



# Visualising the dynamics of online learning communities in online and blending learning courses

*Experiences from three university courses*

## Victoria Jae Chuang

*Research assistant*

Department of Plant and Environmental Science  
University of Copenhagen



## Alejandro Ceballos

*Assistant lecturer*

Department of Plant and Environmental Science  
University of Copenhagen



## Helle Bundgaard

*Associate professor*

Department of Anthropology  
University of Copenhagen



## Peter Furu

*Associate professor*

Department of Public Health  
University of Copenhagen



## Henrik Bregnhøj

*E-learning consultant*

Center for Online and Blended Learning  
University of Copenhagen



## Inez Harker-Schuch

*Research assistant*

Department of Plant and Environmental Science  
University of Copenhagen



## Christian Bugge Henriksen

*Associate professor*

Department of Plant and Environmental Science  
University of Copenhagen



*The authors have worked together for several years in an online and blended learning project at the University of Copenhagen*

## Abstract

Online learning communities are a foundational element of online and blended learning. Many learning activities in online and blended learning courses require students to collaborate and work together with their peers. In order for these learning activities to be successful it is important that participants are engaged socially and emotionally in their online interaction to create a sense of community and cohesion, corresponding to what constitutes Social Presence in the Community of Inquiry Framework model. As teachers, we therefore focus on creating learning designs that facilitate the development of online learning communities. In this article, we examine the development of online learning communities in online discussion forums. We map a selection of discussion threads from three university-level courses using the NodeXL software, and discuss the implications of e.g. structure, facilitation and group size on the online learning community that emerges. We find that the framework for participation in discussions (e.g. level of guidance and role of facilitators) affects the degree of connectivity within the online learning community and the prevalence of “social” posting, which has implications for strengthening the community and student-to-student support throughout the course.

## Introduction

The significance of establishing a social presence for developing an online learning community and facilitating knowledge construction when designing online and blended learning courses has been emphasized by numerous authors (e.g. Garrison et al., 2000; Salmon, 2002; So and Brush, 2008; Akyol et al., 2009; Shea et al., 2009; Shea and Bidjerano (2009); Garrison et al., 2010; Remesal and Columina, 2013; Kozan and Richardson, 2014). In the Community of Inquiry Framework (CoI) developed at Athabasca University (Garrison et al., 2000), teaching presence works together with social presence and cognitive presence to create the education experience by setting the climate, supporting the discourse and regulating the learning to facilitate that students are moving through the different phases of practical inquiry. In the Five Stage scaffolding model developed at Open University (Salmon, 2002) the online socialisation that is taking place in the second stage of the model is essential for bridging social and cultural differences and creating an online learning community before going into the later stages with information exchange, knowledge construction and development. In a blended learning course on HIV-AIDS prevention, So and Brush (2008) found that perceived collaborative learning was correlated with both social presence and satisfaction level. Students perceiving high levels of collaborative learning also perceived higher levels of social presence and were more satisfied with the course. These results were highly affected by the course structure, emotional support, and the media for communication. Akyol et al. (2009) performed a mixed method study of two online courses where interviews with students

revealed that social presence created a comfortable environment for sharing ideas, expressing views and collaborating, thereby facilitating a higher level of cognitive presence. Shea et al. (2009) performed content and social network analysis to examine the discourse in asynchronous online courses. They found that higher and more consistent teaching presence and social presence resulted in higher levels of cognitive presence. Furthermore, correlation between instructor teaching presence and student social presence was lower when instructor teaching presence was low. In another study with more than 2000 online learners Shea and Bidjerano (2009) found that more than 70% of variance in perceived cognitive presence could be explained by the perceived teaching and social presence. Similar results were obtained in a study with 205 online learners (Garrison and Cleveland-Innes 2010), indicating that social presence is to a large extent a function of instructor teaching presence, and mediates the development of cognitive presence. In a study featuring online collaborative group work, Remesal and Columina (2013) redefined social presence as the result of constructive and evolutionary interaction in a group discourse and found that social presence promotes both sense of community, relational dynamics and self- and collective efficacy, and thereby supports the learning process. Kozan and Richardson (2014) investigated the relationship between teaching presence, social presence and cognitive presence in six online courses and found that there was a significant relationship between cognitive presence and social presence, as well as between cognitive presence and teaching presence. Recently, other authors have questioned the significance of social presence in online and blended learning, claiming that cognitive presence within the CoI framework can develop independent of social presence (Annand 2011), and that social presence may even negatively affect critical thinking (Costley and Lange, 2016). However, these claims have also been challenged by Garrison (2011) arguing that whereas social presence may not be so important for courses focusing purely on information transmission, social presence together with teaching presence remains essential for cognitive presence and for constructing knowledge in online and blended learning courses that require critical thinking.

In this paper we explore how online learning communities can be used in learning designs to promote social presence and improve intended learning outcomes. We investigate three use cases within a selection of the online courses offered by the University of Copenhagen (UCPH) and the Technical University of Denmark (DTU). As a point of departure for this paper, we focus on the asynchronous online discussions in three courses: Climate Change Impacts, Adaptation and Mitigation (CCIAM), Global Environmental Management (GEM) and Fieldwork: ethnography and analysis. Although these three courses are quite different from each other in content and learning design, we use them as case studies because they represent different course types, varying in the level of instructor facilitation, as well as other factors

such as course size, group size, student body composition, etc. In online and blended learning courses, interaction in discussions—whether these discussions are driven purely by social connection and emotional support, used solely as a learning activity, or a combination of both—constitutes one of the primary community building activity students engage in during the course. These discussions lay out the interaction among students explicitly and in writing, and are an opportunity to see a space in which a continuous interaction amongst participants can occur.

## Objectives

The objectives of this paper are:

1. To explore the potential of using online learning communities as a means to improve online and blended learning outcomes
2. To describe the social dynamics within these online learning communities by refining and applying a systematic method of visualising these discussions which differentiates: degree of connectivity, responsiveness, number of interactions with other participants, overall CoI level, and sociality
3. To discuss the challenges and opportunities experienced in facilitating online learning communities in online academic discussions

## Scope

We have chosen to map eight selected discussions from two student groups in each of our three courses. The selection of these discussions provides a cross-section of our learning designs and collective experience in facilitating online discussions, and represents a range in--among others--the level of instructor facilitation of discussions, group size and heterogeneity, and purpose of discussion. The teachers have then been presented with the maps from their course and asked to reflect on the dynamic in their groups, and whether certain aspects of the learning design can be identified as positive and negative contributing factors.

While this article focuses on the online learning community within “teacher-organised” online discussions, it is important to remember that interaction amongst students naturally flows beyond the framework of the course, often into students’ personal lives. We acknowledge that students likely interact outside of the course, both in-person (e.g. meeting during other courses and introduction day programs), and on social media and other forms of communication (SMS, Whatsapp, Facebook). These interactions are also significant and contribute to the development of the online learning community within the course; however, we intentionally exclude these interactions from our analysis because they cannot be mapped systematically like discussion threads, and are to a degree outside of the control of the learning design and therefore also outside of the scope of our analysis.

## Methodology

### Description of study settings

The courses studied in this analysis are all offered by the University of Copenhagen or the Technical University of Denmark. The CCIAM course is offered by the Faculty of Science at the University of Copenhagen, and is a masters-level course. It is one of two compulsory, first-semester courses for students of the MSc in Climate Change. The Fieldwork: Ethnography and analysis course is also a masters-level course offered by the Faculty of Social Sciences, and is also compulsory for third-semester students of the MSc in Anthropology. Following the Coursera model, the Global Environmental Management course is open to anyone who is interested in the topic, although two years of undergraduate study in a science field related to the environment is recommended. See Appendix I for a comparative overview of courses studied.

### Data collection

Using a combined quantitative/qualitative approach of systematically mapping interactions within selected discussions on the three courses, we have visualized the structure of the online interactions which took place among students and between students and their teacher(s) in a range of learning communities.

We have used NodeXL, an open-source software package designed to visualize social networks, to produce the visualisation of the discussions. NodeXL works as an extension of Microsoft Excel and is commonly used in scientific research of social networks (Hansen et al., 2011). We have chosen to use NodeXL because it is open-source, widely used in scientific research, and provides a simple procedure for data manipulation and visualization that avoids the use of complex programming language and provides a simple way of analyzing social networks. With regards to the objectives of this article, the analysis provided by the NodeXL software is useful for quantifying the interactions and the connectivity present in an online learning community. Furthermore, the visualisations produced by the software provide a way of summarizing a generally very long and complex discussion into a salient visual graph, which forms the core of the discussion with teachers regarding the facilitation of the development of these online learning communities.

The discussions were mapped manually by reading each thread and entering quantitative parameters of the discussion into the NodeXL first, followed by qualitative parameters.

### Parameters

NodeXL produces a visualisation of the online learning community in each discussion based on inputted parameters describing the interactions in the thread. These parameters are manually entered into an Excel spreadsheet, and

can be classified as quantitative or qualitative. Quantitative parameters are countable parameters, such as the number of participants and the number of interactions, and provide the basic structure of the network map. These parameters are standard to the NodeXL software, and must be inputted in order for NodeXL to produce a visualisation. Qualitative parameters are an assessment of a given interaction, such as the Community of Inquiry level or sociality, and provide more in-depth information regarding the nature of that particular interaction. These qualitative parameters are not required for NodeXL to produce a visualisation, and have been added in this analysis for the purpose of providing more nuanced information about the nature of the interactions in these online learning communities.

### **Quantitative mapping protocol**

A NodeXL visualisation is constructed of two basic building blocks: vertices and edges.

In our visualisations, vertices represent the participants in the discussions, and are shown as blue spheres. The diameter of the spheres represents the number of other participants he or she has interacted with during the discussion. The position of the spheres on the map is purely esthetical and the spheres were arranged manually to ensure a clear overall picture of the network.

The interactions among participants are represented by edges. Edges can only exist between two participants, and are shown in the graphs as lines connecting the blue spheres. An edge is assigned between two participants when a participant explicitly mentions another participant in a post. If a participant mentions several other participants in a single post, an edge is created between the speaker and each participant. If the speaker mentions the same participant twice in the same post, only the first mention is counted.

The first interaction between two participants is represented by an edge with a thickness of 1 unit. After the first edge is created, any subsequent interactions between those two participants are represented by an increase in the thickness of the original edge by 1 unit. The thickness of the line between two participants therefore represents the number of individual interactions between these two participants. In this paper, we refer to the sum of all interactions between two given participants as a 'conversation'.

Since we focus on the interactions between participants in an online learning community and the network that is created by these interactions, posts which do not explicitly mention another participant were initially mapped as an interaction with oneself. These interactions were later determined negligible and not included in the visualisations. It is important to note, however, that although these posts are not included because they do not establish a connection to another participant, they can still spark connections among



participants in the community and foster the discussion, although in an indirect--and therefore unaccountable--way.

The first post to start a discussion was assumed to have been addressed to all participants of the discussion, and was not taken into account or mapped.

In the CCIAM discussions, participants were asked to make summaries of the discussion thus far, for the benefit of the other participants. These summary posts were not mapped.

### **Qualitative mapping protocol**

The interaction between two given participants in a discussion is further elaborated in our analysis by means of two qualitative parameters: Community of Inquiry (CoI) level and level of “sociality”.

The CoI level is intended to assess the overall quality of the interaction between the two given participants. This assessment is based on the Community of Inquiry Framework (Figure 1), which classifies each interaction on a scale from 0-4. It is important to note that the CoI level displayed on the visualisations represents the overall CoI level achieved by these two participants over the entire discussion. A CoI level was therefore not assessed for each individual interaction in the discussion, but rather assigned as an average assessment of overall quality of the interaction between those two participants. The CoI level was assessed by a grader who had experience using the CoI levels for the purpose of grading discussions in the Autumn 2015/16 CCIAM course.

The CoI level is represented on the maps by color of the edges (Figure 1).

In addition to the CoI level, we also use three different types of edges (dotted, dashed or solid) to represent the “sociality” of interaction between two given participants. We use a hierarchical classification of “sociality” for this analysis, in which “anti-social” (represented by a dotted line = -1 in Table 1 below) is the lowest, followed by “neutral” (represented by a dashed line = 0), and then “social” (represented by a solid line = 1) as the highest. We assumed in this analysis that the progression of sociality is unidirectional, e.g. once an interaction has achieved a higher level of sociality in this hierarchy, it cannot be lowered. The visualisations therefore show highest-reached level of sociality. An “anti-social” interaction was only observed once during the analysis of all three cases, due to an accusatory tone used by one participant when addressing another. Because “anti-social” interactions were so rare, the default edge type is of neutral sociality (dashed line), which tends to be characterised as solely curriculum based.



Defining the concept of “sociality” for this analysis is problematic, as “sociality” and socialization is strongly dependent on the context in which interactions exist, and therefore does not adhere to the same rules of classification for all interactions in all contexts (Irwin and Berge, 2006). The use of the sociality parameter itself was an intuitive addition to the analysis, to characterize a particular type of ideal interaction that the teachers strived to see in their courses and consequently designed the discussions to optimise. Although the sociality parameter can be rather dependent on the judgement of the assessor, we have attempted to standardize the definition of a social interaction based on the specific context of the three courses we use as cases in this analysis.

For the purpose of our analysis, we define a “social” interaction based on the interpreted intention of the participants who are interacting. Our definition takes departure in Irwin and Berge’s differentiation of socialization from simple interaction, the difference being that “socialization requires more than just engagement for its own sake or for the sake of a response. For example, students can go through a routine exchange of basic information such as introducing themselves or giving one another their telephone numbers. By definition, these people would be interacting. But it takes more than just talking to constitute socialization” (Irwin and Berge, 2006). In our analysis, we have defined a “social” interaction as one in which at least one participant in the exchange attempts to form a connection with another participant by means of personally relating to the other participant, often by showing empathy, support or a willingness to help collectively resolve a problem and achieve the learning outcome(s).

The rationale behind the creation of a strong online learning community is based on Randy Garrison’s CoI framework which highlights social presence (2011), as well as Gilly Salmon’s Five Stage Model which emphasizes the importance of socialisation and support derived from the online community during the learning process (2002). We therefore also define “social” interactions as those which reflect the “online socialization” stage (Stage 2) of Salmon’s Five-Stage Model, characterized by participants “familiarising” and building “bridges between cultural, social and learning environments” (Salmon, 2002). This corresponds with the definition of social presence as the ability of participants to identify with the group or course of study, communicate purposefully in a trusting environment, and develop personal and affective relationships progressively by way of projecting their individual personalities (Garrison, 2011).

Col level	LEVEL 0	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Col indicator	The interaction is not related to the topic(s) of the discussion	The interaction features exchange of information related to the topic of the discussion (regurgitation = reproducing knowledge)		The interaction features connection of ideas related to the topic of the discussion (argumentation = applying knowledge)	The interaction features the application of new ideas to other contexts (argumentation = developing knowledge)

**Figure 1:** Key for Community of Inquiry (CoI) Framework showing levels used in visualizations

### Ethical considerations

In order to preserve the anonymity of the participants in the discussions, each participant has been assigned an alias consistent with their gender.

### Case studies

Eight discussions have been mapped in this analysis:

- Two discussions from the Climate Change Impacts, Adaptation and Mitigation course on the topic of climate change and human health, directed by Peter Furu.
- Two discussions from the Global Environmental Management MOOC, directed by Henrik Bregnhøj.
- Four discussions from the Fieldwork: Ethnography and analysis course's online activities, directed by Helle Bundgaard.

### Climate Change Impacts, Adaptation and Mitigation

In the CCIAM course, students were required to participate in two asynchronous discussions per week. These discussions were structured by the teacher responsible for the module, and led by guiding questions prepared by the teacher in advance. The discussions selected for analysis from the CCIAM course were two concurrent, week-long online discussions from the module on climate change and human health. We observed the discussions from two distinct teams of students--Team A and Team B--on the topic of health impacts of climate change and variability. This module was particularly highly assessed by students in their feedback and comments. Students on the CCIAM course were divided into several working teams of approximately 12-15 students per group, depending on the size of the course, with one "e-sibling" (a former student on the course acting as a teaching assistant) each. With the intention of building equally interdisciplinary teams containing complementary competencies, the course responsible created these student groups before the start of the course, considering each student's educational background, working experience, study program, and country of origin. For

this analysis, we selected the discussions of two teams: Team A, which demonstrated consistent participation and high levels of contribution in the discussion, and Team B, which generally required more encouragement and intervention from the course responsible to achieve adequate participation.

In these particular discussions, a starting question was posed by the teacher; for example: “What do you consider the biggest climate change related threat to human health in your own geographical setting (your home town/village)?” Students were then expected to review the learning resources provided by the teacher--in this case, a video presentation, literature and a questionnaire--and respond to the opening question. Students were also expected to engage with other students by responding to fellow students’ contributions. The teacher continued to lead the discussion by posing additional questions (also prepared in advance of the discussion start), while the e-siblings facilitated the discussion by encouraging students, participating in the discussion and posing additional questions of their own.

The content and teaching style used in each weekly module was determined by the individual teachers, based on their professional areas of expertise and personal pedagogical preferences. In the design of the Human Health module, emphasis was on stimulating students’ individual reflections on some key thematic questions or issues. This allowed students to bring on board personal knowledge and experiences from their own geographical settings combined with new knowledge gained through consulting the various available learning resources. Furthermore, because of the cross-cutting nature of human health in the climate change context, discussions could benefit from students’ knowledge gained in other E-modules with focus on e.g. water and environment, which are important determinants of health. Other considerations included taking advantage of the different scientific disciplines represented in the teams by highlighting the true multidisciplinary perspective of climate change and health in the online discussions.

### **Global Environmental Management**

The discussion forum on the Global Environmental Management course is an open space on the MOOC in which students can start their own threads and engage in discussion with fellow students. Participation in the discussion forum is not required on the course, and the teacher does not prepare guiding questions to facilitate the discussion. Initiating discussions is therefore the students’ task, and teachers do not facilitate the discussion actively; instead, they intervene in the discussions if necessary and in certain discussions provide in-depth knowledge if they find it appropriate.

The discussions chosen for analysis from the Global Environmental Management course were those which displayed the most interaction amongst students on a topic relevant to the content of the course (that is, not discussions relating to practicalities of taking the course).

When a student chooses to start his/her own discussion, this discussion thread is visible to all participants on the course. Any participant on the course can subsequently engage in this discussion if they find the topic of interest; therefore the “teams” in this course are self-selected and not determined by a course responsible. Students on the GEM course do not work in predefined student groups in discussions or assignments, as is the case in the CCIAM and Fieldwork courses. The two discussions selected for analysis from the GEM course have at least one participant in common.

### **Fieldwork: Ethnography and analysis**

Before developing the fieldwork online activities three key objectives were formulated: to lessen the feeling of loneliness and performance related insecurity which many anthropology students experience during fieldwork, to increase analytical reflection while in the field, and to facilitate the possibility of drawing on the skills of co-students.

The course offers two kinds of online activities, one of which consists of assignments developed by staff, the other an informal chat forum called Café SoFa. Participation in the course was voluntary when material for this article was collected but is mandatory today unless a student has no access to the internet during fieldwork.

The assignments are concerned with the skill - or craft - of fieldwork and consist of a number of questions prepared by the teacher. The questions are intended to make students reflect upon their work process in order to improve the quality of their ethnographic material and move forward analytically. The assignments must be uploaded before a specific deadline in a common thread and all team members give each other feedback within a week. Students are encouraged to respond with a constructive critical approach meant to encourage further reflection and thus progress in the work process. The teacher or teacher assistant uses a separate thread to give each student individual feedback. The reason for not sharing this feedback with the team is to encourage students to trust their own judgement and communicate directly with each other rather than wait for input from the teacher.

In contrast to the teacher-facilitated discussion of assignments, Café SoFa is intended as a space which allows team members to discuss any issue related to their fieldwork, also of a more personal character. Although the teacher follows the threads, she does not intervene unless there is a need.

Autumn 2014 all 50 students going on fieldwork were invited to participate in online activities. Twenty five students decided to join. We discuss the interaction in two of a total of five participating teams. The selected teams were successful in establishing well-functioning online communities. All in all four teams functioned as intended whereas one did not function at all due to some of the participants neglect of their obligations as peer reviewers and participants in ‘cooperative reflection’ (Bundgaard and Rubow 2016).

## Results and analysis

In total, eight online discussions are analysed in this paper. An overview of the discussion outcomes in terms of size and interactivity are presented in Table 1 and each discussion is depicted in figures below.

	Participants	Interactions	Responsive-ness	CoI level	Sociality	Connecti- vity
CCIAM Health Impacts, Team A	14	106	2.5	2.2	0.1	0.5
CCIAM Health Impacts, Team B	13	81	1.9	1.6	0.0	0.5
GEM Hydroelectric reservoirs	5	6	2	1.5	0.3	0.3
GEM Solutions to env. problems	6	13	2.4	2.4	0.3	0.5
E&A Assign. feedback Team 1	3	6	2.0	3.0	0.0	1
E&A Cafe SoFa Team 1	5	57	8.1	3.1	0.6	0.7
E&A Assign. feedback Team 2	6	31	2.6	2.6	0.5	0.8
E&A Cafe SoFa Team 2	4	6	1.5	1.5	1.0	0.7

**Table 1:** Overview of quantitative discussion outcomes in all discussions. The numbers include interactions as defined above, an address of one other person in the discussion (i.e. open unaddressed statements are excluded). The Headings are defined as follows: Participants: No. of participants in the discussion incl. tutor and teacher. Interactions: No. of single interactions made. Responsiveness: average number of interactions per conversation =  $\text{sum}(\text{interactions})/\text{sum}(\text{conversations})$  where one conversation/edge is the same two people referring to each other (1 (lowest possible)=no interaction gets an answer, 2=every interaction get exactly one answer etc.). CoI level: The average of each statement's CoI level (see figure 1). Sociality: The average of all statements sociality level (-1=antisocial, 0=neutral, +1=Social). Connectivity: The sum of conversations/ $\text{sum}(\text{possible conversations (if everyone wrote with everyone)})$

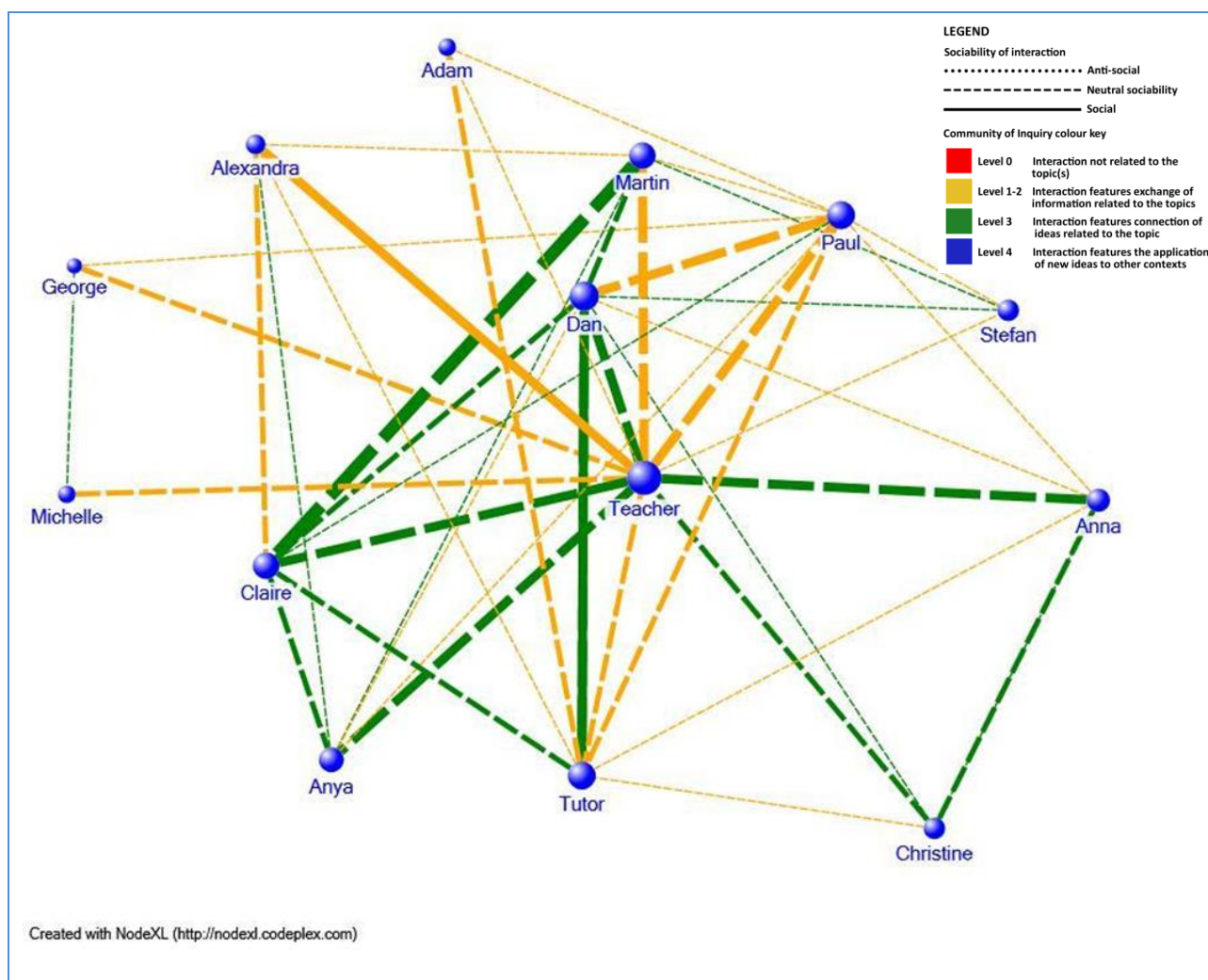
### Guide to reading the figures below

- Each blue sphere represents one participant in the discussion

- **Diameter** of the blue sphere represents how many connections this participant has (how many other participants this participant has interacted with)
- **Lines** between spheres represent the OVERALL interaction between these two participants
- **Color** of the line represents the scientific level of the interaction, which is assessed at a level (from 0-4) on the Community of Inquiry framework (Figure 1), over the ENTIRE conversation.
- **Thickness** of the line represents number of interactions between these two participants
- **Continuity** of the line (dashed or solid) represents “sociality” of interaction. A solid line indicates that this interaction has achieved sociality at least once during this discussion.

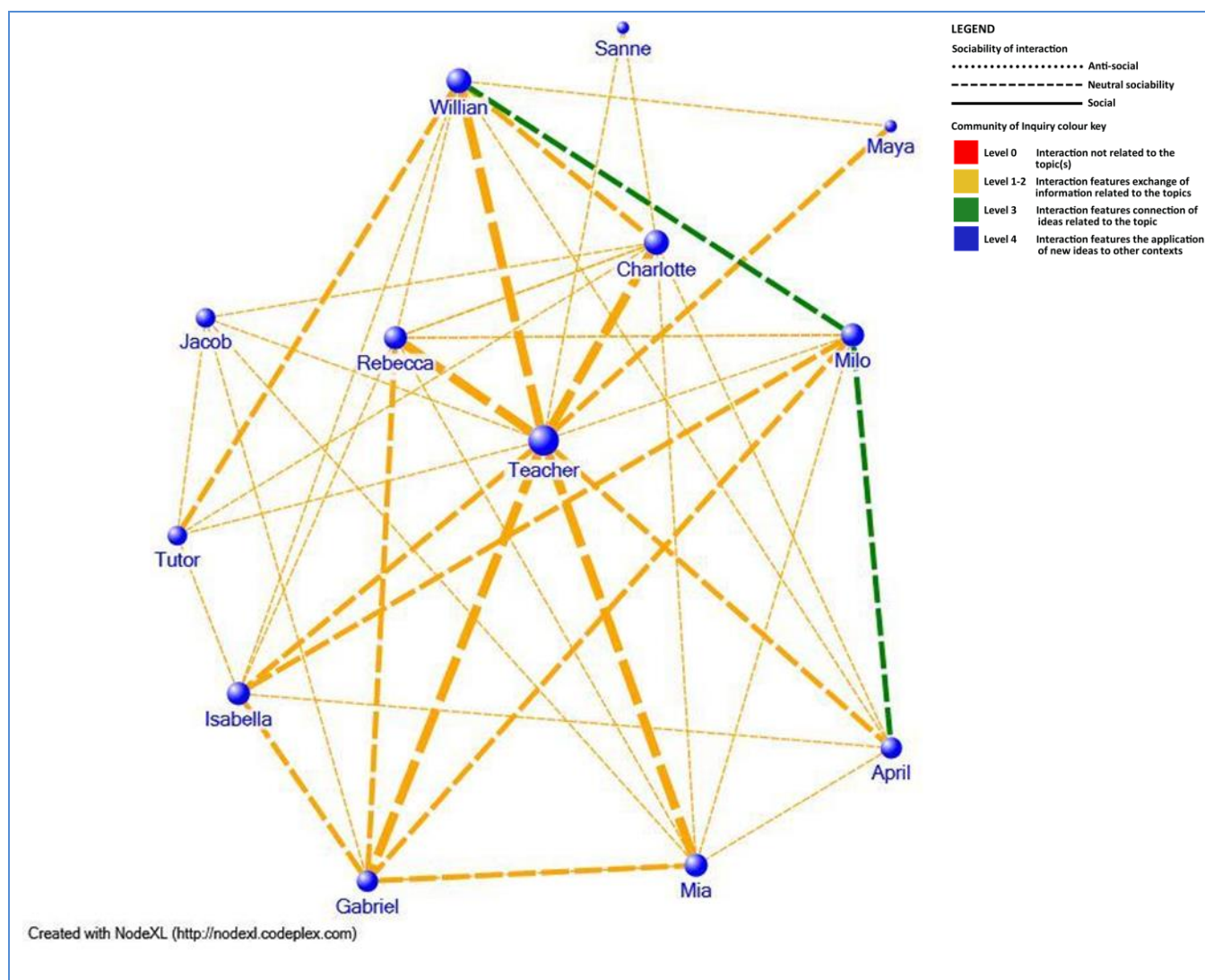
## CCIAM

### E-module 8.1: Health impacts of climate change and variability (Team A)



**Figure 2:** CCIAM Team A discussion visualization



**E-module 8.1: Health impacts of climate change and variability (Team B)****Figure 3:** CCIAM Team B discussion visualisation**Teacher's reflections on the learning design and resulting online learning community**

In coordinating a large course such as CCIAM with 15 week-long modules, we faced the challenge of engaging with every student at a productive academic level. In this case, we had chosen a highly structured and facilitated approach to the online discussions, and as a result, were able to see that close to all participants (53 students, in this case) participated in the discussions weekly. It was evident from both Team A and B that the teacher especially had a central role in the online learning community, engaging with every single student individually. In Team A, the tutor also played a central role--although secondary still to the teacher--which reflected her role as a facilitator, encouraging the students to continue their discussion, and challenging them with further inquiries. We also noted that, while there were a high number of



interactions among many participants at a moderate to high academic level (Level 1, 2 and 3 according to the CoI framework), the conversation was rarely assessed as being “social”, and instead remained focused on curriculum-based topics, with many interactions with the teacher. While this approach helped achieving the intended learning outcomes and produced good and much appreciated engagement by the students, it was also time consuming and demanding for the teacher and tutors, as well as creating a heavy administrative workload for course coordinators.

The rigorous nature of this approach thereby raises the question of how transferable this learning design is, and whether the approach is realistic and/or sustainable to use e.g. in a course which may have fewer teachers, tutors and administrators. However, we experienced that the investment of time in order to maintain a high frequency of teacher feedback to individual students in the online discussions resulted in a generally positive response to this learning design as expressed by students - for example: “- -great presentation for e-lesson 8.1! Not only the content, but also the layout was very interesting” (student a) and “- - the presentation was really well done and the discussions in both e-lessons were very interesting and had a good flow” (student b) “- -great discussion, topic and lecture” (student c); “- - great discussion this week, Avanis, and thanks for good feedback - - “ (student d). We find that the students appreciate the teacher’s engagement in the discussion, and thereby become more engaged in the discussion as a result.

Our experiences from teaching on this course showed that the teacher’s time investment should not be underestimated, as an investment by the teacher in giving individual feedback to students in turn generated more interest by the students in the topic, which resulted in more frequent postings, improved input by the students into the discussion and a more lively online learning community. In this sense, the teacher created a positive feedback loop with his engagement in the role of discussion facilitator, resulting in increasing engagement by students as his participation increased. This teacher’s feedback involved consistently and continuously nourishing the discussion by feeding more information back to the students to work with. The feedback was, for example, constructive comments to an individual student’s contributions, or provision of relevant weblinks and references for further study by the student. Importantly, this feedback was given to the students on an individual basis, and comments were directed towards students by “tagging” them in the post, a la “[Student’s name]”.

An acceptable balance should be struck in order to achieve the intended learning outcomes through active student participation in learning activities without compromising the demand for reasonable and acceptable workloads by the teacher and tutors. The structured and facilitated approach has shown that it is effective in achieving the intended learning outcomes, but we observe that this is at the expense of putting perhaps unsustainable time pressure on

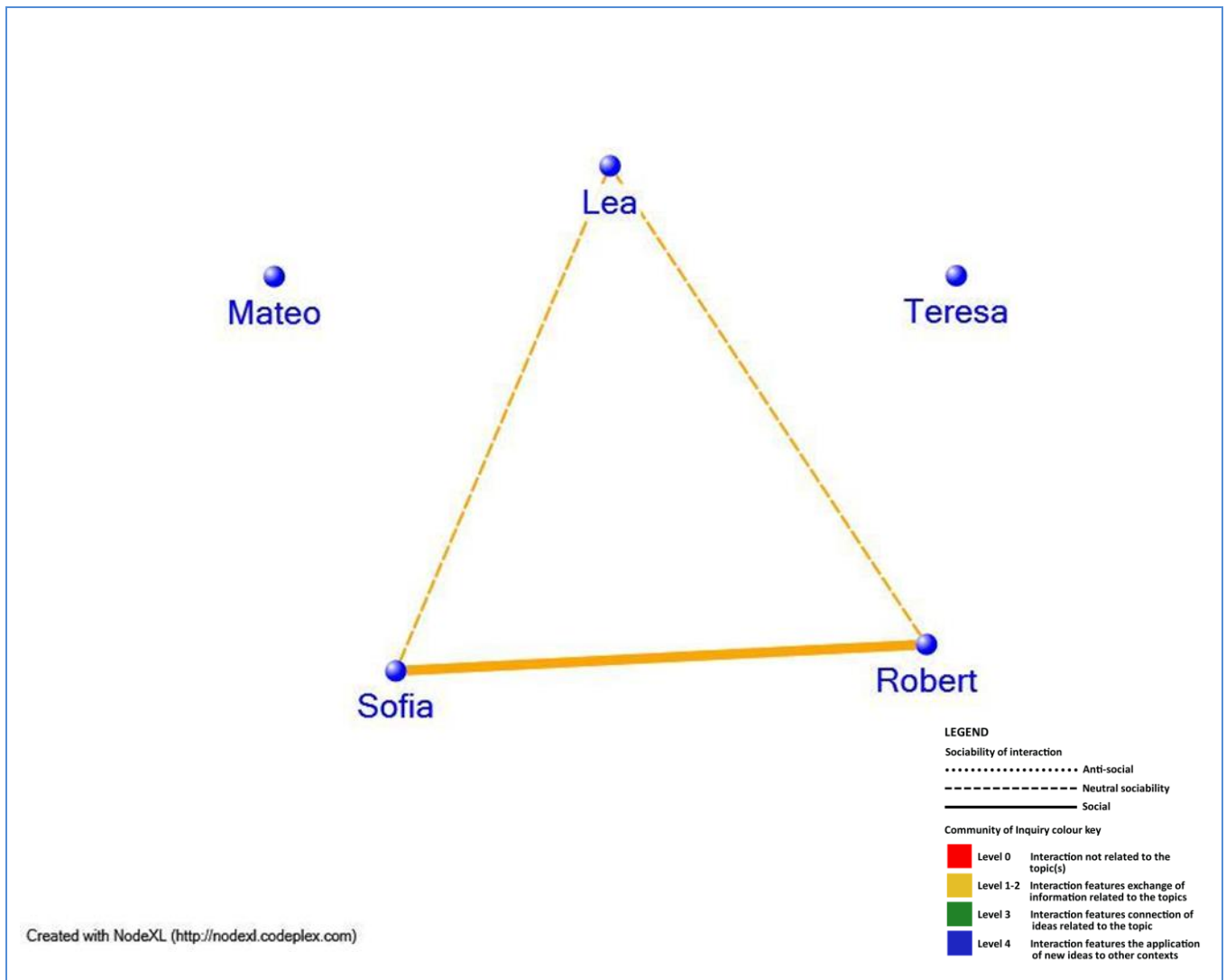
teachers, tutors and administrators. In our experience, the teacher's time investment has been high, but as a result the teacher has had a rewarding teaching experience, and the students were positive about the learning experience. In contrast with other modules on the course with lower teacher engagement, this module received only positive feedback from students, demonstrating that strong teacher engagement dominated when it comes to student satisfaction.

From our experience of using a high level of structure and facilitation in a course with 50-plus students, we recognize a potential opportunity to further activate the online learning community, so that the students increasingly take on the role of motivating and supporting one another in the discussions. This type of interaction would be the quintessential Gilly Salmon "ideal", characterized by students supporting each other, providing feedback, and clarifying information to each other (Stage 3), in order to set the stage for knowledge construction (Stage 4) and development (Stage 5) (Salmon 2002). While achievement of learning outcomes is still the primary focus in the course, we should, however, also remember that a strong online learning community is a foundational aspect of Salmon's five-stage model, used as a basis for the learning design in the CCIAM course. We see that sociality within these highly facilitated and structured online learning communities is somewhat neutral and the conversation is largely curriculum based, suggesting that the strong focus on learning outcomes in a short period of time (one week in this case) does not leave enough time and space for the online learning community to develop and evolve as a social entity.

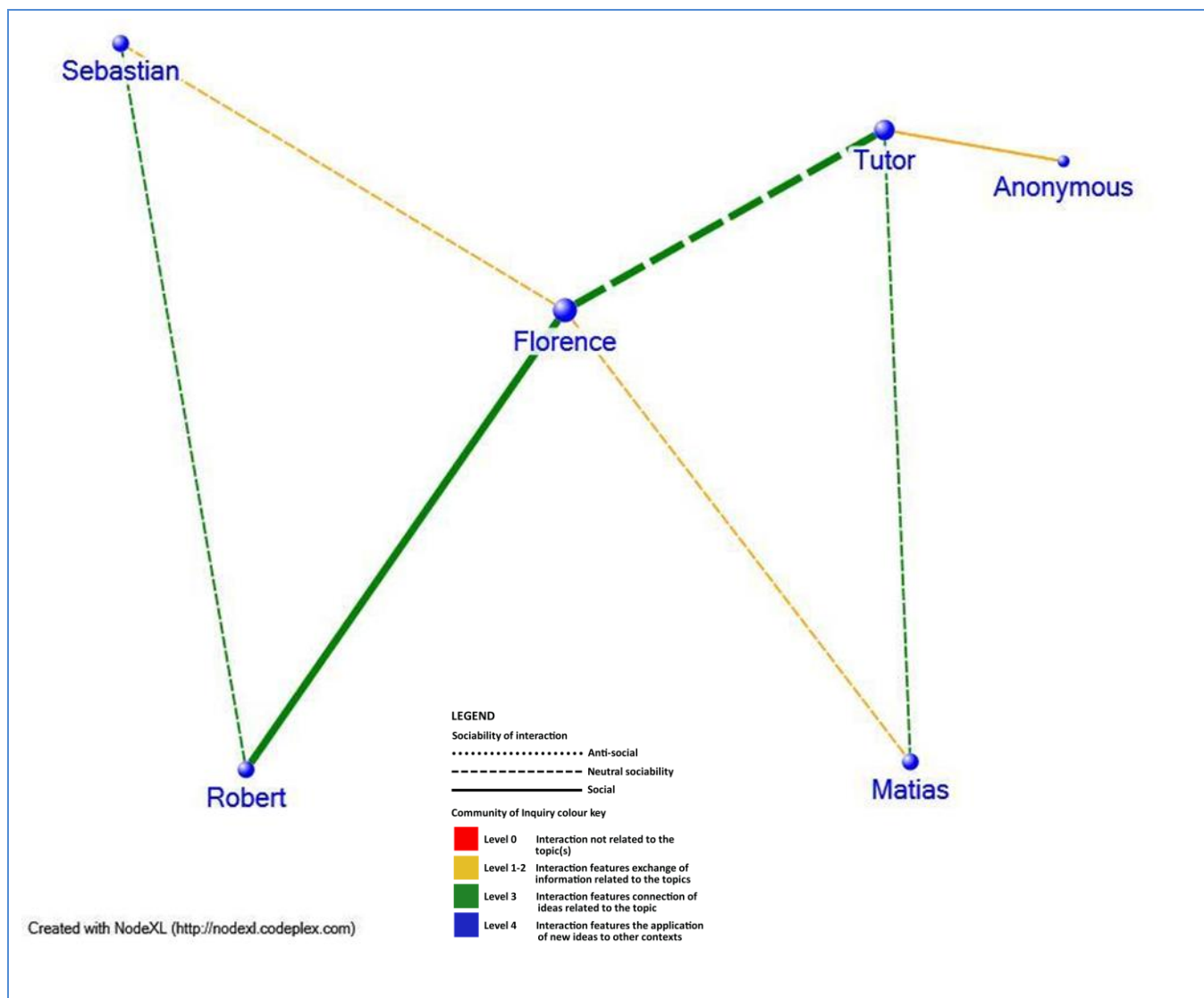
We therefore see potential in supporting and strengthening the online learning community by shifting our facilitation efforts to focus more on Stage 1 and Stage 2 of Salmon's five-stage model, before progressing to the later stages focused on information exchange, knowledge construction and development. In practice, it is necessary to first lay a foundation of support and socialisation by emphasizing and communicating the necessity of a "welcoming and encouraging" tone, and creating more space for familiarisation and sharing of experiences. Once this precedent has been set, students have access to the resources and tools to climb into Stages 3, 4 and 5 and take on more challenging academic tasks. However, the role of the teacher to facilitate the discussion, control the quality of the discussion and ensure continuity is still paramount.

## **Global Environmental Management**

### **Management of Hydroelectric Reservoirs in Drought**



**Figure 4:** Visualization of GEM discussion about management of hydroelectric reservoirs in droughts

**Solutions to Environmental Problems**

**Figure 5:** Visualization of GEM discussion about solutions to environmental problems

**Teacher's reflections on the discussion**

The two discussions from the Global Environmental Management course are taken from the open discussion part of the course. First of all it is noticeable that they are relatively small: 5/6 people and 6/13 interactions. This is clearly because it is not compulsory to participate in the discussions. The discussion space worked as an “open microphone” and the main focus in the course was on other learning activities. So even though the course had 138 students who passed all requirements (3 peer review essays and 5 quizzes) and about 3000 sign-ups to the course, these discussions remained small. An additional reason for the limited size is that the teacher and tutor only participated in discussions, where there was a real need for intervention, where they had a

detailed knowledge of the subject and when they had the time. Some other discussions than the two mentioned here (of approximately same size) had deep inputs from teachers in the department. But mainly because this was the first run of the course, the time was focused on keeping up with the course production and compulsory activities.

The discussions were started voluntarily by students who wanted to raise a particular issue of their interest, and the ones who answered were those who somehow shared the interest or felt like airing something along the same lines. Each discussion shows generally a few quite dedicated students, who take time to go deeper into the course topics and learn more. The discussions here had CoI averages 1.5 and 2.4. In the lower end they exchange knowledge, like suggesting answers out of the blue, informing about another aspect of the same problem or informing about similar incidences in other places they know of, and where level goes up to green, the students really try to dig into understanding the dilemma put up by one of the others.

There are a few longer back and forth discussions between two students in both discussions and in both cases they were started because one student was particularly provocative in his formulations. Particularly, one of the threads started out as a ping-pong side-discussion with another student that was first quite anti-social, but then turned somewhat positive during clarification. Besides the (anti)social content in the threads, they also created some deeper discussion about the topic. Even the second discussion on solutions to environmental problems started out with a provocative statement (by anonymous!) in the first line: "I notice that most of you are more concerned about assignments, grades and certificates than about the environment...". It is not the general trend, but there are examples of situations where a student who is clearly passionate about the course subject is airing the passion in non-polite way. It promotes in these cases a fairly deep exchange of views. It may be compared to the development in open blogs, where things are aired that would not be aired in a verbal discussion. Though in this case of educational discussion the views are not extreme. The tutor or teacher had a few times during the course intervened in discussions to promote decent language and once a posting in another discussion was deleted by the teacher.

All in all these small discussions between people living far away from each other (in Europe, USA and South America) has seemingly not led to creation of any strong online sense of community (sociality 0.3 and responsiveness 2.0 and 2.4). Rather it has been a platform where students could test and practice their own views. The level of discussions has been in the low/middle end of the scale, which is probably due to not being compulsory. Questions are not formulated by a teacher to promote learning; rather they are formulated by the students, who had some personal or particular reasons to raise a subject. Regarding sociality, the first stage of the Gilly Salmon model was promoted by encouraging students to contribute to a simple discussion: "Tell shortly about

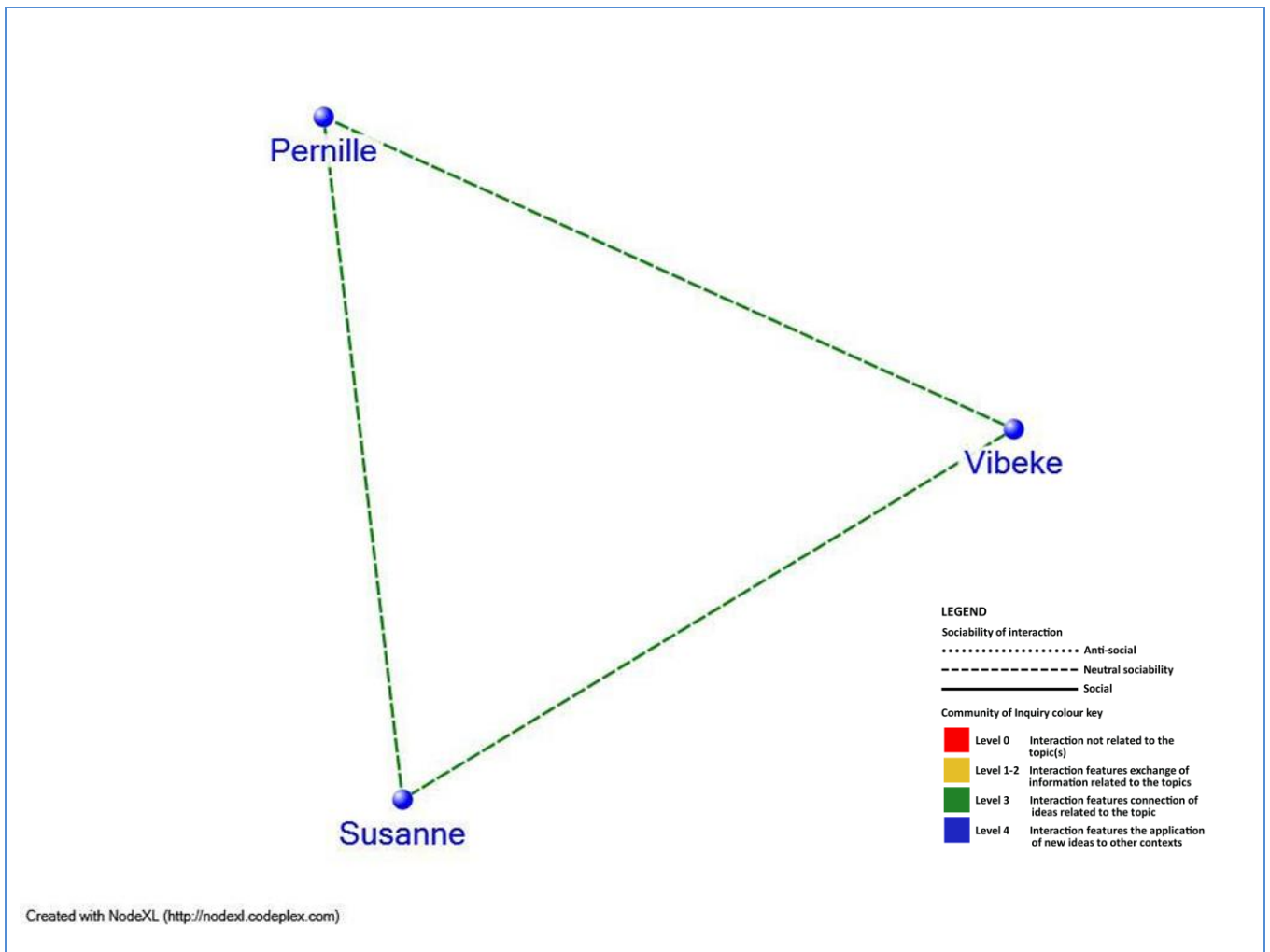
the most significant environmental problem where you live”. About 150 people contributed with an answer to the root question, but few answered other students. Sociality has been generally low and created most often by an even negative statement. This is presumably not the general case, but it illustrates that particular care and initiatives from the teachers have to be taken in order to create this online community.

## Fieldwork: Ethnography and analyses

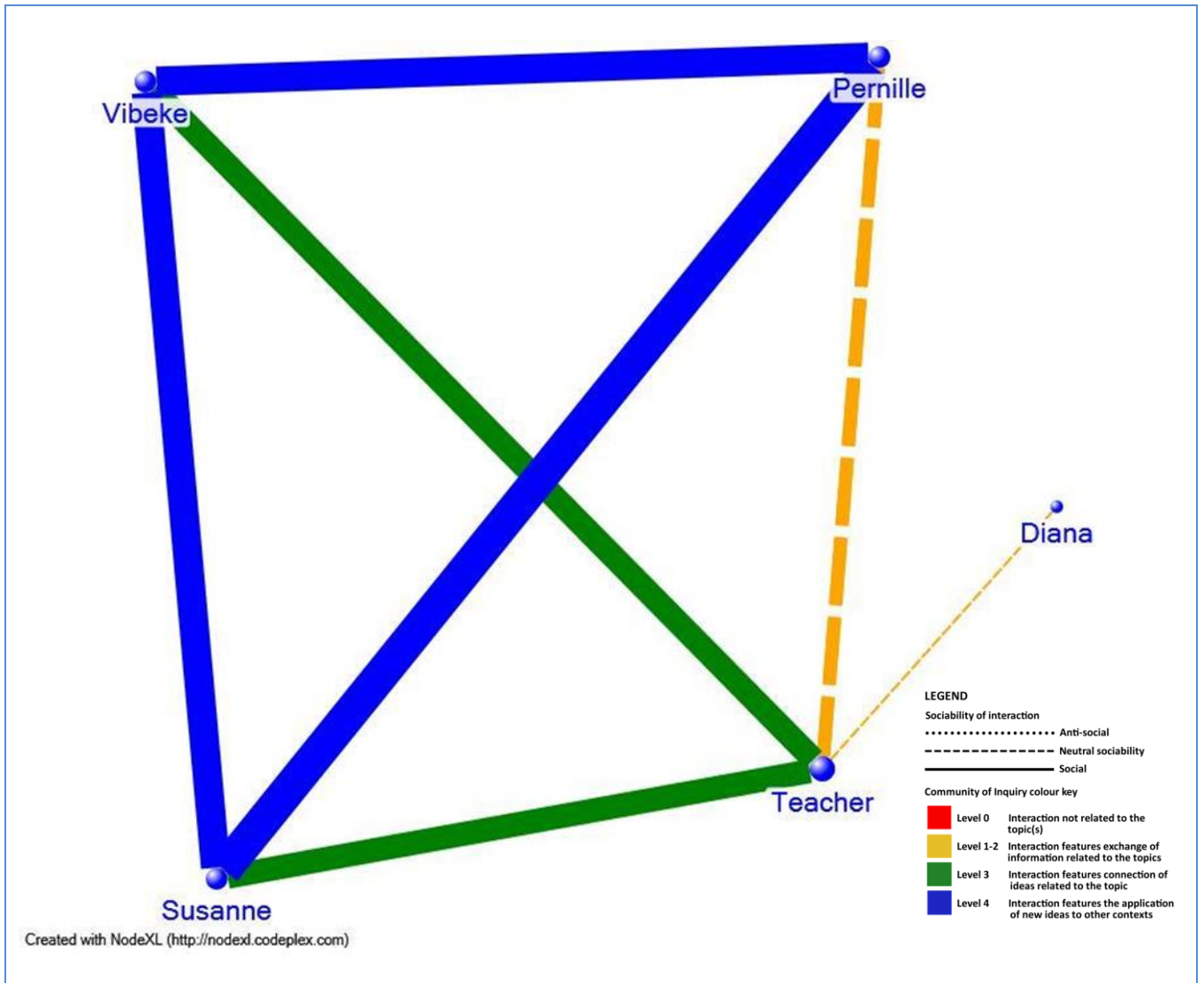
### Team 1

#### *The forum for feedback on assignments*

**Figure 6:** Visualization of Team 1's assignment feedback discussion in Fieldwork



### *Cafe SoFa*

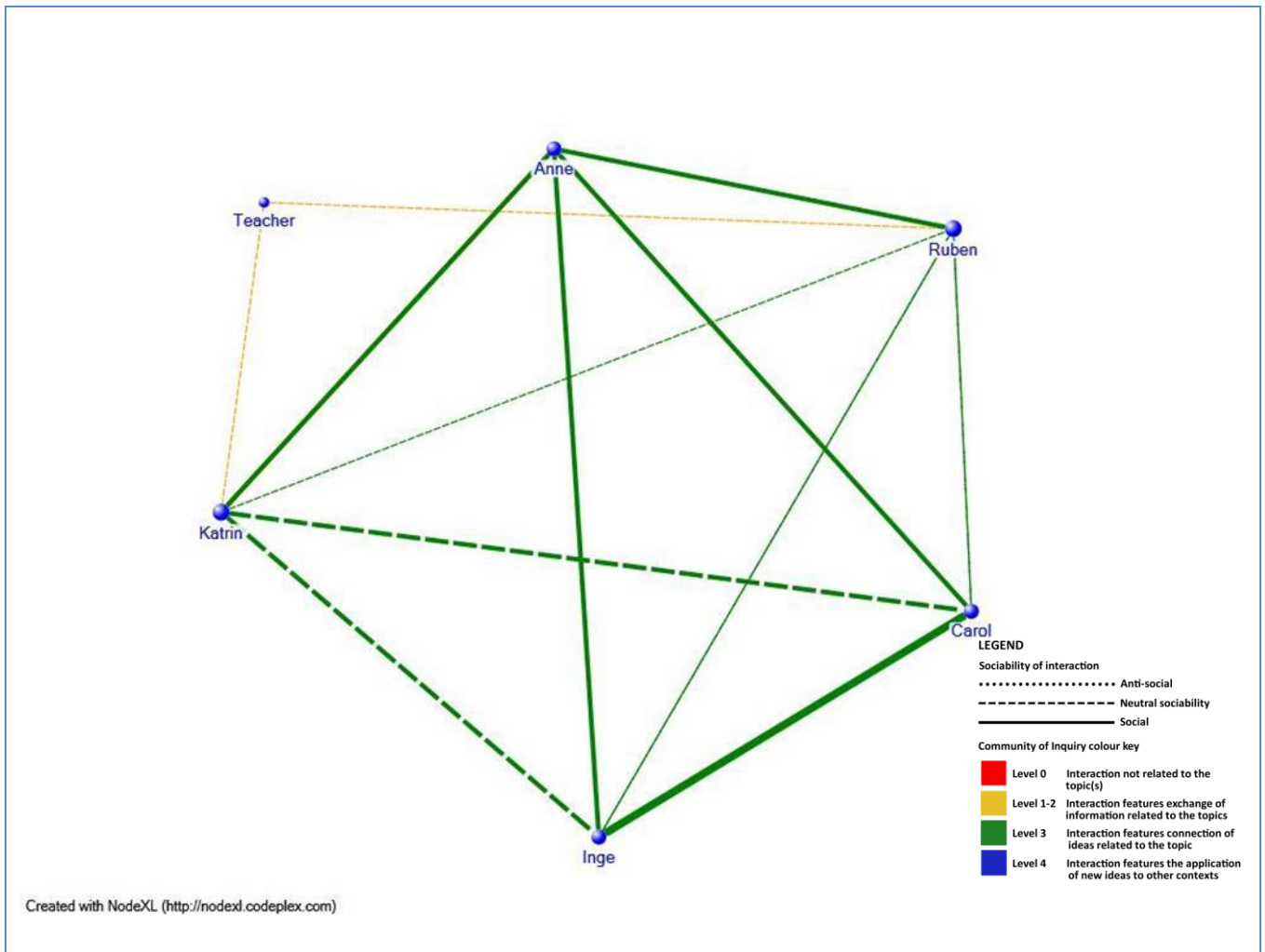


**Figure 7:** Visualization of Team 1’s Cafe SoFa discussion in Fieldwork

**Team 2**

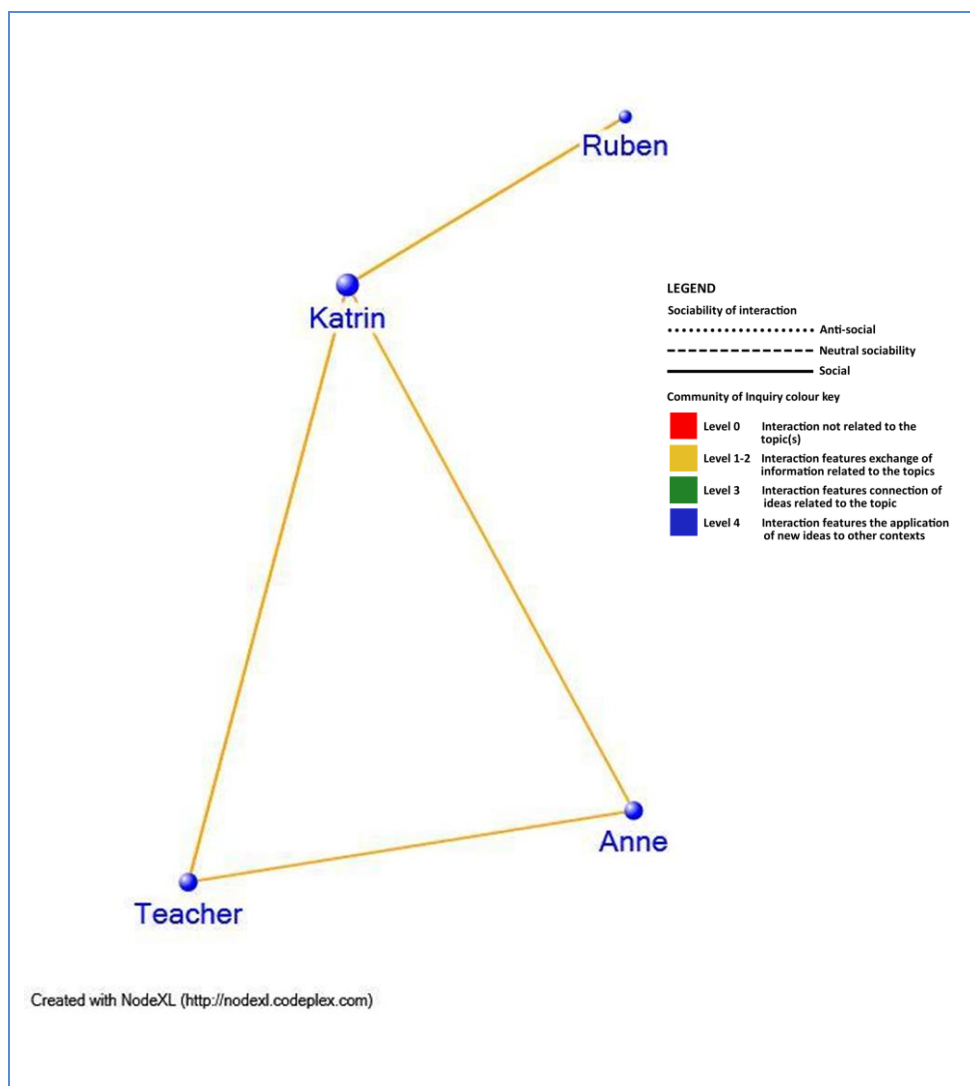
*The forum for feedback on assignments*





**Figure 8:** Visualization of Team 2's assignment feedback discussion in Fieldwork

*Cafe SoFa*



**Figure 9:** Visualization of Team 2's Cafe SoFa discussion in Fieldwork

### **Teacher's reflections on the experiment with online activity during fieldwork**

#### ***The forum for feedback on assignments***

Team 1 used the two forums as intended after a brief spell of confusion. None of the team members skipped giving feedback on assignments and they informed each other if they for some reason had to delay their response. Although their individual feedback varied in level of contribution (one team member tended to apply knowledge whereas another team member often contributed to develop knowledge), they all strived to do their best. Each team member gave feedback as team members uploaded their assignments perhaps reflecting that this team used the online facilities almost daily and not just around deadlines. A few days after an assignment deadline a student could therefore expect to get two sets of feedback from her team members as well as (direct individual) feedback from the teacher. The visualization illustrates the

interaction centered around one specific assignment and mainly in the form of feedback. Social comments are not absent but directly related to the theme of the assignment. Other social interaction related to the experience of fieldwork in this team takes place in Café SoFa.

In the very beginning of their fieldwork Team 2 discussed whether they all were expected to give feedback on all assignments. One student's response 'one for all and all for one' led to a quick agreement about mutual commitment. As was the case with Team 1 the level of individual contribution varied but at the high end of the scale. With several very strong team members the feedback generally helped team members to develop their knowledge and understanding of their experiences in the field. Unlike Team 1, Team 2 did not warm to Café SoFa but instead allowed discussions of a more personal nature to enter the forum meant for assignments as indicated by the continuous green lines. For this reason the links between team members in Team 2 show a high degree of inclusion of social comments when compared to Team 1. Four of five team members are women out of which three have continuous social interactions with each other. The single male member has continuous social interaction with one of the team members only.

### ***Cafe SoFa***

After a few weeks in the field Team 1 began to use Café SoFa to ask questions which arose during - and as a result of - fieldwork. Compared to the curriculum-governed feedback amongst team members characteristic of the forum for assignments, the discussion taking place in Café SoFa was intense. All team members actively participated in the continuous dialogue throughout their fieldwork and discussion was always initiated by the students. The teacher was not the center of the discussion but always available to offer support if needed. As the green lines show, support was needed for two of three students during their fieldwork. Interestingly, this particular team also communicated regularly using Messenger and Snapchat indicating that supplementing the online learning space with external communication technologies do not necessarily decrease interaction in the online learning space; in some cases it might even be supportive.

Out of the five students in Team 2, three team members interacted with each other using Café SoFa and one interacted with one of the team members only. The gendered imbalance in participation should not be taken as evidence that male team members have less need of support from their team, but it might be of a different kind. Just like their female co-students they benefit from participating in the formalised dialogue directly related to subject matter. As mentioned Team 2 never used Café SoFa as originally intended. It is possible that this is partly an effect of the preference of the male member of the team. The student was highly respected by team members for his theoretical sophistication and analytical insight. His relative withdrawal from social

interaction might have discouraged the other team members from spending time simply 'chatting'. However, this did not mean that the female students gave up on social interaction-they simply moved this aspect of their net-based sociality to the forum intended for feedback.

It came as a surprise just how difficult it was to get all students to commit themselves to their learning community. Some students were unwilling to spend the time needed 'on team members' not realizing that they themselves were the ones who missed out in the end. Given that participation was voluntary and all participants therefore had chosen to participate, it is possible that the problem will increase when participation is made mandatory. On a more positive note, the positive experiences of students who have benefitted from their participation in cooperative reflection during fieldwork might have greater influence on students' willingness to invest themselves.

One task which should never be underestimated for teachers preparing students for fieldwork is thus to make it clear to students why they are likely to benefit analytically as well as socially from participating in online activities. Another task is to ensure that the course activities are well anchored in the rest of the education. The semester before students go on fieldwork they prepare their project proposals working in teams established by their teacher. Teams which do not function well must be reestablished in time for the new teams to develop mutual trust before students go on fieldwork.

Online activities during fieldwork, for students committed to their learning community, clearly meet the set objectives. Students who have participated in online activities during fieldwork are ahead of co-students who have not participated in reflective cooperation when it comes to making sense of their data material and experience. It is the coordinated, regular written reflection on their work that most significantly contributes positively to analytical progress. Evaluating the online activities one student noted: 'It is the assignments, more than my fieldnotes, which have started something... [constructive thoughts]. If nobody had asked me to do it, I would not have reached that far' ... The regular feedback and in particular perhaps team members' questions and suggestions triggered by the uploads clearly make a positive difference to the fieldwork process as evident in one student's farewell to team members: 'I just want to say thank you so much for truly valuable feedback! Your thoughts related to my argument have helped me to move ahead...'

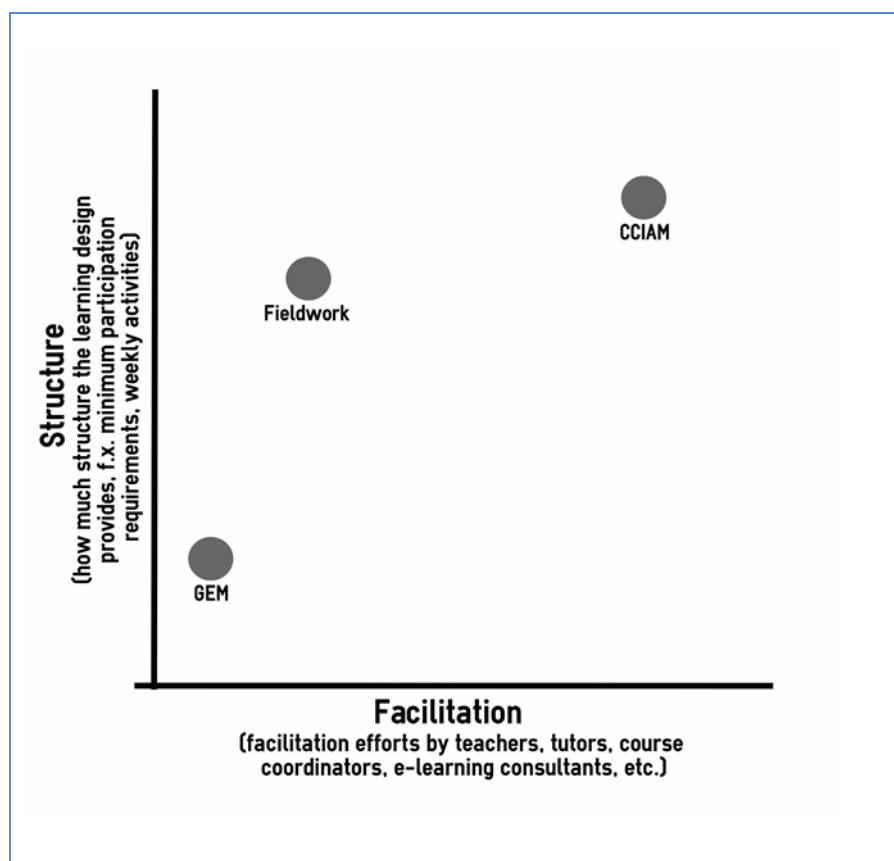
Apart from increased analytical reflection, however, the importance of social support provided via the teams shall not be underestimated. During the last days of fieldwork one team expressed her deep felt thanks at Café SoFa: 'All in all thanks for the feedback you have given me during the last couple of months - it has been a pleasure and an enormous support on a daily basis to have this

forum during a period when one is so far from home and not really has anyone with whom one can share one's anthropological thoughts. And it has been a great support to be able to discuss the methodological challenges with participants who have taken liberties as well as those for whom words do not come easily. It has really been a support to be able to share these things with you...’.

What started as an experiment has become an integrated part of the curriculum. At a time when it is both easy and cheap to communicate across the globe it is increasingly difficult to defend leaving master students on their own during what is arguably the most demanding part of their education. Online activities during fieldwork continuously will be developed in close interaction between students and teachers.

## Discussion

This analysis has served as an opportunity for three teachers to look critically on how our respective learning designs have worked in each of our own courses, as well as a chance to share our experiences with each other and reflect on potential improvements. The three courses we have chosen are distinctive in their level of structure and facilitation, the role of the teacher and students, and the discussion's focus and purpose. The CCIAM course featured high structure (mandatory minimum participation) and high facilitation (high teacher activity in discussions), while the GEM course featured low structure (“open-mic” format discussions) and nearly no facilitation (only intervention by teachers if necessary), and the Fieldwork course featured high structure (regular assignments with feedback and designated space for social discussion) and low facilitation (minimal teacher involvement in discussions) (Figure 10). In CCIAM, we found that although the high level of facilitation by teachers and tutors was rewarding in terms of student engagement, the workload involved in providing feedback and discussion fodder to each individual student could be unsustainable for very large courses (more than 60 students) with limited time and teaching resources. In the GEM course, we found that although the “open-mic” format attracted the most dedicated students and resulted in some provocative and interesting discussions, there was overall very little sense of online learning community amongst students on the course at large. In the Fieldwork course, we found that the groups that devoted themselves fully to engaging in the course benefited greatly from the discussions, but it was a challenge to ensure that more students understood the importance of the online learning community and committing to the process of engaging fully in the discussions.



**Figure 10:** Balance of structure vs. facilitation in the three courses studied in this analysis

### Creating space for sociality

In analysing our visualisations, we also realized that creating a high “sociality” in the online learning community was a common end goal in the learning designs on the three courses, and that we, as teachers, intuitively recognized the importance of fostering social presence in our online learning communities. Although the “sociality” parameter is built into the CoI framework and the Five-Stage model, we can see that the practical application in the online learning communities on the three courses focused differently on optimizing achievement of learning objectives (CCIAM), students supporting each other (Fieldwork), and students’ intrinsic motivation to connect with fellow students on the course (GEM). Participation in the “social” element of the online learning community must always, to some extent, be voluntary, genuine and not forced, and we therefore suggest not to underestimate the importance of creating space for informal discussions in one’s learning design. It remains, however, a challenge to communicate the importance of the online learning community to students and subsequently to get them to engage in its creation and establishment themselves.

### Structure and the online learning community

One important consideration of the structure used in the courses’ learning design is therefore that of making the course--or specific course elements--

mandatory, and the effect of this demand on students' motivation to engage in the online learning community. According to student feedback in the CCIAM course, we found that high structure can cause stress among students, but that this stress can actually be somewhat mitigated by the teacher's facilitation, i.e. providing stimulation and consistent activity in the discussions. We grapple with the question of structure on the CCIAM course, and from Autumn 2016 are experimenting with whether more freedom from structure can provide space for the type of "social" discussions we have seen in past runs of the course featuring less structure. In contrast, the Fieldwork course from Autumn 2016 will be mandatory for all students embarking in fieldwork. Whether more structure will affect motivation to engage in the online learning community or not remains to be seen. Finally, we saw on the GEM course that the "open-mic", low structure approach was capable of creating sociality and engagement in an online learning community, but only amongst a limited group of particularly motivated students. We therefore conclude that some structure and requirements can be beneficial to encouraging development of the online learning community, but that high levels of structure must be balanced with, for example, high facilitation by teachers and tutors, or a small, intimate group setting with space for informal, supportive discussion, in order to prevent isolation and unnecessary stress of students.

### **Facilitation and the online learning community**

The role of the teacher, and more specifically, whether the creation of the content on the course is primarily teacher driven or student driven, must also be considered, and a balance must be struck between giving students total independence and "hand-holding" the students. The high level of facilitation on the CCIAM course could be interpreted as a comfort to the students, with students reporting positive feedback to the teacher's participation in E-module 8 (the discussions studied in this analysis), in contrast to reporting stress and anxiety in other weeks featuring lower teacher facilitation. Students furthermore also report that it is helpful to have their tutor direct the discussion and support the strengthening of the online learning community in their groups. In the CCIAM course, the teacher and tutor take a central and active role in shaping the online learning community and directing students towards the learning outcomes. In the Fieldwork course, the teacher intentionally took a more peripheral role, to allow the students to lean on each other and use each other for support. This is a different approach than employed in CCIAM, used with a much smaller group (4 students vs. 13 students), but is also successful in the groups which choose to commit to the online learning community. Finally, in the GEM course, students are afforded total independence, and encouraged to use each other as resources in the discussion forum, consistent with the Coursera model. The teacher and tutor did not "facilitate" the discussion, but rather "intervened" when they felt it was necessary. We therefore find that the level of facilitation students need must be dynamically adapted to the needs of the particular online learning



community. Attributes of the online learning community--e.g. group intimacy and size, feeling of uncertainty among students, ability to rely on other students for help and support, number of required tasks and structural rigidity of the course--can result in certain groups needing more support at certain times, and perhaps more independence to work within the group during other times. The needs of the online learning community should be interpreted by the teachers, and the role in facilitating the discussion thereby adapted.

## Conclusion

Our study confirms previous studies showing that teaching presence may positively affect social presence and cognitive presence and that social presence may in itself positively affect cognitive presence. Overall, we find that an optimal learning design must be a well-adapted and dynamic balance between structure and facilitation, which strives to give students an adequate framework to launch their learning and ample material to progress their inquiry, while providing freedom for academic curiosity and support for taking intellectual risks.

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