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ORIGINAL RESEARCH

Examining the instructor-student collaborative partnership in an online learning community course

Fan Ouyang[1] · Yu-Hui Chang[2] · Cassandra Scharber[2] · Pengcheng Jiao[3] · Tianhui Huang[4]

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Abstract
Education is under a radical transformation in the current innovation-driven knowledge age. The instructor-student collaborative partnership has the potential to transform education from traditional instructor-directed, transmissive teaching to active, participatory student-centered learning. However, relevant inquiry indicates the conceptual, analytical, and practical gaps on the instructor-student collaborative partnership. This study aims to conceptualize, analyze, and foster the instructor-student collaborative partnership in higher education contexts. To achieve this purpose, we empirically investigate the instructor-student collaborative partnership in an online course where the instructor uses a learning-community approach to foster learning. Using mixed methods, we examine the instructor-student collaborative partnership from the *participation frequency*, *engagement move*, and *participant perception* perspectives. Results show that the instructor and students not only actively participate in learning, instruction, and social environment building processes, but also maintain mutual interactions, communications, and actions to construct knowledge, to design and facilitate discussions, and to build a social learning environment. In addition, most participants perceive a sense of an online learning community in this online course. Based on the results, we provide theoretical, analytical, and pedagogical implications to advance the theory, analysis, and practice of the instructor-student collaborative partnership.

Keywords Instructor-student collaborative partnership · Online learning community · Online discussions · Mixed methods · Student-centered learning

Introduction

A wealth of perspectives in the field of learning sciences has posited that learning is not a passive reception; instead, it is a constructive process of knowledge in socially situated contexts (Bereiter 2002; Lave and Wenger 1991; Vygotsky 1978). In contrast to the traditional, instructor-directed education structures, the sociocultural perspective of learning

✉ Fan Ouyang
fanouyang@zju.edu.cn

Extended author information available on the last page of the article

has favored a more equal, collaborative partnership between instructor and students. In a collaborative partnership, both the instructor and students need to take active roles for design, learning, and instruction, respect others' knowledge, expertise, and experience, and work together to achieve shared learning goals (Brown et al. 1993; Garrison 1992; Sawyer 2014). In order to prepare self-directed, self-driven, lifelong learners for the current innovation-driven knowledge age (Barron 2006; Scardamalia and Bereiter 2006; Stehr 1994), it is beneficial to transform from an instructor-directed, hierarchical mode of teaching to a collaborative partnership mode of learning in higher education contexts.

As a collaborative mode, the instructor-student collaborative partnership is a complex, multilayered phenomenon. First, from the *participation frequency* perspective, both the instructor and students need to actively participate in the learning and instruction processes, including knowledge construction (e.g., Tabak and Baumgartner 2004), instructional design (e.g., Barbera et al. 2017), and social environment building (e.g., Clarke and Bartholomew 2014). Second, building upon active, participatory behaviors, a joint *engagement move* may occur between the instructor and students, through which they take turns to contribute to learning (e.g., Sewell et al. 2013), instruction (e.g., Nel 2017) and social processes (e.g., Ouyang and Scharber 2017). A third critical aspect of the collaborative partnership is *participant perception* about the effectiveness of collaborations towards achieving shared goals (e.g., West and Williams 2017). Overall, the instructor-student collaborative partnership is a complex concept, that needs to be investigated from multiple perspectives.

This study aims to advance the theory, analysis, and practice of the instructor-student collaborative partnership in higher education contexts. Since a learning-community approach has the potential to foster the instructor-student collaborative partnership (Bielaczyc and Collins 1999), we particularly focus our investigation on an online learning community course through which the instructor uses the learning-community approach to design and facilitate learning in online higher education. This study assists in understanding whether, to what extent, and how the instructor and students build a collaborative partnership in this course. We use a mixed method to examine the collaborative partnership from the *participation frequency*, *engagement move*, and *participant perception* perspectives. Based on those results, this study provides theoretical, analytical, and pedagogical implications that are beneficial to understand, analyze, and foster the instructor-student collaborative partnerships in higher education.

Review of the relevant literature

On the theoretical level, grounded upon the social, cultural, situated perspectives of learning (Vygotsky 1978), collaboration is defined as a group of people participate in continued, coordinated, and sustained activities to maintain interactions and dialogues, to work on a shared conception of a problem or a project, and to achieve shared goals (Dillenbourg 1999; Goodyear et al. 2014; Roschelle and Teasley 1995). Learners are active constructors of knowledge in the collaboration process interacting with people, information, and social contexts, rather than passive recipients of knowledge that is accumulated by the instructor and transmitted to them (Bereiter 2002; Brown and Campione 1994; Palincsar 1998). The social, collaborative perspectives of learning challenge traditional, hierarchical education structures, in favor of a more participatory collaborative partnership between the instructor and students. In a traditional, instructor-directed classroom, the instructor usually takes a substantive leader role to design and guide instruction and learning, while students

respond to new knowledge, resources, and activities in order to achieve predefined goals (Greeno et al. 1996; Palincsar 1998; Prawat 1992). In contrast, educational practices in the past decade have widely used a learning-community approach to transform from instructor-directed teaching to student-centered learning. This learning-community approach has been practiced in varied forms, e.g., community of learners (Brown and Campione 1994), community of inquiry (Garrison et al. 2000), community of practice (Wenger 1998), and knowledge building communities (Scardamalia and Bereiter 2006). A learning-community approach can foster distributed expertise (Brown et al. 1993), reciprocal teaching (Palincsar and Brown 1984), and situated cognition (Brown et al. 1989) for both the instructor and students, which has the potential to build the instructor-student collaborative partnership (Bielaczyc and Collins 1999; Fischer 2018; Hod et al. 2018). Particularly, it is crucial for adult learners to take active roles in their own learning, respect others' expertise, and work as lifelong learners in the current knowledge age (Garrison 1992; Scardamalia and Bereiter 2006; Stehr 1994). The instructor-student collaborative partnership can transform education practices from a traditional, transmissive instructor-directed teaching to a participatory, collaborative student-centered learning.

Although the *instructor-student collaborative partnership* concept has not been proposed in the literature, equal and collaborative relationships between instructors and students have been practiced and investigated. For example, high school teachers used the *teachers as partners* approach to collaborate with students in scientific inquiry processes and achieved a balance between teacher authority and student meaning-making (Tabak and Baumgartner 2004). Nel (2017) used the *students as collaborators* approach to collect student feedback about newly-introduced pedagogical strategies, and made pedagogical changes accordingly to improve student learning. The *student-faculty partnership* was used to engage students work with faculty to explore, design, and develop pedagogy (Cook-Sather 2014a). However, there are two gaps in this line of inquiry: first, researchers used all of those concepts in a practical way without offering explicit definitions; and second, those practices and relevant analyses only reflected one specific aspect of the collaboration between instructors and students, such as cognitive inquiry or pedagogical practice. As a consequence, it is necessary to conceptualize the *instructor-student collaborative partnership* in a more holistic way. In the following paragraphs, we offer the initial conceptualization of the *instructor-student collaborative partnership.*

The *instructor-student collaborative partnership* occurs in learning, instruction, and social processes, including knowledge inquiry and construction, instructional design and development, and social environment building. First, grounded upon sociocultural perspectives of learning, knowledge is not considered as a pre-defined information transferred from an instructor to students; rather, it is negotiated and constructed by all participants who are attuned to each other's contributions in socially situated contexts (Barron 2006; Bereiter 2002; Sawyer 2014). Both the instructor and students not only serve as "owners" of some aspects of domain knowledge, but more importantly, as the creators of knowledge in sustained meaning-making processes (Bereiter 2002; Brown et al. 1993; Garrison 1992). Second, instructional design and implementation are shared, negotiable, and co-constructed between the instructor and students (Brown and Campione 1994; Garrison 1992; Palincsar 1998). To foster learning, instructors must see the curriculum content, material, and activity as discovered and negotiable, give up a fixed scope of teaching schedule and plan, and act as responsive guides to the students' needs and goals (Garrison 1992; Healey et al. 2014; Prawat 1992). The students take responsibilities to monitor their own learning and that of their peers, design and chart their course of studies, and explore and design some parts of learning (Bandura 2001; Brown and Campione 1994; Palincsar 1998). Finally, the

instructor and students share responsibilities to build social, trusting, and safe environments, which is critical for an active, student-centered learning to occur (Sawyer 2014). The instructor-student collaborative partnership needs both parties to construct knowledge, engage in instructional design, and become socially interdependent.

In addition, the instructor-student collaborative partnership is a complex, multilayered concept that needs to be examined from the *participation frequency*, *engagement move*, and *participant perception* perspectives. First, active *participation frequency* from the instructor and students is the prerequisite for building an instructor-student collaborative partnership. No collaboration could occur with a low-level of participation (Zhao et al. 2014). The instructor and students should actively participate in learning (e.g., Tabak and Baumgartner 2004), instruction (e.g., Barbera et al. 2017), and social (e.g., Whiteside 2015) processes, which helps build conditions for a more synergistic collaborative partnership. Second, building upon active, participatory behaviors, a joint *engagement move* may occur between the instructor and students, through which they take turns to contribute to the learning, instruction, and social environment building processes. For example, students and their teacher took turns to build on an idea (e.g., Sewell et al. 2013), modified pedagogical strategies to improve learning (e.g., Nel 2017), and were involved in social engagement to foster connections (e.g., Clarke and Bartholomew 2014). The turn-taking engagement moves indicate a joint, synergistic instructor-student collaborative partnership. Third, *participant perception* about collaborations toward achieving shared goals is also an important factor for the collaborative partnership. For example, when the instructor and students collaboratively build a learning community, they conceptualize the same goal for what the community is about, share the same community development process, and perceive they progress as a community towards the same end (West and Williams 2017). Overall, we initially conceptualize the *instructor-student collaborative partnership* as active participations of the instructor and students in the learning, instruction, and social processes, turn-taking engagement moves built on those participations, and perceptions of collaborations on achieving shared goals.

On the analytical level, multiple methods have been used to examine the specific aspects of the instructor-student collaborative partnership. For example, using an inductive, interpretive, and qualitative approach, Park et al. (2015) examined discussion transcripts from the instructor and students to analyze their discourse moves, roles, and functions in knowledge building. Tabak and Baumgartner (2004) used mixed methods to collect and analyze data from field notes, video and audio recordings, and interviews to analyze the teacher-student interactions in scientific inquiry. Nel (2017) used qualitative methods to collect student feedback from online discussions, open-ended surveys, and interviews in order to understand the students' perceptions about engaging as collaborators with the instructor in pedagogical transformation. Ouyang and Scharber (2017) used social network analysis methods to analyze an instructor's social interaction patterns with students and the instructor's social participatory role changes. Overall, the previous studies used varied research methods to examine one aspect (e.g., learning, instruction, or social) of the instructor-student collaborative partnership. Given that the instructor-student collaborative partnership is a complex concept, it is necessary to use a mixed methods approach to capture a more holistic picture of the collaborative partnership.

On the practical level, instructors and students have built collaborative partnerships to varied levels in educational practices. For example, the teacher engaged as a co-participant with students to construct knowledge (Park et al. 2015); the results showed that the teacher shared a more symmetrical relationship, as a co-learner with students. In addition, Nel (2017) made deliberate efforts to engage the students as collaborators in the

technology-enhanced learning; the results showed that the collaboration signified students as active respondents, but the level of the student-instructor partnership was not fully moved to students as co-enquirers. Moreover, examining teachers' and children's participation in a community of learners, Sewell et al. (2013) identified both the reciprocal, dialogic, responsive interactions between instructors and their students, as well as more traditional individual interactions such as teacher-led or student-ran one-sided interactions. These empirical studies indicated that although students and their instructor interacted with each other and collaborated towards shared goals, they still played varied roles, took different responsibilities, and contributed differently to the collaborative partnership. Therefore, it is necessary to further empirically examine whether, to what extent, and how a collaborative partnership was formed.

Given the conceptual, analytical, and practical gaps, it is necessary to advance the theory, analysis, and practice of the *instructor-student collaborative partnership*. This study filled this gap. We empirically investigated whether, to what extent, and how an instructor and students build a collaborative partnership in a graduate-level online course. We considered this course as a good research context since the instructor used a learning-community approach to design learning, which required active collaborations to achieve the learning community goal. Using mixed methods, we examined the collaborative partnership from the *participation frequency*, *engagement move*, and *participant perception* perspectives. Based on the results, we provided theoretical, analytical, and pedagogical implications to advance the theory, analysis, and practice of the instructor-student collaborative partnership.

Methodology

Research purpose and question

This study aims to advance the theory, analysis, and practice of the instructor-student collaborative partnership in higher education contexts. Our research question is: *Whether, to what extent, and how did the instructor and students build a collaborative partnership in an online learning community course?*

Research context and dataset

The research context was a graduate-level online course entitled, *Online Learning Communities*, offered at a midwestern research university in the United States. This course focused on theories of online learning communities and practices of building online learning communities. The instructor (Danielle, pseudonym) used a learning-community pedagogical strategy to design and foster learning and aimed to collectively build a community through authentic practices in the course. Twenty graduate students (16 females and 4 males) enrolled in this course during the 14-week semester of Spring 2014. Danielle hosted this online course on the social networking site Ning (see Fig. 1).

This course was primarily comprised of inquiry-based online asynchronous discussions, including instructor-designed and student-designed discussions (see Table 1). A full cycle of a weekly discussion included three parts: design, discussion, and summary (see Fig. 2). First, the facilitator(s) (Danielle or the student learning team) designed a weekly discussion

Fig. 1 Screenshots of the online course platform

and learning activities, posted class agendas, and created a discussion post. Danielle and students negotiated with each other about discussion topics, contents, and ways of communication. Then, during discussions, Danielle and students put forth ideas, proposed and answered questions, and built on, critiqued, or reflected on others' ideas. Finally, at the beginning of the following week, the facilitator(s) posted a reflection video/audio or a text-based post to summarize ideas from the previous weekly discussion. There were two additional activities designed by Danielle: a class charter activity and a final reflection activity (see Table 1).

We considered this course as a good research context to investigate the instructor-student collaborative partnership for two reasons. First, on the pedagogical level, Danielle used a learning-community approach to design and foster learning and the class aimed to collectively build a community through authentic practices. A learning-community approach required active participation from both the instructor and students, which had potential to foster the collaborative partnership. Second, on the empirical level, a previous study on the same course indicated that from the social network perspective, the instructor and students formed an interactive, cohesive, equally-distributed online community together (see Ouyang and Scharber 2017). This positive result implied a necessity to further investigate the instructor-student collaborative partnership from different angles. Taken together, we investigated the instructor-student collaborative partnership in this study. Data were secured after the course was completed, which included the data for 12 cycles of weekly discussions. Dataset included all transcripts of the class agendas, class charter, instructional videos/audios, asynchronous discussions, discussion summaries, and final reflections.

Analysis strategies, methods and processes

Using a mixed methods approach, we investigated the instructor-student collaborative partnership from the *participation frequency*, *engagement move*, and *participant perception* perspectives. First, using quantitative content analysis (Grbich 2006), we analyzed Danielle's and students' *participation frequency* on the learning, instruction, and social processes. Second, we used qualitative content analysis (Grbich 2006) to analyze the *engagement move* between the instructor and students. Finally, using the final reflections as

Table 1 Course descriptions

Discussion	Description	Timeframe
A class charter activity	Danielle and students co-created a class charter "Participation expectations & interaction guidelines"	Week 1
Instructor-designed discussions	Danielle designed the class- and group-level discussions	Weeks 2, 3, 4, 5, 6, 8
Student-designed discussions	Student learning teams were voluntarily formed by students based on their shared interests; each team designed and facilitated one weekly discussion	Weeks 9, 10, 11, 12
Final reflections	Danielle and students made final reflections about the development of an online learning community	Week 14

Dataset excluded spring break in week 7, and a synchronous meeting in week 13

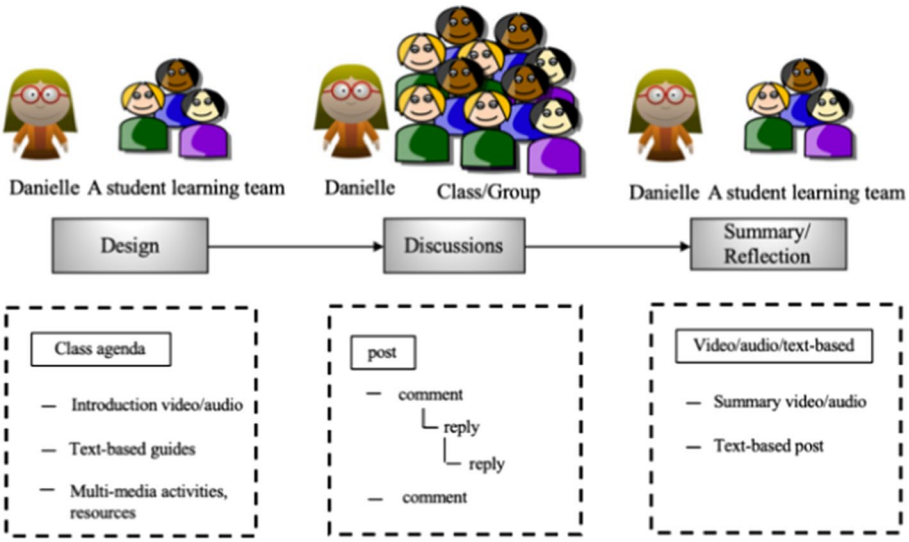

Fig. 2 A full cycle of one weekly discussion

evidence, we examined the *participant perception* about the effectiveness of their collaborations on building an online learning community.

First, to analyze Danielle's and students' *participation frequency*, we adapted the community of inquiry (CoI) framework (Garrison et al. 2000) as our analytical scheme. Three CoI presences (i.e., cognitive, teaching, and social) were consistent with three main aspects of the instructor-student collaborative partnership. To better fit the actual data, we slightly renamed some CoI codes or revised their descriptions (see Table 2). More importantly, to reflect the collaborative partnership, we used all CoI categories to *both* the instructor and students. We provided one example of each category from the instructor and from the students (see Table 2). The unit of analysis was *paragraph* in all transcripts. Except for the transcripts of videos/audios, *paragraph* was the natural paragraph in the data source (e.g., class agendas, discussions, reflections). For the videos/audios transcripts, when there were no explicit natural paragraphs, the first author assigned paragraphs manually in terms of the ideas or topics generated from the data source. Four raters coded a subset (20% of the full dataset) of the data individually first, and then had multiple meetings to resolve the discrepancies, adjust the codes, and reach agreement. Then, four raters used the adapted CoI framework to re-code the subset of dataset. Krippendorff's (2004) alpha reliability was used to calculate the inter-rater reliability among the multiple raters. Krippendorff's alpha reliability were KEX: 0.76, KEL: 0.78, QER: 0.89, DO: 0.86, DF: 0.86, AS: 0.80, ES: 0.90, CP: 0.82, IC: 0.90 (see Table 2). Given sufficient reliability, the first author independently coded the rest of the dataset.

Second, we used the qualitative content analysis method to analyze the *engagement move*, namely how cognitive, teaching, and social engagement moved back and forth between Danielle and the students on a specific topic. The *engagement move* was the turn-taking action between Danielle and the students (i.e., Danielle—> students—> Danielle, or students—> Danielle—> students); and one time of movement within each party was also accepted (i.e., Danielle—> Danielle—> students, or students—> students—> Danielle). The first author individually identified strands of engagement moves and then asked

Table 2 The adapted CoI coding framework

Dimension	Category	Description	Examples	
			Danielle	Students
Cognitive	Knowledge exploration (KEX)	A participant explores information without elaboration	The community of inquiry framework was first introduced in 2000…It focuses on three elements: social presence, teaching presence, and cognitive presence. (Week 5, Agenda)	I think Paul brought up a great point about the value of asynchronous environments… Shawn, it's definitely noteworthy to identify commitments instructors make. (Week 4, Discussion)
	Knowledge elaboration (KEL)	A participant elaborates ideas, with explanations, evidence, or personal experiences	… it just takes a considerable effort to ensure that you are providing a variety of activities, communication means, and content, in order to customize that learning, because we are dealing with a group of adult learners, coming from different background. (Week 8, Video)	Through discussions with my colleagues, I have a deeper thought of online learning community now… an effective online learning community has a characteristic of interdependent, mutual interaction and collaboration… (Week 14, Discussion)
	Question elicitation & response (QER)	A participant proposes or responds to questions	I really liked your comments… Do you think it's possible that an online learning environment may, in some ways, afford more opportunity to do this? (Week 2, Discussion)	I'm still left wondering what online learning looks like for a content specific class, such as history. Has anyone seen that? Experienced it? What was it like? (Week 8, Discussion)
Teaching	Design & organization (DO)	A participant designs and organizes activities	Danielle took advantage of Ning's website layouts, used external pictures, videos or links to design the agenda; provided diverse choices of tools for students to use, e.g., VoiceThread, Flipgrid	Student learning teams together decided goals, and designed learning activities; took advantage of online environments, and technologies to design activities, e.g., second life, learning tools

Table 2 (continued)

Dimension	Category	Description	Examples	
			Danielle	Students
	Discussion facilitation (DF)	A participant initiates discussions, provides prompts, focuses the ongoing discussion on a specific topic	We could talk more about the technologies or tools you guys have used to facilitate a specific type of community during your teaching practices. (Week 6, Video)	Let's discuss this paper… I'm going to post initial thoughts tonight. For this first base group discussion, everyone posts asynchronous. (Week 3, Discussion)
	Assistance & summary (AS)	A participant offers assistance on issues related to activities, resources, or technologies, summarizes ideas	I hope you're all doing well; if there's anything you need, post your question in Ning forum or reach out to me personally by email. (Week 12, Video)	Our learning team will be monitoring "Questions" in discussions for any questions you might have. (Week 11, Agenda)
Social	Expression & sharing (ES)	A participant shares emotions, personal values, things unrelated to course content	I may have heard angel's singing, Peg. This is a mission of mine—to ensure that we are providing online learners with opportunities for social engagement. (Week 2, Discussion)	This has been a fascinating course, and I'm very glad I took it. (Week 14, Discussion)
	Cohesiveness promotion (CP)	A participant addresses others by names, addresses the group as "we", "us", or "our group"	We will learn together as we go… Anyone can answer the questions there. (Week 6, Agenda)	All of you bring up some really interesting thoughts and I can't help but to think back to those first few chapters… (Week 2, Discussion)
	Interactive communication (IC)	A participant continues a discussion thread, replies or comments directly to others	Hi Group! I'm going to suggest at this point that one of you goes ahead and posts it. (Week 3, Discussion)	Hi Sujata, I agree with you that the only area that we really needed to work on would be responsiveness by classmates. (Week 14, Discussion)

other authors to double check the accuracy. It turned out that Danielle's and the students' engagement on a specific topic either occurred within a discussion cycle, or across discussion cycles. In addition, the frequency of moves within all strands ranged between 2 to 10. We decided to take a medium value of frequency—five times—as the threshold; and all the strands with engagement moves less than five were excluded. Figure 3 demonstrates a brief example of an interweaving strand of the engagement moves across weekly discussions (see Fig. 7 and relevant descriptions for more details).

Finally, we used Danielle's and the students' reflections as evidence to show their *participant perception* about the instructor-student collaborative partnership. We examined whether the online learning community was formed as a way to demonstrate the instructor-student collaborative partnership, and if so, to what extent and how Danielle and the students developed the collaborations to build this community.

Results

Participation frequency

First, the quantitative content analysis results demonstrated Danielle's and the students' *participation frequency* in cognitive, teaching and social dimensions (see Table 3). In the cognitive dimension, Danielle's participation frequency (*Sum* = 72) was almost equal with the students' average participation frequency (*Mean* = 75.10). In the teaching dimension, the students' collective participation frequency (*Sum* = 400) was slightly higher than Danielle's individual participation frequency (*Sum* = 356). In the social dimension, Danielle's individual participation frequency (*Sum* = 200) was equal with the most active student's participation frequency (*Range* = [15, 200]).

In addition, Danielle and the students had different contributions under each dimension. In the cognitive dimension, the instructor, Danielle, frequently introduced information and resources on discussion topics to trigger cognitive inquiry (KEX), while the students collectively made the most contribution to elaborate ideas, make new understandings, and

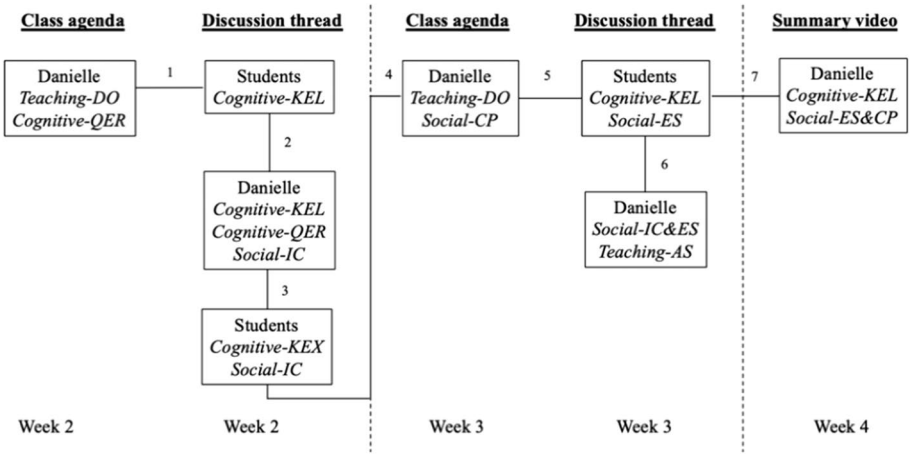

Fig. 3 An interweaving strand of the engagement moves (frequency = 7) across the weekly discussions

Table 3 A summary of the cognitive, teaching, and social engagement frequencies

	Danielle ($N=1$)	Students ($N=20$)		
	Sum	Sum	Mean	Range
Cognitive	72	1502	75.10	[30, 125]
KEX	40	272	13.60	[6, 32]
KEL	24	800	40.00	[18, 64]
QER	8	237	11.85	[1, 28]
Teaching	356	400	20.00	[1, 41]
DO	148	238	11.90	[0, 23]
DF	130	131	6.55	[0, 14]
AS	78	26	1.30	[0, 4]
Social	200	1843	92.15	[15, 200]
ES	101	338	16.90	[5, 37]
CP	88	600	30.00	[6, 67]
IC	11	669	33.45	[4, 73]

advance group knowledge (KEL). In the teaching dimension, Danielle took high-level responsibilities to design and facilitate discussions (DO & DF), while the students made significant contributions to discussion design (DO). In the social dimension, Danielle frequently expressed encouragement for student engagement (ES), while students frequently replied to their peers (IC); they both made significant contributions to promote group cohesiveness (CP).

Strands of the engagement moves

We identified 13 strands of engagement moves within the whole dataset; there were four types of strands: the *cognitive engagement moves*—idea building (frequency = 5), the *teaching engagement moves*—discussion design and implementation (frequency = 4), the *social engagement moves*—social learning environment building (frequency = 3), and the *interweaving cognitive, teaching, and social engagement move*—a "design-inquiry-redesign-inquiry" cycle, with social supports (frequency = 1). We demonstrated one exemplar from each type to elucidate whether and how Danielle and the students formed the collaborative partnership (see full excerpts of exemplars).

The *cognitive engagement moves*: Within five strands of the cognitive engagement moves, Danielle and the students took turns to build upon ideas. Here we explained the idea-building process. Danielle first initiated a discussion on a topic in class agendas without explicit statements of her own ideas. Along with the introduction, she proposed some prompting questions to trigger inquiry. Then, in the discussions, the students presented their own ideas with detailed elaborations, supports of resources, and further extended, connected, and deepened others' ideas. Danielle usually engaged in the discussions as well by pointing out a sub-topic, proposing relevant questions, or building upon students' ideas. The students also proposed questions and provided answers, and sometimes made reflections. Finally, the cognitive engagement moves ended in Danielle's summary videos where she summarized students' ideas, stated her own perspectives, and raised up the collective knowledge. An exemplar showed how Danielle and the students built upon a topic on community re-contextualization (see Fig. 4). Overall, during the cognitive engagement moves,

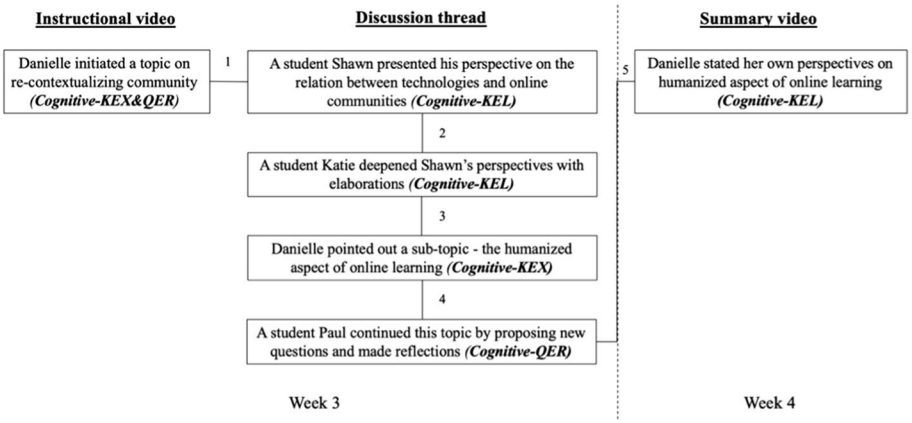

Fig. 4 A cognitive strand of engagement moves (frequency = 5)

Danielle and the students maintained mutual interactions to share, construct, and build knowledge.

The *teaching engagement moves*: Within four strands of the teaching engagement moves, Danielle and the students took turns to design, organize, and implement the discussions, relevant resources, and learning activities. Here we elaborated the discussion design and implementation process. Three to five students autonomously formed a student learning team to collectively design and facilitate a weekly discussion. They collectively decided a discussion topic, selected readings, and designed activities. One member initiated a class agenda document (usually through Google docs) for the team members to work on and also shared the document with Danielle. Based on the content in the document, Danielle provided some suggestions about the discussion design. Based on her feedback, the student team continued to revise the design and organization of activities and resources. Danielle and the students sustained communications until the discussion design and organization were finalized. An exemplar showed how the student team and Danielle took turns to design, negotiate, and finalize the discussion of Week 10 on the topic of Gamification (see Fig. 5). Overall, the students and Danielle kept mutual communications to design, finalize, and implement the discussions.

The *social engagement moves*: In the three strands of the social engagement moves, Danielle and the students took turns to build a social, supportive online learning environment. We explained the social process here. Danielle and the students first collectively created a class charter to build on guidelines of interaction, communication, and collaboration. Then, Danielle and the students together contributed to the social learning environment building in terms of the guidelines. Finally, in the reflections, Danielle appreciated the students for sticking with the guidelines in order to build an online learning community; students acknowledged the effectiveness of co-creating the class charter for building an social, supportive environment. An exemplar showed how Danielle and students took turns to contribute to the social learning environment building process by sticking to one of the class guidelines—the importance of timing and formats of postings (see Fig. 6). Overall, Danielle and the students took joint actions to form a social, supportive learning environment.

The *interweaving cognitive, teaching, and social engagement moves*: Compared to the previous three types of the engagement moves, a strand of interweaving cognitive,

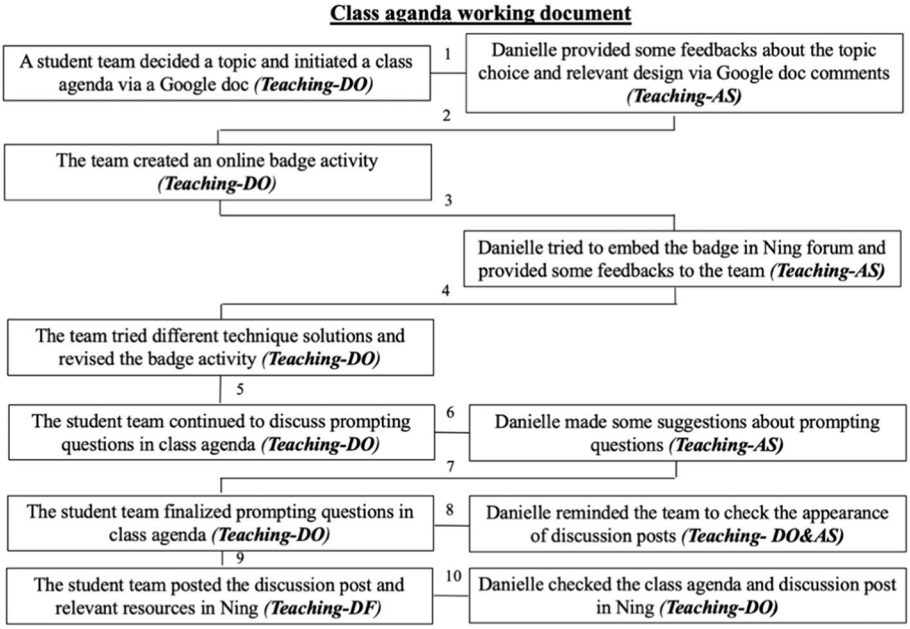

Fig. 5 A teaching strand of engagement moves (frequency = 10)

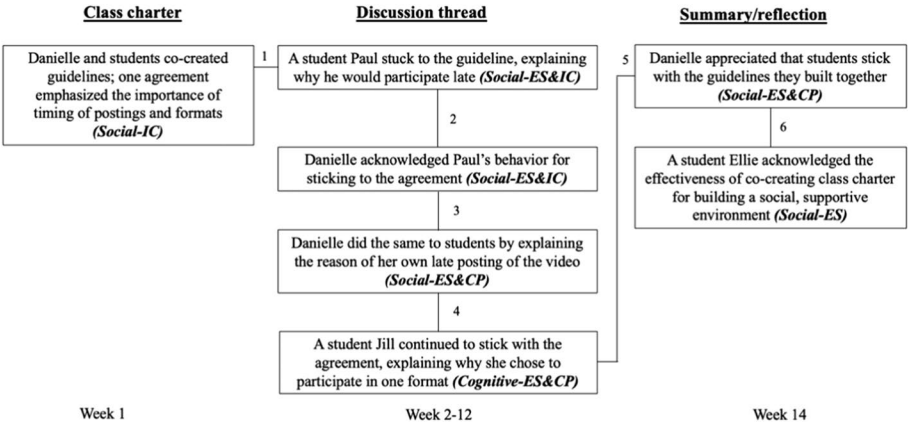

Fig. 6 A social strand of engagement moves (frequency = 6)

teaching, and social engagement moves led to a more synergistic instructor-student collaborative partnership. In this move, Danielle and the students completed one "design-inquiry-redesign-inquiry" discussion cycle, companied with social supports. Specifically, Danielle designed a week's discussion and adjusted a following week's discussion topics according to the students' emerging interests in order to foster deeper inquiry. The social engagement was interweaved with cognitive and teaching engagement, which served as a function to maintain the interactive communications.

As we can see from the interweaving engagement exemplar (see Fig. 7), Danielle initiated a topic of "online learning community" as this week's main topic for students to explore (turn 0). Then, several students discussed the concept of community in online and f2f environments (turn 1). Danielle also engaged in the discussion and introduced a concept of embodiment to differentiate the online and f2f communities (turn 2). Several students (e.g., Tracy) expressed interests in learning more about the embodiment concept (turn 3). Taking the students' interest into consideration, Danielle in the next week's class agenda included an article on the "embodiment" (turn 4). Danielle redesigned a part of the following week's discussion topic to inspire the students' deep thinking in this emerging topic. Students continued sharing, constructing, and building knowledge on the topic "embodiment" (turn 5) and Danielle thanked the students' contribution and summarized this newly-introduced concept (turn 6). In her summary video, she provided more information about the concept of embodiment (turn 7). In addition, the social learning environment building process was interweaved with most cognitive and teaching engagement, which helped build social bonds, connections, and cohesions. Overall, this interweaving strand of the cognitive, teaching, and social engagement indicated that Danielle and the students moved toward a more synergistic form of the collaborative partnership.

The *participant perception*: We demonstrated the participant perceptions of the collaborative partnership from the online learning community perspective. Specifically, we demonstrated it from three aspects: first, whether the online learning community was formed; second, the effect of mutual interactions, sustained communications, and the joint actions in fostering the community development; and finally, the ways this online learning community could be further improved.

First, most students perceived a sense of the effectiveness of the online learning community. For example, Jane shared about her perceived sense of an authentic community:

> I also think we began to feel more comfortable talking to one another and the conversations became more natural and, at least for me, I wanted to respond not because I had to (for my grade), but because I genuinely wanted to participate in the conversations. **I believe we did create an online learning community**.

Then, several students specifically mentioned how the mutual interactions contributed to the collective meaning-making. For example, Alex reflected:

> I think we definitely created an online community and have all been able to explore many topics that have tied us together as a working community…One take away from this course that I felt was **how many people I was able to collaborate with**

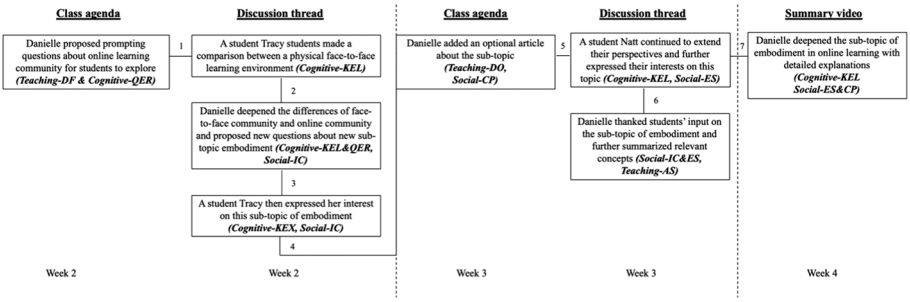

Fig. 7 An interweaving strand of engagement moves (frequency = 7)

> **online to make inquiry**. I think it was a beneficial experience for me to have and helped me find a voice online…

Next, we demonstrated the students' perceptions about their engagement in the student-designed discussions. For example, Katy mentioned how the student-designed discussions contributed to the collaborative attribute of a community:

> The student-led weeks of classes were also important for building the community. A genuine community needs to live and grow on its own - if the activity is solely dictated by the instructor, then it doesn't feel as genuine. By giving up direct control, **it felt more like the class's community, rather than a community forced by the instructor**.

Moreover, we demonstrated students' reflections about how their joint work on creating a class guideline helped build a community. For example, Francie wrote:

> I think the most important experience for me is that **creating this guideline helps me achieve a deeper thought about what an effective online learning community is**. We do know how to form an effective online learning community on a theoretical level, but putting it into practice is another story…

Finally, although most students perceived a sense of community, several students provided suggestions about how this community could be improved. For example, Nel reflected:

> Everyone seems to post at different times and we participated enough to get the job done only. I felt **we could have kept stronger dialogue going**.

The instructor Danielle's reflections throughout this course also indicated a high level of engagement. For example, in the early stage of this course, Danielle said in a video:

> I'm so impressed with the level of effort and energy that you already put into these discussions… **it seems to me that you are all very comfortable sharing here already, so I just wanna say that I appreciate the investment that you're making already**…

At the later stage, Danielle reflected on the online learning community:

> You have demonstrated that you are taking the time to think critically about how we can build and foster social and interactive online learning communities. **You also made great effort toward our goals: building an online learning community**…

Overall, reflections indicated that most participants perceived a sense of the online learning community; particularly, they mentioned the importance of the mutual interactions, sustained communications, and joint actions for achieving this collective goal.

Discussions

Addressing the research question

Collaboration is defined as a group of people participating in coordinated and sustained activities to maintain interactions, dialogue, and actions in order to achieve shared goals (Dillenbourg 1999; Goodyear et al. 2014; Roschelle and Teasley 1995). Empirical results

showed that the *instructor-student collaborative partnership* included the active participation from the instructor and students, their sustained turn-taking engagement moves, and the effectiveness of collaborations perceived by the instructor and students. First, from the *participation frequency* perspective, although Danielle and the students did not have a completely equal, symmetrical participation frequency, they did actively contribute to the cognitive, teaching, and social engagement which paved a road for building a synergistic collaborative partnership.

Second, from the *engagement move* perspective, Danielle and the students took turns to make the cognitive, teaching, and social engagement moves. Specifically, Danielle and the students kept mutual interactions to share, construct, and reflect on knowledge together; they maintained communications to design, negotiate, and organize the discussions; and they took joint actions to create the class guidelines and acted accordingly to form the social learning environment. More importantly, an interweaving strand of the cognitive, teaching, and social engagement indicated that Danielle and the students moved beyond active individual participations and started forming the synergistic collaborative partnership. Specifically, they negotiated, constructed, and completed one "design-inquiry-redesign-inquiry" cycle, companied with the social environment building process. The synergistic instructor-student collaborative partnership was initially developed in this online course.

Finally, from the *participant perception* perspective, most participants perceived a sense of an authentic, effective online learning community; some of them particularly emphasized the importance of the mutual interactions, sustained communications, and joint actions on fostering this online community. Although we did not collect direct evidence about their perceptions of the collaborative partnership, we considered the achievement of a shared goal—building the online learning community—as a critical way to demonstrate the collaborative partnership. In addition, participant perceptions of the mutual interactions, sustained communications, and joint actions were similar to the three key dimensions of the communities of practice (i.e., mutual engagement, joint enterprise, and shared repertoire) (Lave and Wenger 1991), which again implied an effective collaboration from Danielle and the students to build the online community. Taken together, the results showed that Danielle and the students moved beyond active individual participations, took turns to contribute to engagement moves, and started forming the synergistic collaborative partnership. Consistent with previous research (e.g., Cook-Sather 2014b), this study implied that it was a new, challenging practice for both the instructor and students to build the synergistic collaborative partnership. The theoretical, analytical, and pedagogical implications provided below are beneficial for advancing the theory, analysis, and practice of the instructor-student collaborative partnership.

Theoretical implications

We conceptualize the *instructor-student collaborative partnership* as the active participation of the instructor and students in the learning, instruction, and social processes, their turn-taking engagement moves built on those participations, and their perceptions of the effectiveness of collaborations. Based on our empirical research results, we further reflect on the conceptualization of the *instructor-student collaborative partnership*. The *instructor-student collaborative partnership* is not a fixed, static but a dynamic, progressive phenomenon, accumulating from the instructor's and students' active participations, to their turn-taking engagement towards achieving shared goals. Active, individual participation is

a prerequisite for developing the collaborative partnership; but mere individual participations cannot lead to the synergistic collaborative partnership. As the results show, a participant's cognitive, teaching, and social engagement influence the subsequent engagement of the other participants, which have further influence on the turn-taking actions or discourse. Building on the active participation, this turn-taking engagement move contributes to the synergistic instructor-student collaborative partnership, through which both parties keep mutual interactions, sustained communications, and joint actions in the knowledge construction, instructional design, and social environment building. Therefore, the instructor-student collaborative partnership is conceptualized as a shared, progressive, synergistic work between both parties when they construct design, learning, and instruction together to achieve the shared goals (Cook-Sather 2014b; Crawford et al. 2015; Healey et al. 2014). Strictly speaking, based on the concept of collaboration (Dillenbourg 1999; Goodyear et al. 2014; Roschelle and Teasley 1995), the instructor-student collaborative partnership cannot be simply reduced to the sums of individual participatory behaviors or even a sequence of the turn-taking movement; rather, it is a collective work completely shared among the instructor and students for achieving shared design, learning, and instruction goals. More research work needs to be done to further validate and develop the conceptualization of the instructor-student collaborative partnership proposed in this study. The analytical and pedagogical implications proposed below can help achieve this purpose.

Analytical implications

From the analytical perspective, the mixed methods approach can help capture a holistic picture of the instructor-student collaborative partnership in varied aspects, perspectives, and timeframes during the design, instruction and learning. Most previous studies used multiple methods, including qualitative, quantitative and mixed methods, to examine specific aspects of the instructor-student collaborative partnership on knowledge building (e.g. Sewell et al. 2013), pedagogical development (e.g., Nel 2017), or social environment building (e.g., Clarke and Bartholomew 2014). Taking a step forward, this study used mixed methods to capture a more holistic picture of the instructor-student collaborative partnership from the quantitative, qualitative, and perceived perspectives. Future work can integrate traditional qualitative research methods (e.g., observation, interview, survey, reflection) with new learning analytics methods (e.g., social network analysis, content and discourse analysis, temporal and sequential analysis) to analyze the instructor-student collaborative partnership. For example, future research can integrate traditional participant reflections with real-time surveys to understand participant perceptions about collaborative partnership during real-time teaching and learning, which can ensure that the interpretations of engagement moves are indeed the correct interpretations from participants (Lincoln and Guba 1985). Overall, mixed methods can be used to capture the multiple aspects of the instructor-student collaborative partnership.

Pedagogical implications

Overall, building the instructor-student collaborative partnership is a new, challenging educational practice. It is particularly challenging for instructors to create and maintain the connections with students in online higher education (Ouyang and Scharber 2017). A pedagogical strategy—building the instructor-student collaborative partnership—is a potential means to foster the interaction, communication, and collaboration between the instructor

and students in online learning environments. In order to foster this collaborative partnership, instructors can relinquish some parts of the control of the instructional design, direction, and evaluation, and encourage students to take agency for learning (Bandura 2001; Prawat 1992; Scardamalia and Bereiter 2006). This does not mean that instructors must co-design courses with students from scratch, given the overload work and time pressure (Blau and Shamir-Inbal 2018). But, like Danielle did in this course, instructors can provide students with choices to negotiate learning processes and goals, and to take their own initiatives on learning design and facilitation. When students have a say about learning design and facilitation processes, view themselves as designers and creators of the learning process, and actually engage in the entire design, learning and instruction process, they may be more prone to assume initiatives to improve teaching and learning (Evans et al. 2015; Matthews and Yanchar 2018; Ouyang and Chang 2019). In addition, as we can see that the interweaving turn-taking movement is facilitated by the use of social discourse, e.g., recognition, encouragement, and sharing of life stories. The results indicate that social discourse lubricates conversations (Park et al. 2015), builds social bonds (Garrison et al. 2000), and creates a trusting and supportive environment (Clarke and Bartholomew 2014). Taken together, consistent with previous research suggestions (e.g., Garrison 1992; Nel 2017; Sewell et al. 2013), this study indicates that instructors, as the critical agent for educational reforms (Van der Heijden et al. 2015), can use more social, participatory, negotiable approaches (e.g., a learning-community approach) to foster instructor-student collaborative partnerships.

Conclusions and future directions

In the current innovation-driven knowledge age, education is under a radical transformation: the traditional teacher-directed, transmissive way of teaching is challenged by a more active, participatory student-centered learning. This new model of learning requires authentic collaborations between instructors and students during the design, learning, and instruction processes. Echoing this trend, this study advanced the theory, analysis, and practice of the instructor-student collaborative partnership in higher education contexts. Although the research context itself was the graduate-level online learning community course and caution should be taken when interpreting and applying the results in different educational contexts, this study made critical contributions to conceptualize the instructor-student collaborative partnership, empirically investigate this collaboration, and offer theoretical, analytical, and pedagogical implications. This study indicated that the instructor-student collaborative partnership can connect student learning with instructional guidance, balance the tension between student active learning and teacher authorities, and facilitate a shift from instructor-directed to student-centered learning.

This study also opened avenues for future theory, research, and practice. First, from a theoretical perspective, starting from the conceptualization proposed in this study, it is critical for researchers to further validate and develop the instructor-student collaborative partnership concept through empirical research and practice. Second, from the analytical perspective, this study took a step forward to use mixed methods to examine the collaborative partnership. Future study should consider using mixed methods, including traditional qualitative research methods and new learning analytical methods, to further capture a holistic picture of the collaborative partnership. Finally, from the practical perspective, although the instructor in this course shared some responsibilities with the students, it is

beneficial to further develop instructor-student collaborative partnerships by empowering learner agency, participation, and ownership for design, instruction, and learning.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval This study is exempt from the IRB committee review of University of Minnesota (IRB study number 1512E81044). The data of this research is existing data, eligible for exempt category 4 review. The custodian of data sources, namely the instructor of this online course, provided a written agreement for the use of the data in this research. The researchers did not have access to identifiers or identified data. All names used in this article were anonymized.

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Affiliations

Fan Ouyang[1] · Yu-Hui Chang[2] · Cassandra Scharber[2] · Pengcheng Jiao[3] · Tianhui Huang[4]

Yu-Hui Chang
chan1173@umn.edu

Cassandra Scharber
scharber@umn.edu

Pengcheng Jiao
pjiao@zju.edu.cn

Tianhui Huang
hth@ynu.edu.cn

[1] College of Education, Zhejiang University, Tian Jiabing Building, Xixi Campus, Hangzhou 310000, Zhejiang, China

[2] University of Minnesota, 1954 Buford Ave, Suite 210, Saint Paul, MN 55108, USA

[3] Ocean College, Zhejiang University, 316 Haigong Building, Zhoushan Campus, Zhoushan 316021, Zhejiang, China

[4] The Information Technology Center, Yunnan University, Kunming 650000, Yunnan, China