

## Participation and common knowledge in a case study of student blogging

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Received: 17 June 2011 / Accepted: 30 November 2012

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**Abstract** The interaction between participation and the emergence of common knowledge is the subject matter of this paper. A case study of a single class provides the focal point of analysis. During the semester the students participated in a blogging activity. As a result of their participation, the students create and distribute knowledge. The online efforts of the students can be described as participation in both a discourse and knowledge community. At one level, blogging is an activity composed of writing, reading, and commenting, and at a second level, the students share their thoughts in their own voices. At a third level, over the course of the semester, the student posts and commentary form a commons of information that can be mined later in the semester for other kinds of learning activities. Knowledge creation, distribution, and accumulation are analyzed in terms of student participation at both the level of individual events and from the perspective of an ongoing community.

**Keywords** Common knowledge · Participation · Student blogging

### Introduction

All that a class of students learns jointly during the semester is part of the growing “common knowledge” of the participants. How hard the midterm was, is a part of that common knowledge, as is the lecture style of the instructor. The targeted growth areas of common knowledge, those things the students are supposed to know about the material, align with the “learning goals and objectives” of the course: it is the “object” of assigned reading and lectures and the focus of evaluation for an exam or grade. Common knowledge of the intended sort can take a multitude of forms

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from explanation to calculation. Common knowledge accumulates during a lecture, from doing homework or a project, and from the participation of students in online learning activities.

This paper explores and models the interplay between student online work – their participation in student blogging – and the emergence of common knowledge among the students. A case study of a single undergraduate class, Internet & Society, provides the focal point of analysis. The students do not just broadcast their views to one another, they constructively (cooperatively) borrow from each other all semester long, building common knowledge, practicing at explaining using the “official” semiotic for coding the course content. Student work in the blogosphere is a loosely coordinated collaboration.

The first part of the paper develops a theoretical framework for loosely coordinated learning activities, like student blogging, in contrast to meaning making in a tightly coupled joint problem space. The focus is on developing the concepts of common knowledge and participation, which will underpin the analysis of the case study of student blogging.

The second part of the paper presents the case study. At a very basic level, blogging is an activity composed of writing, reading, and commenting. From a more social perspective, the students activity can be viewed as sharing. From a third vantage point, over the course of the semester, the contributions of the students form a *blogosphere commons* that can be mined throughout the semester.

The analysis of student activity is presented from alternate viewpoints: by event, by length of conversation, by topic, and in the context of two papers the students wrote during the semester. Both participation and common knowledge, and their relation, is characterized at each step of the way. The goal is to draw a more detailed picture of how the students’ participation, within individual episodes of activity and across the semester, lead to the growth and distribution of common knowledge.

As members of a discourse community, the students discuss various course-relevant topics throughout the semester. The discussion of each topic is divided into multiple events. A single event, which can develop throughout the semester, is composed of a post and all the commentary it accrues. The amount of discussion that a particular post generates is related to its significance. A student, at one level, from the perspective of community, participates, in the discussion of topics of the course, and at a second level participates in individual events. The emergence of common knowledge occurs over the span of the semester, and not, per se, from any particular individual action.

Transcripts collected during the semester are the basis for both qualitative and quantitative analyses. Ethnography and discourse analysis provides a picture of how blogging as a genre of communication is exploited by the students to develop, share, and deepen the students’ understanding of the material from the perspective of key explanatory frames. More quantitative assessments, fill out the details of the picture.

Given the increase of web-based courses, the more practical value of this work is that it is a step towards an analysis approach for “seeing” how collective knowledge emerges. The framework that is developed explains how knowledge is created, distributed, and accumulated in a loosely coupled ongoing collaboration. The focus of the case study is on connecting participation in individual events to the emergence of common knowledge over time.

**Framework**

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## Loosely and tightly coordinated learning activities

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Within a class, some learning activities are tightly coupled, but many of them are more loosely coupled. In a tightly coupled collaboration, the students work in a joint problem space (Teasley and Roschelle 1993). They share a focus of attention. The interaction among the students, and their communication, enables cooperative problem solving and grounding (Clark and Brennan 1991; Clark and Schaefer 1989; Baker et al. 1999), and meaning making (Koschmann 2002; Stahl 2002; Stahl et al. 2006). These kinds of tightly coupled collaborations can be achieved with the students working together at the same time – either collocated (Teasley and Roschelle 1993) or not (Stahl 2009) – or working at different times in different places (Forte and Bruckman 2006, 2007).

In a loosely coupled activity, there are fewer coordination requirements. The students connect and share with one another, producing common (background) knowledge in a distributed fashion while collaboratively acquiring knowledge and building skills (Alterman and Larusson 2010). Within any community, organization, or class there are many occasions where the activities of the group are distributed. Members are conversing about the same sorts of things. Between pockets there is an assumption of some common background knowledge but the strict criteria of mutual belief in any proposition  $p$  cannot be assumed. These interdependent distributed pockets of activity and interaction among the members have common themes and can produce similar kinds of knowledge and skills. (Cross-fertilization can occur when a member moves from one conversation to another.) The entire collection of these distributed activities on a particular topic are loosely coupled. The activities provide a background, a framing for the work the students do, and can be organized and orchestrated to support significant student learning.

In the traditional classroom, both kinds of activities take place. The students read individually the same material, they do the same homework, take the same exam: in none of these activities are the students' efforts to learn tightly coupled. Other activities – two students working on a homework problem together in the library, a breakout session in class, students as lab partners in a science course – depend on tighter coordination.

The emergence of common knowledge within an online community and its relation to participation, as illustrated in the case study, is the main contribution of the paper. Throughout the semester the students engage in a blogging activity; they are required to post to their blogs twice a week, on either the course reading or the lecture, and comment on each other's blogs. The blogging the students do is loosely coupled: they share topics of discussion, but the online discourse amongst the students does not require tight coordination of their efforts. Knowledge creation, distribution, and accumulation are analyzed in terms of student participation at both the level of individual events and from the perspective of an ongoing community.

*Tightly coupled*

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Collaborative learning mediated by a single computer or a network of computers, enables learning activities distributed in both space and time. Students need not be in

the same place or work at the same time in order to collaborate: student collaboration is neither place nor time-bound. Simple web 2.0 technologies – ranging from chat to discussion forum to wiki to blog – can support the collaboration.

Collaboration implies the participants are working together to learn (Dillenbourg 1999). The participants have common goals and in their collaboration they have symmetry in their action, knowledge, and status. The collaboration is interactive, the students are doing something together, and the learning they accomplish depends on the interaction. The organization of the activity is not hierarchical but rather “party administered” (party administered: Sacks et al. 1974).

It has been argued that “meaning making” is the core problem of the field of computer supported collaborative learning (Stahl et al. 2006): “CSCL is a field of study centrally concerned with meaning and the practices of meaning-making in the context of joint activity and the ways in which these practices are mediated through designed artifacts” (Koschmann 2002). Learning is located in meaning negotiation carried out externally, in the social world, occurring over relative short periods of small group interaction (Stahl et al. 2006), mediated by linguistic, cultural, physical, and digital artifacts (Stahl 2002). The students co-construct a joint problem space as they interact (Teasley and Roschelle 1993), jointly making sense of the situation, the problem, the relevant phenomena – their activity is tightly coordinated. Individual interpretive perspectives are shared, developed, Stahl (2003) and “composed” (Suthers 2006). Some of the artifacts are part of the design of the technology that supports the activity (Suthers 2006), others emerge during the interaction through the externalization of thought (Stahl 2003). The research agenda is to create a moment-by-moment microgenetic account of how new understanding and knowledge are created interactively.

The technological emphasis is to design social technologies that support collaborative learning in the light of how they “afford” “intersubjective meaning making” (Suthers 2006). Argument-based dialogue systems (e.g., Scheuer et al. 2010; Andriessen 2006) and discussion forums (e.g., Thomas 2002; Guzdial and Turns 2000) force the students to tightly coordinate their contributions in an ongoing discussion of a particular topic, even though they work at different times from different places. A wiki article has a single product (Forte and Bruckman 2006, 2007). Virtual math teams chat online working together in a joint problem space, virtually “being-there-together”, co-experiencing a shared virtual world (Stahl et al. 2011). In each of the above learning situations, there is a single focus amongst the students, and students can work in small groups.

This is an interactionist account of learning (e.g., Stahl 2002; Stahl et al. 2011; Zemel and Koschmann 2011; Koschmann et al. 1996) that has its roots in ethnomethodology (Garfinkel 1994), conversation analysis (e.g., Schegloff 1992), and Dewey’s constitutive theory of meaning (Koschmann 2002). This is also a constructionist account (e.g., Suthers 2006; Stahl et al. 2006; Papert and Harel 1991). There is a shift of emphasis from learning to knowledge building (Stahl 2002; Scardamalia and Bereiter 1991). With the appropriate scaffolding, the students collaboratively “re-create” the knowledge that they are expected to learn: “people learn better through building personally meaningful artifacts and sharing them with others” (Zagal and Bruckman 2007).

*Loosely coupled*

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In any class, students cooperate with the instructor to develop a base of knowledge on a set of topics within a field. Loosely and tightly coupled collaborations differ in how the growth and distribution of knowledge occurs. In a tightly coupled interaction there is only one conversation, a single focus point. In a loosely coupled activity, the students do things that have a common basis – reading an assigned text, doing a mathematics problem set, taking an exam – but work independently. Learning activities can be strung together into a sequence, in a manner that is more loosely coupled, with one activity creating content that is available and relevant for subsequent learning activities, and the sum of these activities result in the further development of common knowledge.

Blogging provides an opportunity, outside of class, for students to work together virtually in a loosely coordinated fashion. The blogging environment is an open space where students can publish and broadcast to the rest of the class, thereby providing, to the class as a whole, multiple examples of student work, reflections, commentaries, analysis of cases, and so on. Thus the independent work of the students creates an *open commons* of information (e.g., Scardamalia and Bereiter 1991, 1994; Bruckman 1998; Benkler 2006). The commons are a resource for all the members of the community. Because the blogosphere commons persists throughout the semester, new “collaborations” can emerge, at any time, that are mediated by any of the prior contributions of the students. Once started, any conversation can continue intermittently until the end of the semester. It is also a source of information for other kinds of learning activities, occurring either inside or outside the blogosphere.

Several elements of the collaboration in the blogosphere make it loosely coupled.

1. The discourse does not have a single focus. Multiple conversations emerge on a single topic, which do not have to converge. The range of discussion is broad and bushy with multiple viewpoints, and conversations, emerging. Discussions develop as smaller chunks of interaction.
2. There is both a reduced dependency between the contributions of the students and a greater variety. Each conversation is self-contained, encapsulated, but it can also link to other posts and conversations within the blogosphere.
3. Because of the persistence of contributions, conversation can extend throughout the span of the semester, and multiple activities can be strung together that grow, refine, and distribute the developing knowledge of the students.

The reduced costs of coordination in a loosely coupled activity make it easier to find a time and place to collaborate, and thus create more opportunities for collaboration. The students can work in parallel, enabling greater coverage and diversity, and yet, as the case study will show, the students develop a collective “sense” of the course material, further developing the “language”, concepts, and arguments that were initially presented in the assigned readings and lecture.

## 202 Common knowledge

203 The common knowledge can grow during loosely coupled activities. Two peo-  
204 ple, who have never met, can read the same newspaper in the morning. Their  
205 separate activities depend on common prior knowledge and create new common  
206 knowledge.

207 Common knowledge helps to coordinate (and simplify) communication and ac-  
208 tion. It is a backdrop to any collaborative or cooperative reasoning task. As members  
209 of the same society, as students at the same university, who are in the same class, the  
210 students, at the outset of a particular occasion of tightly coordinated collaboration,  
211 have common background knowledge. Their common knowledge includes the prior  
212 history of learning activities in the class, the required reading they did before they  
213 came to class, the presentation of the activity (and scaffolding) provided by the  
214 instructor, and the prior interactions amongst the students.

215 Two students meeting for the first time at a freshman social, can rely on common  
216 knowledge – things that are generally known – in order to talk to one another.  
217 The less common knowledge they have, the more work it takes to accomplish  
218 any communicative goal. How much conversational work is required to achieve  
219 a communication goal is in part a function of common knowledge amongst the  
220 interlocutors prior to the conversation: some of things are only known by the  
221 interlocutors, other things are commonly known within one of the communities in  
222 which they have joint membership.

223 Pre-requisites for a course assume that the students in a class have certain knowl-  
224 edge in common even though the students might have obtained that knowledge in the  
225 same course in different semesters, or even in different courses. Exams evaluate both  
226 the amount and distribution of common knowledge, showing that “things” commonly  
227 known by the class are not necessarily known by everybody nor at the same depth or  
228 with the same complexity.

229 *Mutual belief & certainty of sharedness* Common knowledge can be distinguished  
230 from shared and mutual knowledge by the *certainty of sharedness* (Lee 2001).  
231 Common knowledge between two individuals is assumed to be held commonly by  
232 those individuals because that knowledge is considered to be general background  
233 knowledge within a community of which they are both a part. In a class, common  
234 background knowledge is essential for reading, writing, talking about, and under-  
235 standing the course material. “Shared knowledge, on the other hand, is that  
236 information which has been established as shared as a result of interaction and  
237 discussion.” Two students share an understanding when they discuss some point  
238 made in the lecture. Mutual knowledge requires an infinite regress of mutual  
239 belief, the certainty of sharedness is very high. With mutual knowledge there is a  
240 proposition  $p$  that each participant knows to be true, they know that each other  
241 knows it is true, they know each other knows each other knows  $p$  to be true, and  
242 so on Clark and Marshall (2002).

243 Suppose two students exchange emails. It is reasonable to assume that shared  
244 knowledge is accomplished. There may be some parts of the exchange where  
245 propositions achieve mutual belief; suppose they agree on a time and place to meet.  
246 But for a lengthier message that exchanges a lot of information, it will take follow up,  
247 face time, to achieve mutual belief on the elements of the complex communication.



In an online discourse community like a blogging community, the students can work together to “digest” the information that is presented during lecture or in the course texts. Common and shared knowledge emerges intermittently and non-uniformly. It is not clear that mutual knowledge ever emerges from participation in the community alone. Sharing of knowledge is asymmetric. When a student makes a contribution and another student reads it, the second student believes she has shared knowledge with the first but not *vice versa*. Many of the things the students learn/know as a result of their participation are beliefs that may be held in common and shared but they are not mutually known. Suppose a student, in a face-to-face conversation wants to refer to the comments she broadcasted in the online discourse community. It is not hard to imagine that she might preface her comments by saying something like “did you see my recent online contribution ....” and then adjust her comments depending on her interlocutors response.

In terms of ‘certainty of sharedness’, there is a strict ordering to mutual, shared, and common knowledge. By definition, two individuals with mutual knowledge of  $p$  have shared knowledge of  $p$ , but not *visa versa*. Common knowledge does not require the degree of assurance that either mutual or shared knowledge do, but it does require that what is known be “commonly known” within the relevant community. So two students can have mutual or shared knowledge of something without it being common knowledge because it is not widely enough known in the same class. In a conversation, at “runtime”, the ‘certainty of sharedness’ of some  $p$  that is commonly known can be changed as a result of the conversation: the interlocutors can establish mutual belief and mutual knowledge of  $p$ .

Suppose you break out a large class of 30 students into groups of three or four students working together, collaborating, on a learning activity. Each group may create mutual or shared knowledge, but common knowledge is a characteristic of not one group but the collection of all groups. Not everything that is known by one particular group will be known by all the groups, but somethings will, but you cannot always be sure. If two students, who worked in different groups, met one another for coffee later in the day, they could refer to things they learned in the small groups, but there would be variance in how much work it took to achieve mutual knowledge of the different referents established in their conversation.

*Establishing mutual belief at runtime* Common ground is defined in terms of mutual belief about some proposition  $p$ :  $p$  is a part of common ground for a set of actors if they all believe  $p$  and they believe that the other actors also believe  $p$  and that those other actors believe that they believe  $p$  and so on (Clark and Brennan 1991; Clark 1996). So, two students talking face-to-face can create mutual belief about each contribution to the conversation.

There is a dicey issue here about whether mutual knowledge and common ground can ever be achieved in the strict sense: there are always differences in experience (Koschmann 2002; Stahl 2007). Koschmann (2002) makes the argument that for learning situations, where the students are in a joint focus space, the students never really achieve mutual knowledge and common ground:

To speak of mutual knowledge and common ground is to suggest that two or more knowers are having the same experience. But, as we know, my experience of a situation can never in any literal sense be the same as yours. Yet, in many circumstances we must go on, trusting that our

understandings are sufficiently in alignment for joint activity to proceed. When this assumption becomes problematic, some negotiation in meaning is called for.

For some coordination tasks, it is reasonable to argue that some  $p$  becomes common ground during the activity or as a product of it. Suppose two cars at a stop sign take turns crossing the intersection, one car moving north to south, the other car moving east to west. Except for unusual circumstance (think *ceteris paribus* clause), the drivers at some point during the activity, assuming they do not hit each other, mutually believe, establish as part of common ground, the belief that one of the cars “went/is going” first and the other car “went/is going” second. On the other hand, it is also reasonable, and perfectly consistent, that the drivers did not have the exact same assessment of the situation. The work of Alterman and Garland (2001), which presents a computational model of the emergence of convention, shows that the participants in a recurrent situation of coordination can develop conventional behaviors even though none of the actors have the exact same “sense” of the activity.

A convention is a solution to a recurrent problem of coordination (Lewis 1969). Conventions are the regularities of behavior that develop among a community of actors with a tradition of common goals and shared activities. Conventions of behavior are common knowledge

However, because of dynamics and uncertainty of any situated activity (Agre and Chapman 1990; Suchman 1987), in any kind of everyday situation, it is unlikely that the participants will agree, *a priori*, in their assessment of what the situation is, even when it is a conventional one. Suppose two actors approach a doorway, one actor lets the other actor pass through first. This is a convention-based activity. The array of conventions that may apply to the situation are part of common knowledge. But which situation and how it plays depends on contingencies and dynamics: one actor is a child and the other an adult, one actor is a woman and the other an elderly man, it is a dating situation, one of the actors is carrying a large box, ... The grounding of a particular sense of the interaction that is in play is determined at runtime – that’s when the mutual belief happens. The participants have “common” background knowledge about the conventions in place prior to a conventional activity, but they create mutual belief (common ground) on how to proceed only during the activity.

In a similar fashion, loosely and tightly coupled student learning activities can be strung together. Individual students read an assigned text before class. During class there is a breakout session that depends on the students having done the reading. At runtime, as their collaboration unfolds, students can establish mutual belief in some of the things that were commonly known of prior to participation in the activity as a result of their reading prior to class.

## Participation

An actor can participate in a *single episode* of activity. Participation is fundamentally social. Crossing the street at a busy intersection in Manhattan is a social situation and the pedestrians, cyclists, and drivers are participants. A public lecture is a social situation. Paying for groceries at the checkout stand is a social situation. A conversation at the dinner table is a social situation. There are actors who



participate in each of these social situations, who cooperatively perform and achieve an interdependent set of tasks and goals.

Every single event that an actor participates in is embedded in an ongoing community. The workplace, the students in a freshman dormitory, the family household, the crew aboard a ship, the regular patrons at the local bar or coffee shop, are all communities that have actors who regularly participate. Some of these are communities of practice but not all. To be a “regular” participant in a community means you are familiar with the relevant codes for communicating (Blom and Gumperz 1986; Halliday 1978), you understand the ongoing narrative (Bruner 2002), you are familiar with the recurrent activities and the common ways of “structuring” the interaction (Schank and Abelson 1975; Lewis 1969), you are a participant in the cultural history of the community of which you are a member (Vygotsky 1980; Wertsch 1991; Cole and Engeström 1993), and you know the representational practices that mediate communication and action (Hutchins 1995).

Participation has been a significant “guiding metaphor” for research on learning (Sfard 1998). For example, reflection begins with experience (Dewey 1916; Collins and Brown 1988), which depends on participation. Students benefit from their participation in a problem-solving situation that is with, or arranged by, an “expert” (Collins et al. 1991). In the sciences, a common practice is for students to learn through participation in a professor’s lab. In professional schools, practicums, and laboratories, students are given the opportunity to participate in activities that are representative of the target community of practice (Schön 1987). Internships, which also depend on participation, is another significant element of professional education. Becoming more knowledgeable, and a gradual transformation of identity, results from the ongoing participation in a sustained community of practice (Lave 1991; Lave and Wenger 1991; Hutchins 1995).

In the case study presented in this paper, the students post to their blog twice a week throughout the semester. Their participation is embedded in the context of being a student at Brandeis, taking the Internet & Society class, reading the assigned texts, attending lectures, and blogging together throughout the semester. The students participate with one another, sharing and responding to each other’s reflections and comments. A student does not just write a post, she writes a post, in her own voice, as a part of her participation in a blogging community. The posts and comments in themselves are information that is shared, they are part of the blogosphere commons, but they are not common knowledge. Common knowledge amongst the students is created by means of their participation in the ongoing social situation of the blogging community.

- i The increase and distribution of common knowledge result from activities both loosely and tightly coordinated.
- ii Things that are commonly known are not necessarily known by everybody nor at the same depth or with the same complexity.
- iii Mutual belief is a feature of the growth and distribution of common knowledge in tightly coordinated face-to-face joint activities like a conversation. But it is not a characteristic of loosely coordinated activities within the same community, where the growth and distribution of common knowledge also occurs. For the latter case, participation is a better basis for characterizing common knowledge.
- iv The content of the blogosphere is not knowledge, but the activities of posting, commenting, reading in preparation for writing a paper – the participations of the students – creates and distributes knowledge.

**Fig. 1** Key elements of the discussion of common knowledge and participation

377 Summing up

378 Figure 1 enumerates some of the underlying arguments about the interaction of  
379 common knowledge and participation.

## 380 Overview of the rest of the paper

381 Section “[Case study](#)” presents the details of the case study and provides a discussion  
382 of prior work on student blogging.

383 A single blogosphere event is defined as a post and whatever comments it  
384 accrues over the semester. A detailed discourse analysis of an example post and the  
385 comments it accrued over the semester is presented (see Section “[A single event](#)”).  
386 Taken together the initial post and the comments are an encapsulated conversation  
387 that is integrated into the ongoing class discussion of the course material in several  
388 ways.

389 A conversation/event has both primary and secondary participants. (see Sec-  
390 tion “[Degree of participation in a single event](#)”). The primary participants are  
391 those that make direct contributions to the conversation/event: either as the initial  
392 poster or as commenters on the post. A secondary participant is a student who does  
393 not make a contribution, but does read the conversation at one point during its  
394 development.

395 Longer conversations are significant because they indicate focal points in the  
396 blogging activity where students did the most interactive work in aligning their  
397 individual viewpoints (see Section “[More about the “conversations”](#)”). By definition  
398 the length of the conversation is directly related to the amount of primary participa-  
399 tion. The data will show that the longer conversations also attract more secondary  
400 participation, thus further amplifying the significance of the longer conversations as  
401 points of coordination that mediated sharing among the students. The less active  
402 students, however, had a more peripheral role in the longer conversations. For  
403 these students, the longer conversations stand out in the landscape; they read as  
404 much as expected, but their direct primary participation was significantly less than  
405 expected.

406 The analysis will show that the topics of conversation, which are composed of  
407 multiple “conversations”, are even more loosely coupled coordinations than the  
408 single events, but nevertheless further the growth and distribution of knowledge (see  
409 Section “[A single topic](#)”). The amount of common knowledge created for a given  
410 topic is directly related to the amount of blogosphere work on that topic. The *breadth*  
411 of the discussion is the total number of conversations on that topic; the *depth* is the  
412 longest conversation on the topic; and the *volume* is the total number of contributions  
413 from all conversations on the topic. Topics where the pattern of contributions are  
414 broad, deep, and large, create the most amount of common knowledge among the  
415 students.

416 Because posts on a given topic, and their comments, once created, persist in the  
417 blogosphere – they are part of *the commons* – students can increase the common and  
418 shared knowledge of that topic throughout the semester, participating in multiple  
419 conversations on the same topic intermittently. Because of the sporadic nature of  
420 participation there cannot be any certainty of sharedness.

During the semester, the students wrote two papers (see Section “[As a basis for other learning activities](#)”). Participation in the blogging activity – helped to create a base of common knowledge for all the students as they wrote the papers. The data shows that just before the deadline for the papers, there was a huge upswing of students reading in blogosphere; the students were mining the aggregated information. The correlation between paper writing and the preparation for writing papers provided by all blogosphere activities was positive and significant, as were reading and posting individually (but not commenting).

## Case study

In the Internet & Society course taught in Fall 2008, 25 students collaboratively blogged throughout the semester. The course explored the impact of the Internet on society. Topics for the course included the Internet revolution, online identity, information versus knowledge, technology and social inclusion, copyright and patent law, and democracy and the Internet. During the semester, in addition to other reading materials, the students read three books – this was the core content of the course. For two of the books, the students were required to write short papers. An important part of the class was for the students to integrate what they learned with their general knowledge about the everyday world they live in.

The students were undergraduates from a variety of disciplines. There were 3 science majors and 1 science minor in the class. There were 12 students majoring in the social sciences and 8 minoring in the social sciences. The remainder of the class was either in the humanities or fine arts. There were 8 females and 17 males enrolled in the course.

Lectures were presented using slides that summarized the key points. At the beginning of each lecture, hard copies of the slides were handed out to support student note taking. PDF versions of the slides were downloadable from the class website.

At the beginning of the semester an in-class tour and exercise introduced the students to the important features of the blogging environment. The students were required to blog at the pace of one post per lecture: there were two lectures per week. A typical post was 2 paragraphs in length. The students were also required to read and comment on each other's contributions. The minimum requirement for interaction for each student was to write at least one comment per week. The blogging work of each student counted for 35 % of his or her grade. The blogging activity was regarded as an opportunity for students to work together at reading the texts and learning the course content.

Much of the evaluation in prior work on blogging has been based on self-reports (surveys, focus groups) of the students and teachers (Davi et al. 2007; Sim and Hew 2010). As discussed below, we did a short survey at the end of the semester, but the main source of evaluation were detailed and labor intensive qualitative and quantitative analyses of students' online work.

All of the students' online work was automatically recorded in a transcript. The transcripts could be treated as an event log file and accessed using database queries. Other tools enabled alternate analysis methods, including discourse, conversational, interactional, and ethnographic analyses (Larsson and Alterman 2007).

The lecture slides provided a basis for tagging content in the blogosphere. For each set of slides, the instructor identified a set of key topics; other topics were identified during the analysis of blogosphere content. The topics were arranged in a tag hierarchy. The tag hierarchy was used to roughly identify the content of each blogosphere contribution, as well as the content of the two papers the students wrote. Additional tags were created to mark contributions that referred to an assigned reading (or quoted it), a lecture, another blog, or an outside article, site, or book. Other tags were used to mark the ways in which comments interacted with a post or other comments (Rafaeli and Sudweeks 1998; Thomas 2002; Beuchot and Bullen 2005).

During the semester, the students were engaged in in-class discussions of their preferences and attitudes. At the end of the semester we distributed a short survey. Questions were on a 6-point Likert scale (from 1, not useful, to 6, very useful); the survey also included open-ended questions. Student assessment of the blogging activity was positive. When the students were asked to rate the value of their online blogging work as a means of giving them first-hand experience with online collaborative learning, the average response was 5.6. In response to the question of whether the students felt the blogging community was useful, the average response was 5.3. When queried about the usefulness of the blogosphere for writing papers, the average response was 4.5. When asked as a yes/no question whether re-reading and reusing the blogging text helped the students write their papers, 67 % answered in the affirmative.

## Student blogging

Student blogging is both a discourse and a knowledge community.

In a discourse community (Brown et al. 1993; Wertsch 1991), students can communicate with one another throughout the semester. An online *discourse community* is where students question, criticize, explore, negotiate meanings, share expertise, constructing and developing new understandings and a “common mind and voice” (Brown et al. 1993). Within a discourse community, communicative events occur in certain kinds of settings via expected channels (Hymes 1964). Members of a discourse community share some common public goals (Swales 1987). There exist standard mechanisms for communication and expectations about “topics, the form, function, and positioning of discursal elements”. There are expected codes of communication and topics.

As a genre of communication, blogging throughout the semester also forms a basis for a knowledge community (Scardamalia and Bereiter 2006, 1994; Miyake and Koschmann 2002). In the blogosphere the students work together, improving each others’ ideas. There is advancement to community knowledge as a result of the students activity. The students constructively use authoritative information. The blogosphere provides students with the opportunity to participate in the collaborative production of knowledge, creating emerging understandings and skills.

In a student blogging community, each student owns her own blog. The blog is composed of multiple posts written by the blog owner during the semester. Students can browse in the blogosphere at any time, reading each others blog posts and commenting upon them when appropriate. Each student has full control over the content of her blog. Student blogging is a social activity.

Blog posts can be lengthy, and they are self-contained. The format of a post or comment is flexible and adaptable to different kinds of contributions (Du and Wagner 2005). Many different conversations on the same topic can be produced: each post potentially initiating a new conversation. Student blogs occupy a 'middle space' between the online world and the traditional classroom setting (Oravec 2003); blogs can include hyperlinks to other online resources (Blood 2002; Ellison and Wu 2008; Davi et al. 2007). Student blogging facilitates extended reflections on, and discussions of the course material beyond the boundaries of the classroom itself (Betts and Glogoff 2004; Kim 2008). The informal nature and more relaxed environment of blogging encourages students to explore and publish their own ideas under less time pressure, within a different kind of social context from that of an in-class discussion (Althaus 1997). The overhead of learning to use the technology is low (Glogoff 2005; Duffy 2008).

At one level, blogging is an activity composed of writing, reading, and commenting, and at a second level, the students share, reflecting and interacting, in their own voices, about the content of the course (e.g., Deng and Yuen 2011). At a third level, over the course of the semester, the contributions of the students form a 'warehouse of captured knowledge' that can be mined later in the semester for other kinds of learning activities (Williams and Jacobs 2004).

*Social orientation* Blogging has a social orientation in that each post initiates communication with other students; it fosters a sense of community and provides a channel for interaction amongst the students (Deng and Yuen 2011). As a participant in a blogging community, a student develops a social presence as an individual person (Cameron and Anderson 2006).

*Identity* Contributions to the blogosphere simultaneously maintain relevance to the course material while "retaining the self-directed, internal focus of the owner" (Cameron and Anderson 2006; Ellison and Wu 2008; Lara and Lomicka 2008). The students establish personal and intellectual ownership of their work (Ferdig and Trammell 2004); the opinions and positions the students develop in their posts mark their individuality (Williams and Jacobs 2004). Each student maintains an online identity (Ferdig and Trammell 2004; Stevens et al. 2005; O'Connor 2001), developing an individual style and voice (Mortensen and Walker 2002; Ellison and Wu 2008), projecting an "image" of who they are, created out of a variety of elements, from text to audio or video (Deng and Yuen 2011).

*Learning activity* Blogging as a learning activity provides an opportunity for students to move beyond just re-reading their notes and doing assigned readings. It invites students to be reflective, to put in their own words what is significant about the material and to make sense of the causal relations among the different elements of the course content (Zagal and Bruckman 2007; Williams and Jacobs 2004; Nardi et al. 2004; Salmon 2002; Deng and Yuen 2011); it provides opportunities for students to become analytic and critical as they consider how their ideas may be perceived by others (Williams and Jacobs 2004; Zagal and Bruckman 2007; Ellison and Wu 2008). The kind of collaborative explanatory discussion that can emerge in the blogosphere benefits learning (Deitering and Huston 2004; Chi and VanLehn 1991); giving and receiving elaborate explanations is a positive predictor of learning (Webb 1991, 1992,



2001). Writing is a significant learning activity for constructing knowledge (Forte and Bruckman 2006).

Students perceive reading in the blogosphere as improving their understanding of the course concepts (Ellison and Wu 2008), and it helps them to better organize ideas and consolidate knowledge (Zeng and Harris 2005). By reading each other's blog posts students can further develop their positions in the context of each other's writing; the students are exposed to alternate ways of "seeing" and "constructing" what is significant and why (Oravec 2002; Ferdig and Trammell 2004).

## The blogging environment

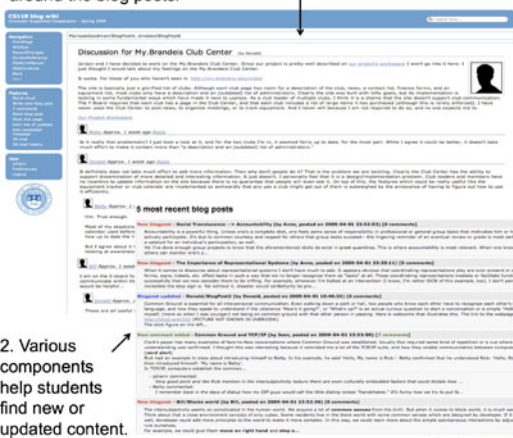
The blogging environment was developed over a number of years in several different courses (Larusson and Alterman 2009) using the design-based approach to research (Collins 2006; Barab 2006; Cobb et al. 2003). At this writing, the blogging environment has been used 10 times in 6 different courses taught at Brandeis by the authors over a 5-year period. Most of the courses were in Computer Science; one of the courses was in Neuroscience.

Manuals for the blogging environment and some screencasts showing how to use the technology already exist (Larusson 2010). An in-class lab has been developed that teaches students how to use the blogging environment.

Figure 2 shows parts of the version of the blogging environment used in this case study. Each student has a blog. A student blog post shows a picture of the author, a title, and tag that relates the post to a lecture given in class (see insert 1). The tags help students navigate the blogosphere. At the bottom of a post (not shown) there is a list of people who read the post. Any threaded discussion that emerges is shown below the relevant post (see insert 1).

At the "front entrance" to the blogosphere, there is a list of the most recent posts or comments on posts (see insert 2); each item in the list displays the name of the author of the post or comment and a short excerpt – this is the community view.

### 1. Students engage in "threaded" discussions centered around the blog posts.



2. Various components help students find new or updated content.

### 4. A daily email newsletter summarizes activity in the preceding 24hrs.



### 3. Students assign pre-defined tags to their blog posts so it is easy to find related blog posts.



Fig. 2 The blogging environment



Alternately the posts and comments of an individual student can be displayed and accessed using the student's name – this is the individual view.

The blogging environment included mechanisms that allowed the students to interact with the blogosphere as a warehouse of student reflection and discussion. Content could be searched by keyword(s) or tag, and posts accessed via a word cloud. When students began to write a blog post, they used one of the tags that are assigned to each lecture (see insert 3). When a student began to write her post she assigned a title to the post (not shown). Students (and the instructor) received daily email newsletters (see insert 4) that summarized the online blogging activity of the class in the previous 24 hours. The newsletter listed the title, author, and first line of all the newly created blog posts, and a list of similar information for any new comment. Students could use links in the newsletter to directly navigate to any post or comment on the blog site that was of interest. Unfortunately we were unable to capture in the transcript information about the usage of the newsletter; we know from the in-class discussions that some students did use it.

### A single event

Lectures and in-class discussions are a cooperation between the teacher and the students to understand the material. The cooperation is asymmetric. There is an authority, the teacher, who is the presenter – the “guardian” of the “official story” on the course material. The texts of the course are “coded” in the semiotic of the field, couched in forms and terms that compose an “authentic” discourse. In class, the teacher acts as the “interpreter”. When the discussion moves to the blogosphere, the conditions of the cooperation change significantly. The blogosphere is a student-owned space. Students can reflect and “converse” informally, on their own time schedule, at different times, from different places. The students learn to “talk” in their own “voices” about the material: they are practicing and learning to talk and reason about the material, firming up their “grasp” of it. Student work in the blogosphere is a collaboration amongst the students.

The content of the course can be organized into themes that are composed of topics. A theme for the Internet & Society course is information, and the topics that compose it include the limits of information, information vs. knowledge, and the social life of information. The instructor's lecture is a narrative that explores the themes of the course, revealing and explaining important issues and relationships within the course topics. Each point made in the lecture has a “frame”. The frame provides a viewpoint from which certain kinds of issues become foregrounded. For example, the Internet makes accessible from any location tremendous amounts of information. One way to frame the issue of the limits of information available on the Internet is to explore the trade-offs of information available while “working home alone” vis-à-vis the Internet versus the knowledge and information available while working with other people at the same location. Given this frame, students may or may not converge on the same explanation for a given event. These “talking frames” are semiotic tools that first mediate the discussion in class and later mediate the online discussion amongst the students.

Initially the line of arguments, the explanations provided by the teacher are thin, skeletal. The students need to work at exploring their meaning, seeing how

they interact with other ideas and explanations, filling out the details, making them substantial. In a post, a student will present a topic at the beginning of her post. Her presentation of the topic provides a frame for the rest of her discussion. In many cases, the topic of the post coincides with a “talking frame” provided in the lecture or by the course readings.

In the blogosphere, ideas and concepts are poked, prodded, and played with. The students play with the talking frame. Use it. Analyze it. Run it, and see how it works. The externalization of descriptions, reflections, explanations, analyses, and arguments makes them accessible to other students, sedimenting (Stahl 2006) the collaborative sense that is made with the talking frames available to the class. The students learn how to re-produce the course narrative with the frames provided by the instructor during lecture. As the students explore a talking frame they collectively produce “piled up structures of inferences and implication”, that is *thick description* (Geertz 1973; Ryle 1968): the students are collaboratively thickening the initial descriptions and explanations of their everyday world, embellishing and adding to the skeletal structure that was first presented in an assigned reading or during lecture. The more the students produce explanations and descriptions with a given talking frame, the thicker will be the set of descriptions, the more it is a part of the assumed background knowledge of the students (Alterman and Larusson 2011).

The persistence of content in the blogosphere commons throughout the semester enables the students to make progress in creating common knowledge and sharing their understandings of the course material on their own schedule when it becomes relevant to what they are thinking about. A single conversation in the blogosphere could potentially span the entire semester; however, because participation is asynchronous and can occur over extended periods of time, earlier participants can potentially miss the contributions of later participants. The students can mine the aggregated information as a resource for another learning activity, when the situation warrants it.

As the students contribute to the blogosphere, the talking frame, a semiotic tool, becomes a part of how the students reason about the course material, it is appropriated (Baker et al. 1999):

Children are said to appropriate cultural objects (material and semiotic tools), when they learn from other members of the culture how those cultural objects are used, and what they are used to accomplish. Appropriation is not a process of rote-learning, in which the individual simply adopts the facts and assumptions of the culture. Children appropriate these objects by participating in their use with more expert members of that culture. Learning results from the child's own experiences and practice with the object under the guidance of an expert. Thus, it is not a matter of information transmission from the expert to the novice, but of the novice “making this tool his own” (Leont'ev 1981).

The trajectory is from an inter psychological plane with the instructor, to an intra psychological plane without the instructor (Vygotsky 1978). The talking frames are the semiotic tools that mediate the activity.

To summarize this discussion:

1. Assigned readings and the teachers lectures provide talking frames for explaining course material.

Q3

Q3

Q2

Q3

2. In the blogging community, the students practice at “speaking” with the talking frames. 676
3. In the blogging community, students appropriate the talking frames by using them to mediate the production of thick descriptions about phenomena relevant to the course content. 677
4. Through the use and application of the talking frames, the students enrich their common background knowledge, collectively producing better, richer, more nuanced and textured descriptions, explanations, analyses, and arguments. 680

A post and some comments 684

A post and all of the comments it accrues during the semester represent a single event or “conversation”. 685

Contributions to the blogosphere, either post or comment, have one or more talking points, issues that are addressed in a post or comment. Contributions refer to the common background of the students, either as co-members of the class (e.g., their common experience of reading an assigned text) or as undergraduates at the same institution (e.g., using Wikipedia to help do their schoolwork). The cases, examples, issues, analyses, and arguments that are drawn from the common, shared, and individual backgrounds of the students further ground each contribution and the conversation it engenders. The discourse mode of a contribution can vary, ranging from argument to (re-)articulation to reflection to analysis to story telling – all within the bounds of a single post or comment. 686

The opening text of a blog post is where a student directly or indirectly connects his or her reflection to what he or she assumes is common knowledge among the students in the class (see Fig. 3). Students refer to, or quote, examples, arguments, and distinctions made in the text (1). They also mention in-class discussions (2), the presentation slides of the instructor (3), other activity in the blogosphere (4), as well as experiences that are likely to be held in common amongst the students like internships, googling, and studying abroad. Frequently posts begin with multiple kinds of references to common knowledge. 697

By connecting and framing each post in terms of things that are likely to be common knowledge, the author of a post can expatiate on that topic, embellishing, creating deeper and more complete explanations and alternate perspectives that are available to other students for review and comment, and thereby increase the amount and distribution of what constitutes, for the students, common knowledge of the course material. 705

1. Information vs. knowledge is an important distinction presented in The Social Life of Information. I have to agree that information on its own is not good enough, not complete enough to qualify as knowledge. I see knowledge as ...
2. Talking in class about limits of information on the internet made me think that we cant expect internet to solve all ours problems at once. The cant expect that Amazon will buy us book automatically catered to our preference. We cant expect...
3. I've been thinking a bit about the limits of information, especially the second to last question asked in the slides: What kind of critical commentary does this lead you to make about the huge amounts of information that are being generated on the Internet?
4. After doing some reading and viewing some blogs, I began to feel that the amount of information that is offered to internet users is having a major effect on the world and the type of news that is being presented. One of the blogs commented on the question that was presented in one of the class slides: What kind of critical commentary does this lead you to make about the huge amounts of information that are being generated on the Internet?

**Fig. 3** Excerpts from posts

711 *Blog post*

712 A tremendous amount of information is produced each day on the Internet. Can  
 713 this information solve/change everything? Can agents/bots help us to manage all  
 714 the information? What is the difference between information and knowledge? Does  
 715 access to information mean that people will be able to work home alone and that they  
 716 no longer need to work in the office? How much does collocation matter? Issues  
 717 like these are explored in the book *The Social Life of Information*. Although they  
 718 have a balanced view, Brown and Duguid (2002) are intent on showing the limits of  
 719 information. Their exploration of these issues provides many motivating examples,  
 720 presenting alternate viewpoints, and arguments.

721 One issue in *The Social Life of Information* concerns the pros, cons, and condi-  
 722 tions of working home alone. This is a theme that has several topics associated with  
 723 it. Does the information available on the Internet free people to work home alone?  
 724 Is collocation at the office still necessary? Working home alone is a talking frame  
 725 that can be used to explain things like the limitations of information, the relation of  
 726 information to knowledge, and the significance of collocation.

727 Figure 4 shows a sample blog post. The student was reading in the blogosphere  
 728 before composing this post. The topic is “working home alone” (see line 1). The  
 729 opening line also refers to other posts: it refers to other commentaries without being  
 730 specific. On lines 9–10, the post explicitly refers to two cases that another student in  
 731 class, Nancy, discussed in a previous post on this topic. On lines 10–13, the author  
 732 of the post refers to his own experiences of working home alone. Another thread of  
 733 prior conversation that is weaved into the post is to an argument made in the Brown  
 734 & Duguid book on the *The Social life of information* (lines 4–6), countering that it *all*  
 735 *depends on the person*. The mode(s) of the post are reflective (the discussion of his  
 736 own experiences at working home alone) and analytic (beginning line 14), providing  
 737 further arguments and examples (lines 18–2) for the complications of working home  
 738 alone.

1 I know there are few blogs about working from home, but I still want to write one more just to let my  
 2 thoughts out. I believe that working from home is not very expensive if you know how to set up everything  
 3 you need. And it is not hard at all if you know your limit and if you are able to push yourself to do work.  
 4 Time management skill also comes in handy in such cases. I know that In ‘‘Social Life of Information’’,  
 5 Brown and Duguid had depicted that it is hard to work from home and it is expensive. Even with their  
 6 clarification on this subject, i think that it all depends on the person. There are some jobs that makes it  
 7 impossible for people to work from home because some people just have to be out there. For example, if you  
 8 are a director or musician... yea sure you get to work at home to write and organize your arts and materials.  
 9 However, you still need to get out to do get the outcome of your hard work. On the other hand, like Natalie  
 10 mentioned how her friend and her dad works from home. I know that I can’t concentrate when I am in  
 11 my room... but when I am able to concentrate I can do the work anywhere. I get distracted when I  
 12 am in my room, then again when I have a test or something it does not matter to me where I study  
 13 because I stay focus.

14 Now let us talk about the expenses for ‘‘working from home’’. Well, to make a home office in general...  
 15 all you rally need is a computer and a good internet connection. And most Americans have this set up at their  
 16 home so this should not be hard. Thus, I believe it is all up to the person for what he does and how he does it.  
 17 For some people it is better to stay put in a office with other co-workers because it helps them to get the work  
 18 done. It might not be just them, it might be also about the system of the job. For example, if you don’t have  
 19 the knowledge to operate company system by yourself then you may want to stay in the office to get  
 20 the job done with the help of your co-workers. In this case, you can not work from home even if you  
 21 want to since the situation does not depend on you. The Social Life of Information is a great book when it  
 22 comes to giving examples of real lives.

**Fig. 4** A post on working home alone. (Note, a different font was introduced by authors for highlighting purposes)

Participation and Common Knowledge

1     **Comment 1:** I understand what you are saying when “it all depends on the person” as to whether  
2     or not you are able to work at home but it is also important to see the social implications of work-  
3     ing in an isolated, home environment. When people work from home, even if they are able to concen-  
4     trate, they are missing the social aspect of working with other people and learning from one another while  
5     in the work place. “The Social Life of Information” even says that the “office space is not neutral  
6     ground...dense with highly charged social relations.” (pg 73) While I know that you are discussing the  
7     problem of being able to make money from home, but it is also important to address the other issues that could  
8     arise from home working.

9     **Comment 2:** I agree with “it all depends on the person” as well, however it definitely also depends on the  
10    company you work for. I know friends who work for a company remotely, and while they are great at their job, it is  
11    clear that they would be more effective working from the office. It is so much easier to walk up to someone and ask  
12    them a question than it is to email them and wait for a response. While there is a definite missing social aspect,  
13    it also can reduce efficiency at your job. Or it could increase it, too, if the workplace happens to be distracting.

14    **Comment 3:** I do recall the book stating “office space is not neutral ground...dense with highly  
15    charged social relations” and you are absolutely right with your point of view. But i was more focusing  
16    on how it is possible to work from home (if it's option). I also liked how you brought the social networking in office  
17    which I totally missed to point out. Then again, people that works from home may have different priority on such  
18    situations. I wonder what they are...

**Fig. 5** Comments made on the post on working home alone. (Note, a different font was introduced by authors for highlighting purposes)

Comments

739

Figure 5 shows the comments that were made on the post in Fig. 4. Each comment 740  
links to a different talking point in the post. The first comment explicitly links to 741  
a phrase in the initial post (line 1): “it all depends on the person”. The second 742  
comment also links to this specific phrase (line 9). In both of these cases, the linkage is 743  
established in the opening line. Both comments address the social part of the Brown 744  
& Duguid argument; comment 1 specifically quotes the Brown & Duguid book (lines 745  
5–6). In the third comment, the initial poster responds to the comments of the other 746  
two students, quotes the text (lines 14–15), and then proceeds to clarify his position. 747

Taken together the initial post and the comments are an encapsulated conver- 748  
sation that is integrated into the ongoing class discussion of the course material 749  
in several ways. It specifically links to prior posts and a reading for the course. It 750  
acknowledges prior arguments, further thickening the discussion, adding meat on the 751  
bone, explicating a deeper sense of what the material means. Argument, reflection, 752  
and expatiation are the modes of the contribution. 753

Degree of participation in a single event

754

During a single event, there are primary and secondary participants (Alterman and 755  
Larusson 2010). The primary participants are those that make direct contributions 756  
to an event. The secondary ones witness the action but do not make direct contribu- 757  
tions. A tertiary participant is one that does not directly witness an episode within 758  
the community but they hear about what happened from a third party at a later date. 759

In the blogosphere there are two ways to be a primary participant: author a blog 760  
post or act as a discussant on another student’s post. Secondary participation occurs 761  
when a student reads either a post or a discussion that has emerged online. A tertiary 762  
student participant reads a brief description of a recent post or a new comment on a 763  
post in a newsletter. 764

Other differences exist between the three degrees of participation. As discussed 765  
earlier, writing a post is a form of learning by construction (Forte and Bruckman 766

2006; Zagal and Bruckman 2007). The preparation for composing a comment makes the student read the post more critically, which improves comprehension (Amer 1994; Brown 1981). Both kinds of primary participation create the potential for receiving feedback, while further establishing the student's identity and social presence within the blogosphere.

Secondary and tertiary participation are more peripheral kinds of participation. The secondary participant accesses the informational content of the blogosphere commons, but he has less engagement in learning the course material – he does less work and there is less payoff for learning. Because the secondary participant does not make a contribution, she neither establishes her identity or much social presence. The tertiary participant receives less information, is even more peripheral in her participation – for the other students in the class there is no trace of the tertiary participant's activity.

### More about the “conversations”

Discussions amongst the students are focal points in the blogging activity where students did primary work at exchanging viewpoints on a topic and creating common knowledge. The students who contribute to the conversation benefit most from the giving and getting feedback, and have a demonstrated social orientation (especially the commentators). It is in the interaction among the students that a sense of community is created.

A post without a comment may have been read, but it has attracted no feedback. There are a lot of reasons why this can happen. Ranging from a lack of timeliness – the post was written after a majority of the students started talking about another topic – to poor composition or analysis to lack of insight. In any event, a post without a comment, a “conversation” of length 1, has lesser impact.

A post that elicits a response from another student does so for any number of reasons: it says something substantial about an assigned reading or a lecture or an in-class discussion, it presents an interesting or insightful example or argument, it relates to the common experiences of the students, it echoes thoughts of the reader, or even because it is amusing.

Each time a contribution is added to a developing conversation, it will reappear at the top of the list of most recent contributions that is featured on the front page of the blogosphere. The longer the conversation, the more often it is visible on the front page. The visibility of a conversation affects its impact on the development of common knowledge.

The data shows that roughly 55 % of the time that the students browsed in the blogosphere during the time they wrote their posts, so since the longer conversations are most often visible, they are more likely to be read by those who browse as they compose a post. The data also shows that there was a strong positive correlation between the length of a conversation and the number of read events ( $r(151) = .061, p < .01$ ). A study by Pena-Shaff et al. (2005) and Kim (2008) found that in a blogging community 94 % of the student will check for feedback on their contributions. Factors like these amplify the impact of a longer conversation on the growth and distribution of common knowledge.



Participation and Common Knowledge

**Table 1** Average percent of students who had either primary or secondary participation in a conversation of a certain length

Conversation length	% Primary or secondary participation	
1	15 % of class	t1.1
2	21 % of class	t1.2
3	26 % of class	t1.3
4	32 % of class	t1.4
5	35 % of class	t1.5
6	36 % of class	t1.6

There were a total of 246 blog posts on the three books read during the semester. There were 56 conversations of length 2 and 38 of length three or greater ( $\geq 3$ ). A post with no comments or a single comment was not very eventful: it happened roughly 84.4 % of the time. A post with two or more comments happened less often, 15 % of the time, and consequently was much more eventful as a “happening” to take note of. As shown in Table 1, the students did take note: the longer the conversation, the larger the set of students who participated either as a primary or secondary participants. An average of 19.3 % of the students participated (primary or secondary) in conversation of length one or two. An average of 30.6 % of the students participated in a conversation of length  $\geq 3$ .

The larger the participation, the greater the impact of the conversation as a focal point for creating common viewpoints and distributing knowledge.

The students who were primary participants in longer conversations received more feedback on their ideas, explicitly shared more knowledge, and connected to other students, and larger groups of students, more often. Because longer conversations were read more widely, the primary participants were more visible, thereby increasing their social presence within the community.

The students who were secondary participants in the longer conversations, were not as visible or connected, but they did increase their sense of community by being “aware” of the events/conversations that attracted relatively more attention and being “in” on the key events in the distribution of common knowledge.

Participation in longer conversations

Many of the comments included either an agreement with, or an expatiation of, another student’s point: this happened 45 % of the time in blogosphere conversations on the three books. These sorts of confirmations moved the students towards creating a common understanding of a particular interpretation of some portion of a text or lecture. Other comments, might have agreed with some point, but asked for clarification or espoused alternate viewpoints; this happened 54 % of the time. Give-and-take on a talking point – a post attracts a comment to which the poster responds – can only happen in conversations of length 3 or greater; this happened roughly 18 % of the time in the conversations of length  $\geq 3$ .

Other studies of student blogging (Deng and Yuen 2011; Hodginsons 2007) have reported that conversations in the blogosphere were short-lived rarely extending beyond two levels. In this case study, on average, there were 4.2 longer conversations ( $\geq 3$ ) per lecture on the three books (there was roughly one post due per lecture

during the semester). In total 38 posts (roughly 15 %) received two or more comments.

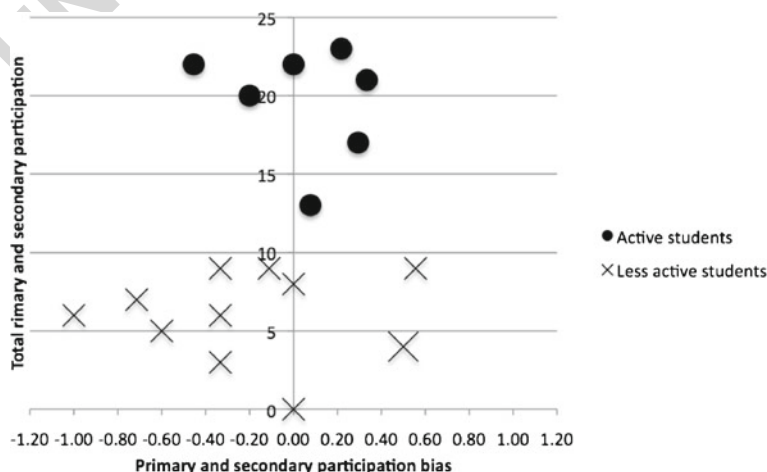
If there was a subset of students who were disproportionately active in the longer conversations (length  $\geq 3$ ), these students are the most likely to be connected to what is “going on” in the blogosphere and to each other, who feed off the social interaction, who are the most socially-oriented, and who seek out the interaction. These students do the most sharing of knowledge, and those among them that contribute establish the greatest amount of social presence. These are the core group of participants.

*Active in longer conversations* For each student in the class, we counted the number of conversations of length  $\geq 3$  on the three books in which the students made a contribution (primary participation), and also counted the number of conversations of length  $\geq 3$  that they read but did not directly participate (secondary). For each student we then computed the following:

$$\frac{\text{contributions} - \text{reads}}{\text{contributions} + \text{reads}} \quad (1)$$

Figure 6 shows the results as a scatterplot. A negative number on the x-axis means a student was more of a secondary participant than a primary one; a positive number on the x-axis indicates a student was more of a primary participant. The y-axis is a count of total number of primary or secondary participations the student made; students with high values were the most active. In order to show trends we removed the four students who were within .5 of the average number of primary or secondary participations, which was  $M=10.68$ . Students above the mean are referred to as the *active* students and those below the mean as the *less active* students. There were fewer primary participants than secondary ones.

None of the students who were most active on the longer conversations were *batchers*. We computed the ratio of blog posts to login sessions. *Batchers* were identified as those whose ratio of posts to sessions was above the average. Eight out



**Fig. 6** Trends of primary and secondary participation

**Table 2** Participation in longer conversations

Participation	<i>N</i>	Primary	Secondary	
Active	8	25.7 %	51.4 %	t2.1
Less active	13	7.3 %	16.2 %	t2.2 t2.3

of the 26 students were batchers. The data shows that the batchers were less active: they wrote fewer blog posts and tended much more towards secondary participation than primary participation (Alterman and Larusson 2009).

On average, each active student contributed to 25.7 % of the longer conversations and read 51.4 % of them (see Table 2). On average, each of the less active students contributed to 7.3 % of the longer conversations and read 16.2 % of them. This difference is large and significant. A t-test on the longer conversations showed that the active students were significantly more active than the less active students as both primary ( $t(21) = 5.9733, p < .0001$ ) and secondary participants ( $t(21) = 7.4151, p < .0001$ ).

*Disproportionally active* We performed a chi-square goodness of fit analysis to test whether the observed primary or secondary participation of the active students significantly exceeded expectations (see Table 3). For the null hypothesis we assumed the commenting and reading activity of each student was evenly distributed among all the discussions, whether they were longer or not. The difference between the observed and expected values for the active students' primary participation was significant  $\chi^2(1, N = 21) = 25.419, p < .0001$ . The difference between their observed and expected secondary participation was also significant,  $\chi^2(1, N = 21) = 300.708, p < .0001$ . In other words, those students who were active in the longer conversations, tended to be more active in those kinds of events than they would be otherwise (see Table 3).

A chi-square goodness of fit comparison of the online work of less active students shows that their primary participation in the longer conversations was significantly less than expected ( $\chi^2(1, N = 21) = 22.361, p < .0001$ ), but the difference between observed and expected reading behavior was insignificant. In other words, the less active students' participation in critical events was more peripheral than was expected (see Table 3).

*Summary* To summarize this discussion:

1. The longer discussions are significant because they indicate focal points in the blogging activity where students did the most work at creating common viewpoints for understanding the course material.
2. The students who were most active in the longer conversations, were more active (both primary and secondary participation) than could be expected from their participations in other conversations. This suggests that these students were either better at finding and creating good content or their orientation was more social, or both.

**Table 3** Expectations about student participation in longer conversations

	Primary	Secondary	
Active	exceeds expectations	exceeds expectations	t3.1 t3.2
Less active	below expectations	met expectations	t3.3

3. In contrast, the students less active in the longer conversations had more of a peripheral role in the longer conversations: they read as much as would be expected, given their participation in other conversations, but not more than expected, and their direct primary participation was significantly less than expected.

### A single topic

Over the course of the semester, there can be several events/conversations on the same topic. During the semester, there were 6 posts and 10 comments of posts on the topic *working home alone*; a total of 3088 words were produced. The average post length was 341 words; the longest post was 507 words and the shortest 113. The average comment length was 104 words; the longest comment was 164 and the shortest 37. Taken together the posts weigh the pluses and minuses of *working home alone* versus working with others in the same location. The posts and comments included relevant examples, stories, reflections, re-articulating content previously discussed in the text or during lecture, piling up descriptions, explanations, and arguments.

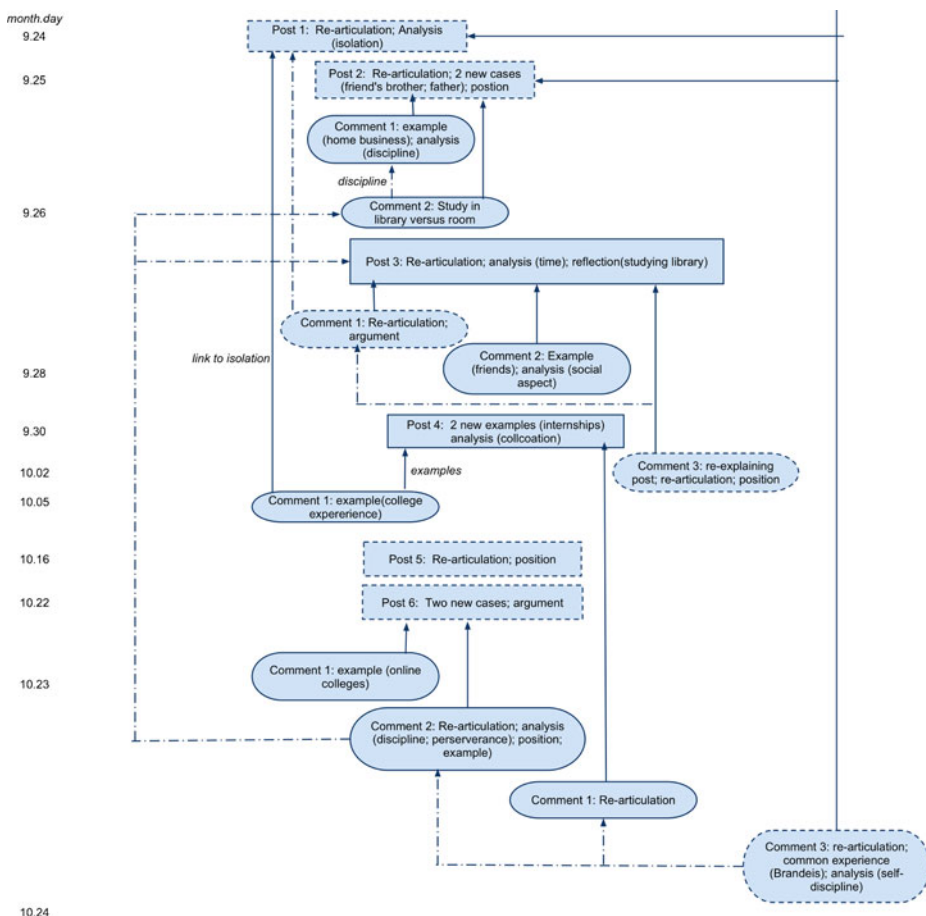
Figure 7 depicts the distribution of student collaboration over time as they create common knowledge on the topic *working home alone*; a more complete discourse analysis can be found in Alterman and Larusson (2011). Contributions are listed in chronological order; the month and day of each contribution is listed in the left hand column. Rectangles are posts and ovals are comments. Post or comments with dotted line boundaries indicate an explicit reference to, or quotation of, the book. Arrows show references to previous posts and comments. Arrows with solid lines show which post the comment was attached to; arrows with dash dot lines show references to other posts and comments.

The contributions to the blogosphere on the topic *working home alone* occurred over a one-month period: September 24 to October 24. Half of the 16 contributions occurred within a week of the discussion of the topic in class: during that time there were 4 posts and 5 comments. Out of the 16 total contributions on the topic *working home alone*, 7 of them either referred to the text or directly quoted it (ovals and rectangles with dotted lines). One post, Post 5, was completely isolated in that it attracted no comments or references, nor did it reference any other posts or comments. By way of contrast, the second comment on Post 1, referenced 4 other contributions, and comment 2, on Post 6, referred to a comment on Post 1 and was referred to by two other posts. Post 3 and its comments were discussed in Section “A post and some comments”.

Data like this shows that the blogosphere commons continued to mediate collaboration amongst the students for extended periods of time.

Depth, breadth, and volume.

One can get a feel for the “shape” of the discussion on any topic by characterizing the depth, breadth, and volume. The *breadth* of the discussion is the total number of conversations on that topic. The *depth* is the longest conversation on the topic. The *volume* is the total number of contributions from all conversations on the topic.



**Fig. 7** Graph depicting the collaborative thickening of the talking frame *working home alone*. Rectangles denote posts and ovals represent comments. Post or comments with dotted lines indicate explicit reference to, or quotation of, the book. Arrows indicate references to previous posts and/or comments. Contributions are listed in chronological order; month and day of each contribution is listed in the left hand column. Arrows with solid lines show which post the comment was attached to; arrows with dash dot lines show references to other posts and comments

Q5

Some topics have lots of short conversations; for other topics, a few posts mediated a lot of participation; and other topics never got off the ground.

Imagine a topic where there are six different conversations, but each of length 2. Contrast this to another topic where there are two conversations each of length 6. Both topics produce the same volume of material. The first topic has greater breadth; the second has greater depth and is more substantial because the students are building on one another's contributions. The second topic also produces more common knowledge.

Table 4 lists all the conversations in the blogosphere on the talking frame *working home alone*. The breadth of the discussion was six, the depth was 4, and the volume was 16. The volume of the discussion is directly related to its thickness, but the

**Table 4** The count of the number of conversations of each length on the topic *working home alone*

Length	Count	
1	1	t4.1
2	2	t4.2
3	1	t4.3
4	2	t4.4

962 average length of a conversation, or the number of longer conversations, is what  
963 measures the substance.

964 Mutual knowledge?

965 Do any two students reach the exact same understanding of the talking frame *work-*  
966 *ing home alone*? Unlikely. There are connections between the multiple conversations  
967 that emerged. Individual students carried ideas from one conversation to another.  
968 Individual students read some but not necessarily all of the contributions on the  
969 topic. There was some convergence, but also differences of opinion. From these  
970 separate loosely coupled conversations, general common knowledge of the topic  
971 *working home alone* developed. Was mutual knowledge achieved? No. Was there  
972 sharing? Yes, but it was asymmetric, depending on factors like when and how much  
973 of the material was available in the commons different students read.

974 The notion of “polarization” was another topic introduced during the course  
975 of the semester. The book *Republic.com 2.0* (Sunstein 2007) reported on evidence  
976 that *polarization* tends to occur within groups of likeminded individuals, and the  
977 claim was made that the Internet exacerbated that tendency. Let  $x_1, x_2 \dots$  represent  
978 contributions to the blogosphere that discuss the possibility of cyberspace breeding  
979 polarized factions. Table 5 shows an idealized sequence of events in the blogosphere  
980 that are ordered in time. At times  $t_1, t_2, t_3$ , and  $t_4$  contributions to the blogosphere are  
981 made that develop this talking frame:  $x_1, x_2, x_3$ , and  $x_4$  are added to the blogosphere.  
982 Between times  $t_5$  and  $t_6$  there is extensive reading in the blogosphere in preparation  
983 for writing the paper on *Republic.com 2.0*.

984 For the sequence of events shown in Table 5, at no point does it appear that Mary  
985 and Joe have attained mutual knowledge on  $x_1$ . At time  $t_4$ , Joe knows Mary  
986 read his post. At which point he may or may not believe that she understood his  
987 contribution. Suppose Joe believes Mary understood his contribution. He still does  
988 not know if Mary believes that he believes she understood his contribution. At time

t5.1 **Table 5** A sequence of events in the blogosphere

Time	Event
t5.3 $t_1$	Joe posts a blog on “polarization”, $x_1$ .
t5.4 $t_2$	Mary reads Joe’s post $x_1$ and posts comment $x_2$ .
t5.5 $t_3$	Mary posts a blog on “polarization”, $x_3$ .
t5.6 $t_4$	Joe reads Mary’s comment on his post and replies. $x_4$ .
t5.7 $t_5$	Ed reads the conversation between Mary and Joe.
t5.8 <i>3 day period before</i>	<i>Extensive reading by other students in class.</i>
t5.9 <i>paper is due</i>	
t5.10 $t_6$	Ed reads Mary’s post on “cybercascades”.
t5.11 $t_7$	Mary reads Joe’s reply to her comment on $x_1$ .



$t_7$ , where Mary reads Joe’s reply to her comment, even if Mary believes Joe believes she understood his contribution, Joe will not know that.

Throughout the semester, because all contributions are broadcast to the entire class, students are both “sharing” and “borrowing” from one another. Right before the paper deadlines there was widespread reading in the blogosphere. Even while authoring posts, students would frequently sample other contributions before writing their own: over the entire semester, 55 % of the time the students browsed while authoring a post, and 35 % of the total number of reading events occurred while students were authoring posts. On average 43% of the topics that a given student “considered” during the blogosphere activity occurred as a result of commenting or reading, which is another indicator that ideas are being shared.

But the “borrowing” and sharing of knowledge is asymmetric as can be demonstrated by considering again the idealized sequence shown in Table 5. At time  $t_2$ , Mary believes she shares knowledge of  $x_1$  with Joe, but Joe does not believe he shares knowledge of  $x_1$  with Mary until time  $t_4$ . At time  $t_5$ , Ed may believe he shares knowledge of  $x_1, x_2$ , and  $x_4$  with Joe and Mary, but neither share that with him. And so on. In each of these cases, the “borrowed from” does not necessarily know that the borrowing occurred.

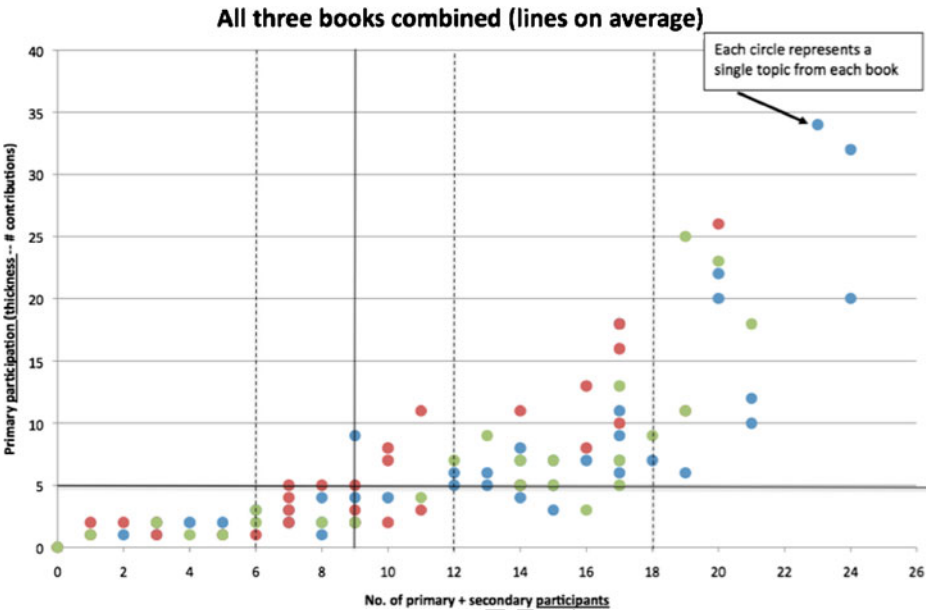
Accumulation and distribution of common knowledge of the topics

Although students do not technically achieve mutual knowledge from their participation in the blogging community, knowledge accumulates, advances, and is distributed as a result of their activity: common knowledge grows out of student participation in blogging. What makes for common knowledge is a product of two things: the amount of accumulated knowledge and the distribution of that knowledge. For the blogosphere, the amount of accumulated knowledge is a function of the number of topics that are discussed in the blogosphere and the extent to which those topics are discussed. The other factor, distribution, measures how widespread was the interaction of students with knowledge deposited in the blogosphere on a given topic.

Table 6 gives a feel for how these two factors interact. The blogging community is generating thick descriptions. Both the quantity and distribution of content will be a function of collective and individual participation. A large group of students participating actively will create a large base of “knowledge”. Within that base of knowledge certain topics will become the focus of the accumulation of common knowledge. The area of greatest common knowledge is where there is a large accumulation of knowledge that is widely distributed. The least common knowledge is of topics that accrued few contributions, and few numbers of students participated either primarily or secondarily in those discussions. Where contributions on a given topic were high but distribution low, or where contributions were few but distribution high, there is middle ground on to what extent the knowledge represented by this activity is common.

**Table 6** Common knowledge is a function of the accumulation and distribution of knowledge

	Small distribution	Large distribution
Small accumulation	little common knowledge	middle ground
Large accumulation	middle ground	great common knowledge



**Fig. 8** Number of contributions on a given topic versus number of participants

Figure 8 shows how these two factors interact during the semester. There were 147 topics discussed that were related to the three books; each node in the graph represents a topic discussed in the blogosphere. The x-axis is the total number of primary and secondary participants and the y-axis is a count of the total number of contributions, which is a measure of thickness. The dotted lines show the quadrilles for the x-axis and the solid lines (both vertical and horizontal) show the means of both the x and y axes. The largest number of contributions on any of these topics was 35 (the average was 5.5); the topic with zero contributions was a topic discussed in class but it was never discussed in the blogosphere. The average student participation, either primary or secondary, was 9, which is 36 % of the class.

On average 57 % of the topics a student “considered” in the blogosphere were those that the student wrote about in one or another of her posts (see Table 7). As mentioned above, the other 43 % of the topics that a given student “considered” occurred as a result of commenting or reading in the blogosphere. The variance is high for these numbers because there were a few students who were not very active at all.

Of the 147 topics discussed in the blogosphere on the three books (see Table 8), 54 % of them garnered primary or secondary participation from a quarter of the

**Table 7** The relation of participation to topics considered

	Average	Median	Stdev	
Posting	57 %	55 %	22 %	t7.1
Commenting	12 %	8 %	15 %	t7.2
Reading	31 %	28 %	20 %	t7.3

**Table 8** Distribution of participation

Distribution	Number of topics	Percentage of topics	t8.1
25 % of class	79	54 %	t8.2
50 % of class	56	38 %	t8.3
75 % of class	33	22 %	t8.4

class, 38 % of them from at least half the class, and 22 % of them from at least three quarters of the class.

Compare the numbers shown above to those shown earlier that measured the impact of a single conversation (see Table 1). The average primary and secondary participation in any single conversation steadily increased, ranging from 15 % for a post without any comments to 36 % for a post with 5 comments. A single topic is composed of multiple conversations. Table 8 above shows that the distribution of knowledge for most of the topics extended beyond the distribution in any one conversation on the topic. There is some cross-fertilization between conversations on the different topics, but between conversations is nevertheless very loosely coupled.

**As a basis for other learning activities**

What makes for common knowledge in the blogosphere is not independent of other learning activities during the semester. The reading that the students do, their attendance during lectures, in-class discussion, and offline conversations are also factors that determine the accumulation and distribution of common knowledge, amongst the students, on a particular topic. Making it into the blogosphere discussion is evidence that a particular topic has become a part of the conversation.

The representational system provided by the blogging environment enables the students to make progress at creating common knowledge; the amount of common knowledge is directly related to the amount of blogosphere work on that topic. Because posts and discussions, once created, persist in the blogosphere, students can increase the common and shared knowledge of that topic throughout the semester. Because content persists throughout the semester, the students can mine the aggregated information as a resource for other learning activities, but they do not have to. An indicator that content in the blogosphere has become “common” knowledge is the degree to which that content is transferred, by the class, to other, subsequent, learning activities, like writing a paper.

When students began to write their required papers, there was a pronounced shift in how they approached the blogosphere. We analyzed the reading and writing behavior of students on the blogosphere during a three-day period before the paper deadlines. Figure 9 shows the scatterplot of participation during this period. The data shows that the students spent the bulk of their time during this period reading posts and conversations related to the topic of the paper (Alterman and Larusson 2009). During periods like this, by reading extensively in the blogosphere, students moved closer to one another in understanding, converting more of the commons into common knowledge.

Figure 10 shows a scatter plot of topics in papers that were foreshadowed by participation in blogging. Each node represents the two papers an individual student wrote. The x-axis is a count of the number of topics mentioned in either paper.

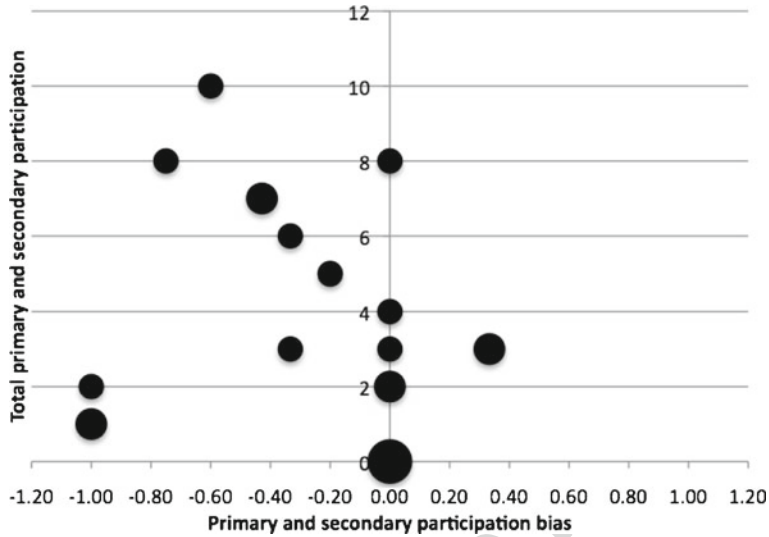


Fig. 9 Participation during paper deadlines

1086 The y-axis is the percentage of topics mentioned by that student in a paper, where  
1087 the student wrote, commented upon, or read about that topic. Participation in the  
1088 blogging activity helped to create a base of common knowledge for all the students.  
1089 On average there were a total of 17.25 topics discussed in the two papers (median  
1090 was 17) written by each student, and an average of 50 % of those topics (48 %  
1091 was the median) were foreshadowed by student activity in the blogosphere. As the  
1092 graph shows, all the papers had at least 30 % of its content foreshadowed by the  
1093 co-production of common background knowledge in the blogosphere.

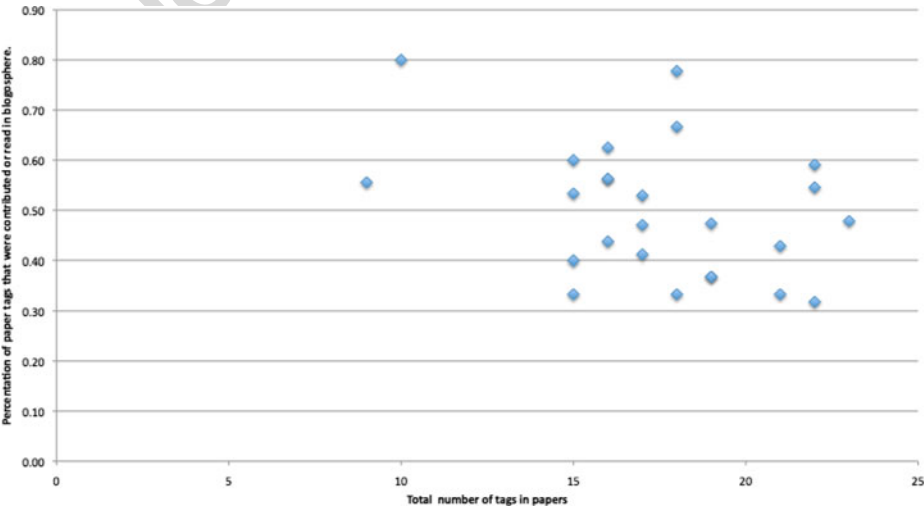
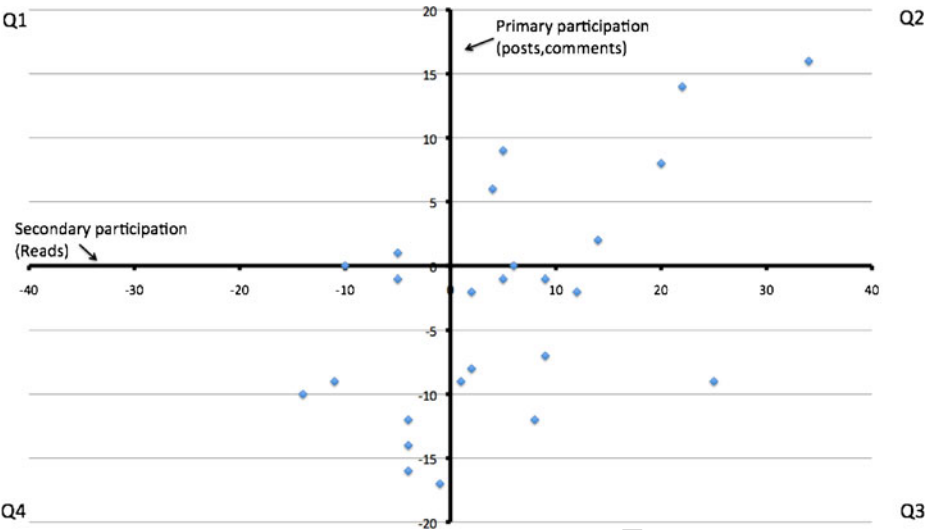


Fig. 10 Students create common knowledge in the blogosphere

Participation and Common Knowledge



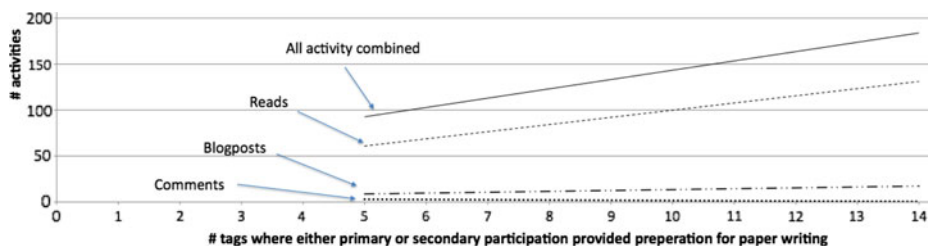
**Fig. 11** Activity in the blogosphere exposes students to topics they discuss in their papers

Figure 11 explores the relation of the creation of common knowledge to subsequent paper writing along the dimensions of primary and secondary participation. Each node in the graph represents the two papers written by an individual student in the class. The y-axis compares the number of topics/tags in each student's posts and comments (primary participation) to that number for the same student's topics/tags in his or her paper. A positive number means that more of a student's paper was composed of topics they contributed on initially in the blogosphere. A negative number means that a majority of the content in a student's paper did not begin with contributions to the blogosphere. The x-axis computes a similar number for secondary participation. So, a positive number means that more of a student's paper was composed of topics they read about in the blogosphere prior to writing their paper. A negative number means that a majority of the content in a student's paper did not originate from reading in the blogosphere.

Table 9 summarizes the content of each quadrant. For 16 of the 25 students, their work in the blogosphere helped to create a base of common knowledge for a majority of the concepts that appeared in their two papers (their data is either positive on the x-axis or y-axis). The largest group of students (Q3) benefited most

**Table 9** The four quadrants of participation

Q1	Primary participation created common knowledge relevant to the papers written by the students.
Q2	Both primary and secondary participation created common knowledge relevant to the papers written by the students.
Q3	Secondary participation created common knowledge relevant to the papers written by the students.
Q4	Primary and secondary participation provided some help, but most of their papers were derived from work that was not influenced by their activity in the blogosphere.



**Fig. 12** How different kinds of participation affect each student's preparation for writing a paper

from the reading. The next largest group (Q2) benefited significantly from both primary and secondary participation in the blogosphere. These data confirm that the class was “mining” the aggregation of information available in the blogosphere.

Figure 12 shows the correlations between the preparation for writing papers provided by reading, posting blogs, commenting, or doing all three. The trend line for all three activities combined is significant and positive ( $r(23) = 0.485$ ,  $p < .05$ ). The trend lines for reading ( $r(23) = 0.402$ ,  $p < .05$ ) and posting ( $r(23) = 0.419$ ,  $p < .05$ ) are also significant and positive. The trend line for commenting was not significant.

### Concluding remarks

The first part of the paper developed a theoretical framework for loosely coordinated learning activities, like student blogging, in contrast to meaning making in a tightly coupled joint problem space. Key elements of the discussion were the development of the concepts of common knowledge and participation as it functions in a loosely coordinated activity.

In a loosely coordinated activity, knowledge creation, distribution, accumulation, and aggregation are distributed over extended periods of time, occurring in small pockets of interaction, amongst different, but overlapping, subgroups of students. These interdependent distributed pockets of activity and interaction among the students are focused on the topics of the course and produce, in parallel, similar kinds of knowledge and skills. Common knowledge is not the result of any single action in the blogosphere. Rather, common knowledge emerges from the entire collection of participations in these distributed activities within the community.

The second part of the paper presented a case study. The goal was to draw a more detailed picture of how the students' participation, within individual events of activity and across the semester, lead to the growth and distribution of common knowledge.

At a very basic level, blogging is an activity composed of writing, reading, and commenting. From a more social perspective, the students activity can be viewed as sharing. From a third vantage point, over the course of the semester, the contributions of the students form a blogosphere commons that can be mined throughout the semester. Students participate at both the level of individual events and as members of an ongoing community, working intermittently, at different times, from different places, with different purposes, throughout the span of the semester.



Common knowledge amongst the students is created by means of student participation in an ongoing social situation of the blogging community. The posts and comments in themselves are information that is shared, they are part of the blogosphere commons, mediating student participation and collaboration, but they are not the common knowledge itself. Secondary forms of participation and other learning activities enable greater sharing within the class. How much common knowledge and the degree to which it is distributed directly depends on the numbers of participants in a given topic, the degrees to which the students participate, and the different kinds of activities in which they participate.

As they blogged, the students practiced explaining together the material using the “official” semiotic of the course. Contributions to the blogosphere built off one another. The contributions of the students varied in discourse mode. Their contributions frequently referred to the assigned reading and in-class discussions, linked to other blogosphere contributions, and related the students’ own experience with the Internet. Because of the persistence of content, the students had multiple opportunities to accumulate and distribute shared knowledge during the semester.

Longer conversations were significant blogosphere events because they were focal points for the merging and distribution of the ideas and perspectives of the students. Participation in those events was unevenly distributed amongst the students. Those who kept pace with the lectures as they blogged were more likely to make and acquire common knowledge from the longer conversations. Students who were primary participants in a longer conversation received more feedback on their ideas, explicitly shared more knowledge, and connected to other students, and larger groups of students, more often. Because longer conversations were read more widely, the primary participants were more visible, thereby increasing their social presence within the community. The students who were secondary participants in the longer conversations, were not as visible or connected, but they did increase their sense of community by being “aware” of the events/conversations that attracted relatively more attention.

Primary and secondary participation of the students active in longer conversations significantly exceeded expectations from their participation in shorter conversations. Either they were better at finding and creating good content or their orientation was more social, or both. In contrast, the less active students had a more peripheral role in the longer conversations: these students read the longer conversation as much as was expected, but not more than was expected, but their direct primary participation was significantly less than expected.

There were typically several different events/conversations on the same topic. Both the quantity and distribution of knowledge among the students on any given topic directly depended on participation. Some topics were obviously of more interest than others, but over half the topics received attention from a significant number of students in the class. The areas of greatest common knowledge were where there was a large accumulation that was widely distributed through primary, secondary, and even tertiary participation. The evidence showed that 54 % of the topics discussed in the blogosphere garnered primary and secondary participation from a quarter of the class, 38 % of them from at least half the class, and 22 % of them from at least three quarters of the class.

During the semester, the students wrote two papers. During the three day period prior to the due date of each paper there was a huge upswing of students reading

in the blogosphere. The correlation between paper writing and the preparation for writing papers provided by all blogosphere activities was positive and significant, as were reading and posting individually (but not commenting). For 16 of the 25 students, their work in the blogosphere helped to create a base of common knowledge for a majority of the concepts that appeared in the two required papers.

**Acknowledgements** The first author would like to thank the meta reviewer and other reviewers for their thoughtful and extensive comments on the earlier drafts of this paper.

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