time for reflection and possibly facilitate interaction.

Another step taken towards boosting student–student interaction is to reduce the amount of personal salutations to the individual student, and to increase the strategies used to attract attention from the entire group. Explicitly challenging others is one such strategy. In addition, facilitators could log on once or twice a week to summarize some keywords and unresolved issues valuable to pursue (Hewitt 2005; Rovai, 2007). Engaging students in summarizing operations might also be necessary to achieve progressive and sustained discussions (Hillen, 2014). Teaching presence also involves instruction, and directing participants to revisit and comment on previous postings could help enhance and extend reflective discussions. There is a risk, however, that if participation itself becomes the goal, participants will gravitate towards those topics that are familiar and easy to talk about, while avoiding challenging problems or exploring new ideas (Hewitt, 2005).
The mixed-methods approach has given some insights into the effectiveness (or not) of the discussion forum, which enables me to identify and further develop strategies that enhance reflective dialogues during field practice, and evaluate how the use of this particular ICT format can support these dialogues. The constant comparative method was useful in coding response material and interview data, identifying the applied (or not) facilitator strategies and including how the participants responded to them (or not). This analytical focus is important in showing how interaction patterns and strategies are articulated in a context, so that they can be made explicit, shared or challenged, and redesigned. Proceeding from a descriptive level of quantified findings to an interpretive level also represents a challenge and an element of uncertainty. This underscores the importance of conducting similar studies, applying a similar methodological model. In this way, the outcome of this analysis could have implications for both practitioners and researchers planning to establish online learning environments for facilitating discussions.

REFERENCES


