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## Abstract

**Background:** Sense of Community (SoC) refers to the cognitive or emotional connections established between physically separated learners; it is essential for study success. The recent COVID-19 pandemic highlighted the need for practical guidelines to facilitate building a SoC in online medical preclerkship education in the Netherlands. Therefore, this qualitative study aims to 1) examine perceptions of SoC from both students' and teachers' perspectives in an online elective course during the COVID-19 pandemic in order to 2) provide a conceptual framework with practical guidelines to medical educators on how to build SoC in online education.

**Methods:** The study had an exploratory qualitative design. Semi-structured focus groups with student ( $n = 15$ ) and teacher ( $n = 5$ ) volunteers were conducted. Participants discussed their experienced SoC using the storyline method. In addition, course developers ( $n = 2$ ) were interviewed and lecturers ( $n = 5$ ) wrote an experience story. Audio- and video-recordings were transcribed verbatim and both the ensuing transcripts and experience stories were analyzed using an inductive thematic analysis.

**Results:** All students experienced an increase of SoC during the eight-week course. Five themes were identified: "social contacts made possible by a physical campus", "group dynamics", "teacher influence", "education format" and "teachers' Sense of Community". The authors formulated challenges and practical guidelines on how to build SoC based on these themes.

**Conclusions:** This exploratory qualitative study provides a conceptual framework with practical guidelines for medical educators on how to build SoC in online medical preclerkship education. These guidelines provide a valuable starting point to build SoC in online education for medical educators and students alike.

Word count: 261

## Introduction

The recent COVID-19 pandemic disrupted medical education in the Netherlands in an unprecedented way. (1) In a short period of time, offline education for more than 9,000 Dutch medical students at the preclerkship level was moved online. (2) A commonly reported challenge in online education is establishing and maintaining a sense of belonging between students and teachers, (3) also called Sense of Community (SoC). In this context, “community” refers to “the cognitive or emotional connections established between physically separated learners”. (4) McMillan et al. (5) defined SoC as “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members’ needs will be met through their commitment to be together”.

Ryan and Deci’s self-determination theory of motivation (6) underscores the importance of SoC. According to this theory, fulfillment of the three basic psychological needs, competence, autonomy, and relatedness is essential for intrinsic motivation. Relatedness bears great similarity to SoC, as both refer to a sense of belonging to a group. Creating a SoC, and thereby fulfilling learners’ need for relatedness, thus increases learners’ intrinsic motivation and positively influences their study success.

However, practical guidelines for building SoC in online medical education are currently lacking. (4) Such guidelines would be timely and relevant as the COVID-19 pandemic has caused unprecedented changes to the educational environment. Due to the social distancing measures in place, students have far fewer opportunities to engage in face-to-face community-forming activities with their fellow students and friends. These unique and potentially long-lasting repercussions of the COVID pandemic heighten the need for a conceptual framework with actionable guidelines for educators to help them increase levels of SoC in their online courses.

This qualitative study aims to 1) examine the perceptions of SoC from both students’ and teachers’ perspectives in an online medical preclerkship elective course during the COVID-19 pandemic in order to 2) provide a conceptual framework with practical guidelines to medical educators on how to build SoC in online education.

## Methods



### *Educational setting*

This study's setting was a preclerkship elective course for second-year medical students at Utrecht University, the Netherlands. This eight-week course took place during the COVID-19 pandemic (April 20-June 12, 2020) and was offered completely online to a group of 75 medical students. The main learning objective of the course, entitled "COVID-19 and Society", was to teach students how to understand and critically reflect upon the current COVID-19 pandemic.(7) Students were placed in this course as many of the elective courses they initially enrolled for could not be given online. The week structure (see **Table 1**) consisted of educational formats commonly used in online courses at Utrecht University, including online lectures, discussion groups and group assignments. The study load was approximately twenty hours per week. Attendance was compulsory for all elements in the course and students received a pass/fail grade based on the sufficient completion of the course assignments.

### *Study design and data collection*

This study employed a qualitative methodology using focus groups. Focus groups are particularly useful in exploratory research in poorly understood or ill-defined topics (8) as is the case with students' and teachers' experience of SoC. Focus groups as a method fit into a constructivist paradigm which views knowledge as a product of the interaction between individuals. (9) We used a purposive sampling strategy (10) to select the participants; the course developer (RdJ) invited students and teachers to participate in the study on a voluntary basis. Three focus groups were organized with students ( $n=15$  and one with discussion group teachers ( $n=5$ ) to explore perceptions of SoC during the course. Each focus group included between 4 and 6 participants, meeting the recommended minimum of three participants to capture sufficient varying opinions and perspectives.(9) The focus groups took place a week after completion of the course and lasted between 53 and 79 minutes.

Microsoft Teams was used as an online meeting site for the focus groups. All participants had their camera turned on and were simultaneously visible on the screen. All participants spoke Dutch during the focus groups. Participants did not know the moderator (GM) beforehand. An

observer, also a guest lecturer during the course (MM), took notes about group interaction and had her camera turned off during the discussion.

The semi-structured focus groups started with a short explanation of the concept of SoC by the moderator using the definition by McMillan et al. (5) as described in the introduction. Next, participants were asked to individually draw a line on a digital whiteboard representing the level of SoC experienced (y-axis) over the eight-week course (x-axis). To assist participants while drawing their lines, the course program was displayed in the chat as a reminder. **Figure 1** provides an example of a student's storyline. This "storyline method" (11) was used to stimulate critical discussion, as it can be used to evaluate educational experiences (12,13). To initiate the discussion, all storylines were displayed on the same screen and participants were asked to explain the shape of their lines. Similarities and differences in the storylines were then discussed. The moderator asked probing questions regarding the highs and lows in SoC in the story lines (i.e. "In week six your line dips. What happened?"). Teachers were asked to draw a second storyline reflecting the SoC they experienced with their colleagues in addition to drawing a storyline depicting their impression of students' SoC.

To collect additional information about teachers' experiences of SoC, the two course developers were jointly interviewed by GM using the storyline method. Furthermore, five guest lecturers were asked to write a short experience story focusing on expectations, experiences and recommendations with respect to SoC regarding the lecture they had given.

### *Data analysis*

The focus groups and the interview were audio- and video-recorded and transcribed verbatim. Next, inductive thematic analysis (14, 15) was conducted to identify emerging themes in both the transcripts and the experience stories. GM used all data to create a codebook and assigned a code to each data unit, adhering to participants' terminology as much as possible. Preliminary coding categories were discussed with MM and adjustments were made until consensus was reached about the final coding categories.

These final coding categories were then used by GM to code all data with the software program NVivo version 12 and served as the themes reported in the results section. Within each subtheme, factors were identified which positively and negatively contributed to building SoC.

The authors subsequently used these factors to formulate challenges and practical guidelines on how to build SoC.

### *Ethical considerations*

The ethical review board of the Netherlands Association for Medical Education (NVMO) provided consent for this study (review number: 2020.4.9). No additional approval was required from a medical ethics review committee (METC). All participants gave their consent to audio- and video-recording the focus groups and to transcribe the tapes in a way that no identifiable information was retained.

## **Results**

### *Description of the storylines*

All students and teachers shared the concept of SoC after they had been informed about McMillan's definition (5). Their storylines showed a general trend, namely an increase in the experienced SoC over the eight weeks of the course. The storylines of both students and teachers showed less SoC was experienced in the weeks in which fewer discussion groups were scheduled. More SoC was reported in the last weeks of the course when students collaborated on a final assignment. Inductive thematic analysis of the factors influencing students' and teachers' experienced SoC was conducted. This analysis resulted in five themes which are depicted in **Figure 2** and can be used as an explanation for the levels of SoC experienced. These themes have been further divided into subthemes and will be elaborated upon in this section. A complete overview of the positive and negative factors influencing students' and teachers' experienced SoC can be found in **supplementary Table 1**.

#### *Theme 1: Social contacts made possible by a physical campus*

Students mentioned that they missed social contacts made possible by the physical campus. They reported missing the social contacts outside the classroom, as one student stated: *"I like to walk downstairs after a discussion group. Then the chitchat starts. Now when you have a break, you turn off your camera and you don't speak to each other. Normally, after a lecture you get a cup of coffee together. Then a bond is created much faster."* (P2) Students also missed attending

classes with their friends. One student mentioned: *"Normally, you sit among your friends during the lecture, but that was impossible now, of course. A substitute for this was that I had a What's App group with my small assignment group. We were constantly sending messages during the discussion groups and lectures with our opinions about what was going on. For me, this has replaced the old means of contact during lectures."* (P4)

## *Theme 2: Group dynamics*

Six subthemes were found important for group dynamics, which refer to the interaction between the students during the course. First, both students and teachers said seeing each other's faces was a prerequisite to build SoC. One student reported: *"Often everybody is on time, but everybody has his camera turned off and the microphone on mute. Then you don't know 'is that person actually there?'"* (P14) Second, it was important to get to know each other, as illustrated in the following quote: *"In advance I didn't know anybody in my discussion group at all, so I experienced little team spirit."* (P13) The third factor in group dynamics was staying motivated, especially when group members were not. One participant described this experience in her discussion group as follows: *"I had the feeling many people in my discussion group did not enjoy this course. [...] That made me feel less motivated because the others were demotivated and not enthusiastic."* (P14) Fourth, a proactive attitude was helpful to build SoC and the opposite was true for a passive attitude: *"I open my mouth myself, so I get to know others. You feel less engaged with the students who say something only once or twice during the whole discussion group."* (P2) Fifth, sharing emotions and experiences emerged as a vital subtheme, especially for this student, who said: *"I am motivated by being part of a community if I learn something new and can discuss this with people."* (P9) The last identified subtheme within group dynamics was professional identity. Participants found it challenging to remain connected to the medical professional community during online education. This is reflected in the following student's quote: *"You see less doctors, and this impacts your view of the medical profession. You create your own image of what a doctor should look like. There are advantages to seeing the standard image of what a doctor looks like, but there are also disadvantages like rivalry and perfectionism."* (P10). Some students liked being away from the medical word and this standard doctor image, while others reported liking precisely this interaction.

### *Theme 3: Teacher influence*

Teachers' influence on the creation and maintenance of a SoC is illustrated in the following subthemes. First of all, teachers who provided space for informal interactions between students had a positive influence on SoC. As one student stated: *"My discussion group teacher asked at the start of the week 'what did you do this weekend?' and at the end of the week 'what are your plans for this weekend?' [...] Actively asking to share personal stuff is very helpful."* (P11) Secondly, teachers created SoC through their communication style, as can be seen in this quote: *"For me the peaks were really the discussion groups with [name teacher]. She did a good job giving everybody turn so you could hear everybody and really felt involved with the discussion group."* (P6) The final subtheme was the accessibility of teachers contributing to SoC in an online environment. A discussion group teacher mentioned this as follows: *"The threshold was much lower to send a message, because all contact was online. At one moment in the course, I thought I had [...] had an email conversation with each of my students."* (P18)

### *Theme 4: Education format*

The various education formats contributed to both students' and teachers' feelings of SoC in different ways. For the students, group assignments had the greatest positive impact on SoC. As one student reflected: *"Towards the end of the course we were assigned a small group in which we had to make an infographic, we completed the big final assignment in the same group. At those times we sat with the four of us in [Microsoft] Teams a lot. Then you start chatting here and there about personal stuff and it starts to get fun to work together. After a while I really began to feel a kind of bond with my group."* (P3) Discussion groups also had a considerable impact on SoC, as one student mentioned: *"I didn't feel that connected to my fellow students during the course, but I did feel connected during the group discussions. If you are interested, it's exciting to participate. You really engage in a conversation. That really created that sense of community for me: you are not alone, other people are there, you can talk to each other."* (P14) Finally, both students and teachers experienced the least SoC during the large group lectures, as illustrated by this quote: *"the lectures [...] were relatively anonymous. You hardly saw anybody. I had little motivation myself to turn on the camera. It was a one-way street with respect to what was being*

said. I came online, I listened a bit and that was it. In any case, you don't create a sense of community this way. With 75 students it is impossible to involve everybody." (P3)

#### *Theme 5: Teachers' Sense of Community*

Next to the SoC of students, this study revealed teachers also engaged in building SoC with both their students and with their colleagues. A discussion group teacher described SoC with the students as follows: *"During the last discussion group, someone said more or less surprised: 'Is this the last time we see you?' And then I thought 'oh yeah, that is actually true.' I thought it was particularly nice because she said it in a way like 'oh it is so sad!' Another student also asked: 'How did you end up here as a teacher?' Those students gave me the feeling that they were also interested in me as a person and not just in the discussion group topic."* (P17) Secondly, teachers valued opportunities to develop a SoC with their fellow teachers, as represented by this discussion group teacher's words: *"When you had a question for the course developers, more discussion group teachers joined in [Microsoft] Teams and everyone could read in What's App if a meeting was at hand. Before you knew it, you sat together with the whole team and really felt a kind of Sense of Community like 'we have to do this together, we are going to make the most of this course. We are all in this together [...]. Let's do this!'"* (P16)

#### *Challenges and practical guidelines*

Based on the factors positively and negatively contributing to SoC, which have been included in *supplementary Table 1*, a list of challenges and practical guidelines on how to build SoC was formulated by the authors. These are shown in **Table 2**. The guidelines are practical in nature and implementable for both teachers and students.

#### **Discussion**

This exploratory qualitative study provides a conceptual framework with practical guidelines for medical educators on how to build SoC in online medical preclerkship education. The five themes in this framework suggest that perceptions of SoC in the investigated online medical preclerkship elective course depended on "social contacts made possible by a physical campus", "group dynamics", "teacher influence", "education format" and "teachers' SoC".

Our practical guidelines build upon and expand the unclassified recommendations already published. Various pre-covid studies have reported on how to build SoC in online education.(4,16,17) Recommendations include creating an effective introduction, (18-21) peer reviewing, (21-25) teacher feedback on assignments, (22, 26-28) and providing space for informal interactions.(17, 29) These recommendations were also included in our practical guidelines. This study adds a conceptual framework that can be used to structure these practical guidelines. This study furthermore shows that the guidelines previously found are robust to the changes in the educational landscape due to the pandemic. Guidelines for supporting SoC could also be structured in line with the Community of Inquiry (Col) framework. In the Col framework it is put forth that students need to experience *social*, *cognitive*, and *teacher* presence for a valuable educational experience.(30) When interpreting our themes through the lens of the Col framework alignment can be found. “Social contacts made possible by a physical campus” and “group dynamics” both refer to the importance of social presence, while “teacher influence” supports the importance of teacher presence, and “education formats” bears similarities to cognitive presence. Although frequently used in online education research, this COI framework has a philosophical and theoretical point of view, thereby lacking the practical applicability our conceptual framework offers.

Two key limitations can be identified in this study. First, students participated voluntarily, thereby potentially introducing self-selection bias. Secondly, and more importantly, all participants in this study were enrolled in the same course. However, the design of the course under study was highly similar to the design of other online courses at Utrecht University. It is therefore unlikely that a different sample would have led to highly different findings. Nevertheless, further research in which practical guidelines for SoC are explored and tested with students in different courses should be conducted to further substantiate the conceptual framework and guidelines reported in this study.

The presented practical guidelines on how to build SoC are important as medical preclerkship education will most likely be offered primarily online for the foreseeable future as the COVID-19 pandemic is still ongoing. More research on the effectiveness of these practical guidelines is needed to prioritize and further refine them. Nevertheless, these guidelines provide

a valuable starting point to build SoC in online education for medical educators and students alike.

Accepted Article



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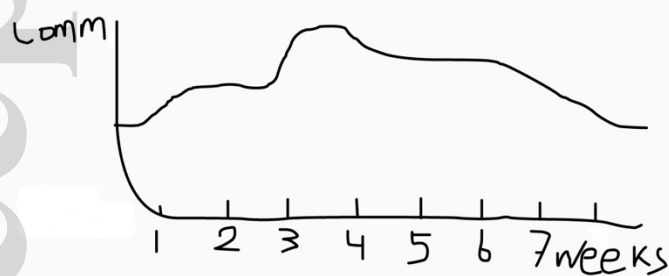
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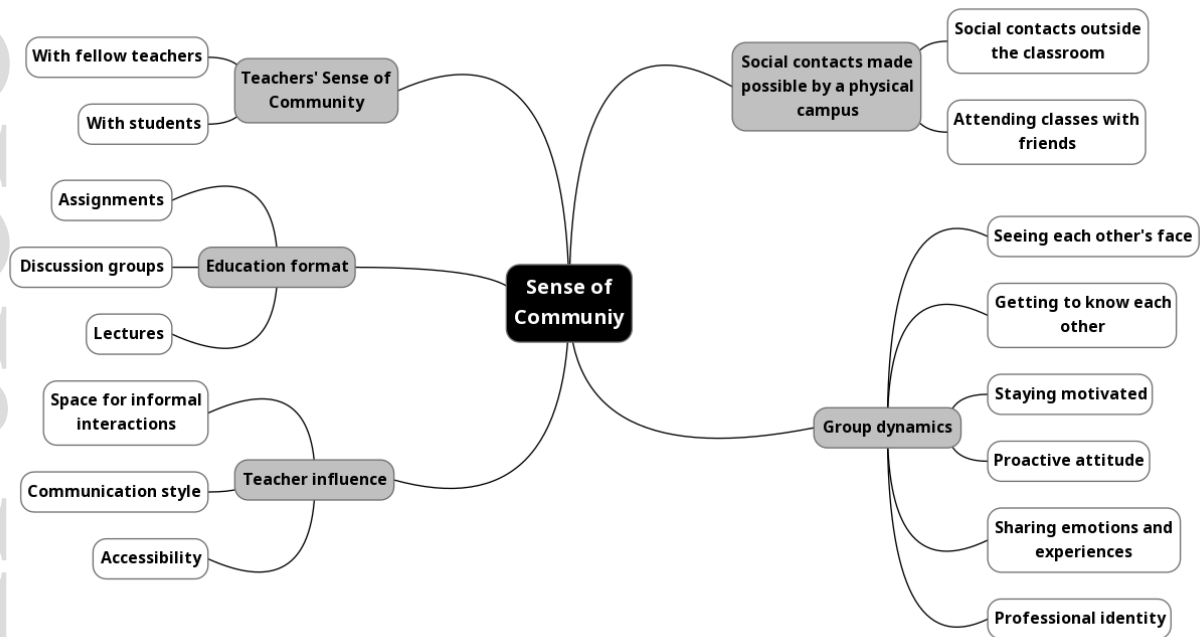
**Table 1.** Week structure

Education format	Frequency	Description	Online format	Number of students
Introduction	1x1h	Introduction of the weekly learning goals by course developer	Zoom, Microsoft Teams	75
Lectures	3x1h	Powerpoint presentations by guest lecturers	Zoom	75
Discussion groups	1-2x1.5h	Teacher-guided discussion based on prepared questions by students	Microsoft Teams	12-13
Assignments	1x10h	Weekly assignment individually or in small groups	Offline or in Microsoft Teams	1 or 4-5
Self study	1x4h	Preparation of discussion groups and lectures	Offline	1
Office hour	1x1h	Opportunity to ask questions to course developers	Microsoft Teams	Varying

**Figure 1.** Storyline student P7

X-axis: eight weeks of the elective course

Y-axis: level of Sense of Community experienced



**Figure 2.** Overview of identified themes related to Sense of Community

**Table 2.** Challenges and practical guidelines on how to build Sense of Community in online education

Theme	Challenge	Practical guidelines
<b>Theme 1: Social contacts made possible by a physical campus</b>		
Social contacts outside the classroom	Creating a virtual campus experience	<ul style="list-style-type: none"> <li>• Provide opportunities for interactions that normally take place outside of the classroom during class</li> <li>• Stimulate students to plan online video breaks with fellow students</li> <li>• Encourage students to go to an online group environment before and/or after class to chat in small groups (3-5 students)</li> </ul>
Attending classes with friends	Keeping in touch with your friends during education	<ul style="list-style-type: none"> <li>• Stimulate students to have conversations during education via unofficial means of communication such as What's App</li> </ul>
<b>Theme 2: Group dynamics</b>		
Seeing each other's face	Picking up on nonverbal communication	<ul style="list-style-type: none"> <li>• Make turning on your camera mandatory</li> <li>• Use online meeting tools that allow you to see most of the group on the screen simultaneously</li> </ul>

Getting to know each other	Creating an effective introduction	<ul style="list-style-type: none"><li>• Avoid traditional formal introductions (such as asking students to state their age and interests)</li><li>• Invite students who know each other already to tell something about what they have in common</li><li>• Stimulate an introductory discussion in which people can give their personal opinion</li><li>• Create speed dating sessions in small, randomly selected groups (3-5 students) so that students get to know the entire class after a few sessions</li><li>• Play an online game (e.g. a game in which you ask each other open-ended questions about personal life)</li><li>• Consider getting to know each other a process; use aforementioned introduction strategies throughout the course</li></ul>
Staying motivated	Staying motivated despite other group members' lack of motivation	<ul style="list-style-type: none"><li>• Stimulate students to explore common grounds of interest and motivation</li><li>• Encourage students to do something in an assignment which suits their personal interest</li><li>• Create assignments groups based on students' personal interests</li></ul>
Proactive attitude	Raising awareness of students' own ability to build Sense of Community	<ul style="list-style-type: none"><li>• Tell students that preparing and participating in discussions create a positive feedback loop by lowering the threshold to say something in future discussions</li><li>• Stimulate students to meet regularly for group assignments in a video call</li></ul>

Sharing emotions and experiences	Sharing personal issues with unfamiliar students	<ul style="list-style-type: none"> <li>• Stimulate students to share their emotional challenges by creating a safe learning environment</li> <li>• Ask students to explore their common situation and learning goals and share them subsequently</li> <li>• Encourage students to give their personal opinions</li> <li>• Structure classes to allow for time to engage in small talk</li> </ul>
Professional identity	Keeping in touch with community of (future) medical professionals	<ul style="list-style-type: none"> <li>• Encourage students to talk about how they envision their future medical careers</li> <li>• Stimulate students to use the physical distance to explore and develop individual talents, hobbies, and interests</li> </ul>
<b>Theme 3: Teacher influence</b>		
Space for informal interaction	Meeting learning goals while still providing enough time for informality	<ul style="list-style-type: none"> <li>• Ask actively about students' lives and experiences outside of the classroom to start an informal discussion</li> <li>• Create assignment deadlines in a way that ensures students have time for informal conversations during collaboration</li> <li>• Limit listening in while students are working together in small groups in a video meeting</li> <li>• Create a small informal introduction at the start of the class instead of beginning with difficult substantial questions</li> </ul>



		<ul style="list-style-type: none"> <li>• Dare to show your own vulnerability by talking about your personal life and interests</li> </ul>
Communication style	Creating and maintaining a Sense of Community without losing sight of individual differences	<ul style="list-style-type: none"> <li>• Distribute your attention between talkative and silent students</li> <li>• Ask questions directly to students by calling them by their names</li> <li>• Address students as a group in language use</li> <li>• Acknowledge students' responses</li> <li>• Give compliments</li> <li>• Behave enthusiastically when in front of the camera</li> <li>• Set clear expectations in a weekly introduction meeting or mail</li> <li>• Explain why a topic or assignment is valuable</li> <li>• Use motivated students' enthusiasm to stimulate less motivated students</li> <li>• Allow students to interrupt and ask questions</li> <li>• Offer an instruction on the technical aspects of online tools and how to behave in an online environment (netiquette)</li> </ul>
Accessibility	Minimalizing distance between students and teachers whilst maintaining a teacher	<ul style="list-style-type: none"> <li>• Stimulate students to email their questions and provide a quick response</li> <li>• Allocate the same teacher to a discussion group during the whole course</li> <li>• Allocate a teacher the function of coordinating teacher to answer students' general questions</li> <li>• Ask actively for feedback throughout the course in small group settings and make an effort to</li> </ul>

	presence	<p>incorporate the feedback into the course</p> <ul style="list-style-type: none"><li>• Consider using junior/student teachers who are close to students with respect to age</li><li>• Create regular online office hours during which students can ask questions in a video call</li></ul>
<b>Theme 4: Education format</b>		
Assignments	Taking into account Sense of Community during the design of an assignment	<ul style="list-style-type: none"><li>• Create an intensive group assignment in a small group (3-5 students) that spans multiple weeks</li><li>• Provide meeting spaces in the online environment for subgroups</li><li>• Create a peer feedback system for individual assignments</li><li>• Give extensive feedback for both individual and group assignments and discuss the feedback with the student(s)</li><li>• Create a possibility for the students to present their assignments to fellow students and have a group discussion afterwards</li><li>• Consider varying group composition for each assignment to enable students to get to know more people</li><li>• Stimulate students to work together (i.e. not dividing the assignment in little pieces and combining them at the end): encourage students to work on group assignments during a video meeting using screen sharing while working in the same document simultaneously</li><li>• Create assignments in which students be creative and feel a certain amount of autonomy</li></ul>

		<ul style="list-style-type: none"><li>• Consider adding a competition element to some assignments</li></ul>
Discussion groups	Taking into account Sense of Community during the design of a discussion group	<ul style="list-style-type: none"><li>• Schedule discussion groups on a fixed schedule so they form the foundation of the course (e.g. two times a week every week on the same days)</li><li>• Keep the same discussion group composition throughout the course</li><li>• Do not overestimate the effect of discussion groups on Sense of Community: with 12-13 persons it is still a challenge to build Sense of Community</li><li>• Consider dividing students into smaller discussion groups (3-5 students) for certain topics</li></ul>
Lectures	Taking into account Sense of Community during the design of a lecture	<ul style="list-style-type: none"><li>• Avoid scheduling too many lectures because of the limited participation of students in large groups in an online environment. Many will turn off their microphones and cameras if not invited to participate.</li><li>• Consider a flipped classroom construction in which you record a short instruction video so that you have more time for interaction during the lecture</li><li>• Stimulate students to ask questions in the chat during the lecture. Then, ask students to explain their questions with the camera and microphone turned on.</li><li>• Strive for interactivity, for example by small group discussions in groups generated at random or by Q&amp;As a few times during the lecture</li></ul>

		<ul style="list-style-type: none"> <li>• Schedule the same lecturer multiple times throughout the course so that this lecturer can invest in connecting with the students (i.e. not only guest lectures)</li> <li>• Allocate a permanent moderator who manages students' questions in the chat during each lecture</li> <li>• Ask for students' feedback during lectures (e.g. using emoticons) as a substitute for the missing nonverbal interaction</li> </ul>
<b>Theme 5: Teachers' Sense of Community</b>		
With fellow teachers	Creating a Sense of Community among teaching staff	<ul style="list-style-type: none"> <li>• Create opportunities for informal interaction with other teachers to share educational experiences</li> <li>• Encourage teachers to prepare a lecture or discussion group with a coordinating teacher</li> <li>• Invite teachers to participate in course development and evaluation</li> <li>• Encourage teachers to provide peer support when other teachers experience difficulties</li> <li>• Discuss and evaluate students' assignments together</li> </ul>
With students	Stimulating students to behave in way that contributes to teachers' Sense of Community	<ul style="list-style-type: none"> <li>• Explain behavior to students which positively influences teacher Sense of Community. For example, expressing appreciation to teachers, asking critical questions, applying key messages in assignments, actively participating in group discussions and showing motivation and enthusiasm.</li> <li>• Explain behavior to students which negatively influences teacher Sense of Community. For</li> </ul>

		example, turning off the camera and microphone, doing something different during group discussions and acting disinterested
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