

On the nature of social interactions and cognition in learning communities

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Abstract

Whether explicitly used as a research aim or implicitly discussed as an outcome, the concept of community is central for the networked learning research as it allows networked learning researchers to study how people perceive the networked environment as a space, wherein the members can develop relationships among one another. The underlying premise for this work is that it is erroneous to assume a learning community is a unified concept, functioning in the same way for everyone under same circumstances. Taking the contextual factors into account, this research questions the characteristics of a community that are related to learning. I explore how different types of relationships among members of a learning community are related to learning. In particular, I conceptualise the concept of community using social capital theory. Since the central tenet of social capital theory is that different relationships within networks of people hold different values, I argue that it can inform the ways by which the perceived level of learning is understood with respect to interaction patterns. The findings suggest that both distributed–diverse communications and strong–close communications are manifest in learning. However, the impact of diverse relationships on learning is considerably larger and stronger compared to denser relationships. The implications are discussed.

Keywords

Learning community, Cognitive Presence, Social Capital

Introduction

There is no doubt that learning is simultaneously an individual and social process, situated in its social context. It is through this dialogic approach that we can reconceptualise learning as “a matter of engagement, participation, and membership in a community” (Nasir & Cooks, 2009, p. 42). Indeed, the notion of learning community is central for the theory and practice of networked learning. Defined as “learning in which information and communication technology is used to promote connections ... between a learning community and its learning resources” (Goodyear, Banks, Hodgson, & McConnell, 2004, p. 1), networked learning research puts a strong emphasis on the concept of community. This is not entirely surprising because networked learning “suggests a relational view in which learning takes place in relation to others” (Jones, Ferreday, & Hodgson, 2008, p. 90).

The question, therefore, we need to ask is which aspects of the relationships in a community best support or promote learning. It will be erroneous to assume a learning community functions in the same way for everyone under same circumstances. A community is in flux and how it functions is contextual. Etymologically, community is derived from the Latin word “communis”, which means common. The idea of commonality is inherent in the meaning of community. According to the Oxford Online Dictionary, community is a group of people with common values, attitudes, and interests. Then, what are the common values, attitudes, and interest that impact networked learning activities? Which characteristics of a community are related to perceived learning?

Here, in this research, I explore how different types of relationships among members of a learning community are related to perceived level of learning (below, I explain why it is “perceived level of learning” instead of learning). In particular, I conceptualise the concept of community using social capital theory. Since the central tenet of social capital theory is that different relationships within networks of people hold different values (Oztok, Zingaro, Makos, Brett, & Hewitt, 2015), I argue that it can inform the ways by which the perceived level of learning is understood with respect to interaction patterns. I suggest that this nuanced understanding of

community may contribute to the ways in which networked learning researchers can conceptualise and study pedagogical activities within a learning community.

Before articulating the details of the research explained in this manuscript, it is important to clarify where it is situated in the literature of networked learning research. As I have already argued above, the importance of the concept of community for networked learning is evident in the variety of perspectives and frameworks employed for studying it. Nevertheless, a considerable number of studies challenged the idea that community is a central tenet of networked learning, or defied a preconception that community is a unified construct. A study cited in Jones et al. (2008), for example, examined the overall patterns of interactions and suggested that weaker ties and looser groupings can afford better opportunities for sharing knowledge. In this research, I acknowledge both approaches to community as in that I do not necessarily argue whether community is necessary or even fundamental for networked learning. I do not privilege any type of relationships; rather, I employ the concept of community in a general sense for referring to a set of students in a given learning space. Community means, within the parameters of this research, a group of students in a digital space taking the same course when it was offered in a particular term or year, who use digital technologies to connect with one another as well as connect with teacher(s) and learning resources. Therefore, this manuscript does not offer any discussion about the relationship between network and community since it is not the aim or focus of this paper neither does it investigate whether the ties that bind a community should be weak or strong.

Theoretical Background

The concept of community in networked learning

Whether explicitly used as a research aim or implicitly discussed as an outcome, the concept of community is manifest in overwhelming majority of the networked learning research. It is a fundamental concept as it allows networked learning researchers to study how people perceive the networked environment as a space, wherein the members can develop relationships among one another (Carson, 2014). Since the definition of networked learning strongly argues for establishing healthy connections among participants, the concept of the sense of community provides means by which the networked learning researchers can study the quality of those connections. Dialogue, sense of isolation, consensus, trust, and identity are among the main research directions that the networked learning researchers explored in relation to the sense of community (see, for example, Brouns & Hsiao, 2012; Davis, Cronin, & Seitzinger, 2014; Tremblay, 2018). It is equally important to acknowledge studies adopting more decentralised approaches to a learning community (see, for example, Jones et al., 2008). Yet, even in these studies overall patterns of interactions are examined in relation to knowledge sharing and dialogue, which ultimately can lead to higher levels of perceived learning.

Networked learning research links the concept of community with cooperative and collaborative forms of learning (de Laat & Ryberg, 2018). This is reasonable since the pedagogical principles underlying these learning activities are inherently concerned with how people engage with and react to each other in group-based work. Networked learning researchers, then, study dialogue (Crosta & Gray, 2014), knowledge construction (Lee, Rahmat, Lim, Lin, & Tan, 2018), distributed cognition (Parchoma, 2016), high-level thinking (Ramanau, Sharpe, & Benfield, 2008), and critical thinking (Corich, 2006). It is important to reiterate here that while these studies can have different views on what community is, it is clear that they have a shared perspective on what community does: it provides a space in which a group of people work together towards a common goal, whether this common goal is learning a subject, solving a problem, or creating an artefact (Oztok, 2021).

Social Capital in Learning Communities

Social capital has been employed by many sociologists to study connections within and between social networks. Bourdieu (1986) defined social capital as “the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition” (p. 249). Because social capital is inherent in the structure of relations between and among actors, it can offer means to study the structures of social relations among community members by allowing systematic investigations into the ways that relationships and connections are diffused in communities. Social capital can be used to explore the benefits gained by the individual within the community as well as how the community can benefit from social capital through the development of interaction among its members (Oztok et

al., 2015). Thus, the central tenet for social capital is that different relationships within and between social networks hold different values. How can we study these different values and their outcomes? Two types of social capital are most prominent: bridging and bonding.

Bridging social capital refers to the diversity of relationships with people from other communities, cultures, or socioeconomic backgrounds. Typically, bridging social capital provides “a basis for collective action” (Pigg & Crank, 2004, p. 68) by allowing individuals to “share their histories and experiences, as well as establish their common values and prosocial goals” (Tseng & Kuo, 2010, pp. 1044–1045). It is possible to argue, then, that bridging social capital can help to explain the relationship between diverse social interactions and perceived level of learning in collective pedagogies.

Bonding social capital refers to the strong ties of attachment between relatively homogeneous individuals. Individuals with similar interests or backgrounds develop higher levels of bonding social capital, which leads them to establish and maintain peer relationships. These stronger relationships, then, provide important environmental conditions for knowledge exchange by allowing information to flow throughout the existing social contacts (Chiu, Hsu, & Wang, 2006). Bonding social capital, therefore, improves the acquisition of knowledge and fosters learning in a community (Daniel, Schwier, & McCalla, 2003). Consequently, bonding social capital may help explain the relationship between strong social interactions and perceived level of learning in collective pedagogies.

It is important to note that bridging social capital and bonding social capital are not mutually exclusive; they are “relative conceptions, and [they] may coexist in any given set of relationships” (Jones et al., 2008, p. 91). However, much research favours bonding social capital (stronger ties) as it is deemed to be a necessary condition for any collective work. The works cited in Jones et al. (2008) and Oztok (2013) can be a counter argument to this perspective. Both studies argue that weaker ties and looser connections are necessary for improving the variety of information being shared. In this research, I do not privilege one type of capital over the other; simply, I explore the relation of them to the perceived levels of learning.

Overall, the educational value of social capital lies in its ability to provide opportunities for members to establish a common ground where a relatively coherent sense of community can be created. Having established a strong sense of community, norms of reciprocity can be cultivated through which individuals can share knowledge and negotiate meanings.

Perceived level of learning and Cognitive Presence

The definition of networked learning does not imply what learning means but simply suggests that it will occur as a result of collective actions, leaving the nature of learning activities or the expected outcomes open to interpretation. Consequently, there is a plethora of approaches to and frameworks for studying learning in networked learning research. Theories, such as constructivism, Actor-Network Theory, Activity Theory, or socio-material perspectives – just to name a few – have been employed to conceptualise and measure learning.

Similarly, measuring learning in digital spaces has always been problematic from theoretical and methodological points of view (Rourke & Kanuka, 2009). By and large, surveys are employed to assess perceived learning as an indicator for interpreting critical thinking, epistemic development, or meaningful learning. These cursory efforts at assessing learning are arguably unreliable or inconclusive. Researchers that are more sensitive to the limitations of their probing tools have been suggesting “perceived level of learning” is a more nuanced term that better reflects what these surveys are measuring (Rourke & Kanuka, 2009). I concur with this perspective and employ the notion of perceived level of learning instead of learning. Therefore, in this study, I employ the cognitive presence model for interpreting students’ perceived level of learning.

Cognitive presence is “the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication” (Garrison, Anderson, & Archer, 1999, p. 89). It comprises four types of hierarchical discourse: triggering events, exploration, integration, and resolution. Deep learning is said to occur when these four steps are manifest in a discussion. In other words, it is only when students reach to the level of resolution in a discussion, they can critically examine new facts and make deep connections with their existing knowledge structures.

Data Sources and Method

I collected data from 13 online postgraduate level courses over three years between September 2018 – 2021, from large research universities in the UK and Canada. At minimum, all courses had the optimum class size to support and sustain critical discussion, and they offered weekly discussions, where students are required to engage with each other. Students came from diverse historical and cultural backgrounds, different geographical locations, and were of various ages and professions (Table 1).

At the end of the courses, I administered a Likert-type online survey with ten-point questions, comprising three main sections. In the first section, I examined students' perceived level of cognitive presence through a questionnaire, adopted from research explained by Akyol and Garrison (2008). In the second and third sections of the survey, I measured students' perceived level of social capital by assessing the nature and value of social ties and relationships that students hold in their learning communities. In specific, the second section measured the types of social capital (bridging or bonding) using an already established survey (Oztok et al., 2015) whereas the third section measured dimensions of social capital (social dimension, relational dimension, and cognitive dimension), using a survey from a studied explained in research by Choi, Kim, Sung, and Sohn (2011).

Before moving on to data management, it is important that I discuss the validity of surveys used in this research. There are three levels by which validity can be discussed. First, all three surveys are developed for and validated as a data gathering tool in online spaces. Given the contexts of courses and demographics of students are similar to a great extent between this study and the studies where these tools are developed, it is possible to argue that there is no need to further probe the validity of the data gathering tools employed in this research. Second, because I do not aim to alter or develop but rather verbatim employ the concepts that these data gathering tools are measuring, it is fair to argue that there is no need to further probe the validity or reliability of these tools. For example, I accept and employ the definition of cognitive presence explained in Akyol and Garrison (2008), or strictly follow the categories explained by Choi et al. (2011); therefore, I did not need to revise questions – or even revise wordings – in these surveys. I did employ these surveys exactly as they are, which renders further validity and reliability checks unnecessary.

A total of 631 students responded to the survey. However, in order to address the potential bias of “inactive” students, data from 23 students were removed as they posted less than four notes in total (less than one note for every three weeks) and received one or no replies overall. While I acknowledge that data from these students may be valuable for understanding why they appear to be excluded from the learning community, such an analysis is beyond the aim and scope of this paper as I focus on understanding the social dynamics among members that do belong to a community. Furthermore, data from 15 students were removed as they did not fully complete the survey (or left large sections of the survey empty). Overall, I report data from 593 students.

Table 1: Demographics

Category	Loading
Age	
< 30	42
31 – 40	203
41 – 50	199
> 50	94
No Answer	55
Study degree	
PhD	181
EdD	67
MA	108
MSc	81
MEd	93
MRes	59
No Answer	4
Location	
Asia	44
Europe	231
North America	202
South America	12

	Africa	39
	Oceania	59
	No Answer	6
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Work experience	< 5	64
	6 – 10	193
	11 – 15	239
	16 – 20	67
	> 21	23
	No Answer	7
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N=593		

Findings

I used multiple linear regression analysis to examine the relationship of social capital to cognitive presence. 22 cases were removed from the analysis because they were strong outliers (at least 2 Std. Deviation from the residual mean) with large Cook's distance, substantially biasing the interpretation of the model. Table 2 represents the descriptive statistics after the outliers removed.

Table 2: Descriptive Statistics

	Mean	Median	Std. Deviation
Bridging social capital	6.98	7.00	1.76
Bonding social capital	6.45	7.00	2.15
Social Dimension	7.02	7.00	1.78
Relational Dimension	5.96	6.00	1.98
Cognitive Dimension	6.03	6.00	1.99

N=571

The multiple regression analysis revealed that types and dimensions of social capital have different levels of impact on cognitive presence (Table 3). Bridging social capital ($\beta = .456$, $t(570) = 21.987$, $p < .001$), bonding social capital ($\beta = .05$, $t(570) = 5.258$, $p < .001$), and social dimension of social capital ($\beta = .463$, $t(570) = 22.801$, $p < .001$) have a significant impact on cognitive presence while relation dimension of social capital ($\beta = .006$, $t(570) = 0.991$, $p > .5$) and cognitive dimension of social capital ($\beta = -.005$, $t(570) = -.741$, $p > .5$) do not.

Table 3: Multiple Linear Regression Analysis

	β	Std. Error	t
Intercept	0.286	0.083	3.434 *
Bridging social capital	0.456	0.020	21.987 *
Bonding social capital	0.052	0.009	5.258 *
Social Dimension	0.463	0.020	22.801 *
Relational Dimension	0.006	0.007	0.919
Cognitive Dimension	-0.005	0.007	-0.741

N=571, * $p < 0.001$, $R^2=0.961$

What the Table 3 shows, in simple terms, is that for every 1 unit increase in bridging social capital, the cognitive presence increases by .45 units. A unit here refers to the average score in the questionnaire. Operationally, this means that if somebody's bridging social capital raises from, say, 5 to 6, that person's cognitive score will increase by 0.45 points. Similarly, for every 1 unit increase in bonding social capital, the cognitive presence increases by .05 units and for every 1 unit increase in social dimension of social capital, the cognitive presence increases by .46 units. Therefore, the model predicts: Cognitive Presence = 0.45 x bridging social capital + 0.05 x bonding social capital + 0.46 x social dimension of social capital + 0.286.

Overall, the regression model explains 96% of the total variance ($R^2_{\text{adjusted}} = .961$) of cognitive presence ($F(5, 565) = 2850, p < .001$). For the model, the median value is reasonably close to zero (.013), meaning that residuals are symmetrical and that the model is predicting evenly at both the high and low of the data set. In statistical terms, the model is not skewed.

Table 4 below shows the correlation coefficients of variables to cognitive presence.

Table 4: Correlation coefficients and significance

	α	Sig.
Bridging social capital	0.958	0.001
Bonding social capital	0.763	0.001
Social Dimension	0.959	0.001
Relational Dimension	- 0.030	0.741
Cognitive Dimension	0.034	0.459

Discussion

The underlying premise for this work is that it is erroneous to assume a learning community is a unified concept, functioning in the same way for everyone under same circumstances. Taking the contextual factors into account, this research questioned the characteristics of a community that are related to learning.

In the language of statistics, the results show that both bridging and bonding dimensions of social capital have statistically significant impact on the perceived level of cognitive presence though the effect size of the bonding social capital is arguably weak. The results echo the findings in previous research (see, Daniel et al., 2003; Oztok et al., 2015; Pigg & Crank, 2004). Similarly, social dimension of social capital has statistically significant impact on the perceived level of cognitive presence while relational and cognitive dimensions do not. Below I will explain how to interpret these results.

Let me reiterate that bridging social capital refers to the diversity of relationships with people from other communities, cultures, or socioeconomic backgrounds. The emphasis is on how the individual can benefit from the community as opposed to the benefits gained by the community from its members (Oztok et al., 2015). Broadly speaking, the results indicate that in a learning community, students prefer communication patterns that favour personal benefits. It is important to note that this does not mean strong, close personal ties that is favoured by bonding social capital are irrelevant. Simply, it means that when cognitive presence is considered, students value the diversity of social ties.

Why individual benefits are more favourable than collective aims? I can offer three hypotheses.

First, collective practices can be inherently privileging diverse relationships over dense social ties. Some research suggests, for example, that students do not preferentially reply to the most active students or to the instructor (Zingaro, 2012). That is, participants may be more concerned with setting wide nets rather than cultivating close friendships. Such behaviour is in fact in line with interactive pedagogies whose effectiveness stems from students reaching shared understandings with those of differing opinions (Chi, 2009). By discussing and challenging a variety of online participants, students are exposing themselves to ideas disparate from their own.

Second, it is possible that students engage with each other professionally and do not utilise personal knowledge, which in return may be hindering communal ties (Wasko & Faraj, 2005). In other terms, students can be refusing to develop close relationships and stronger social ties with their peers because the very nature of online learning communities can be problematic for community-building. This is not entirely surprising since students in a learning community come together not because they know who others are or because they share similar interests, but because they have simply enrolled in the same course (Oztok, 2013).

Third, the CP can be biased towards measuring learning from individual point of view. It is possible that there is an error or bias in the ways that research has conceptualised and measured cognitive presence. That is, the

measurement of cognitive presence may be mostly concerned with the diversity of social ties and disregards the quality of those relationships.

Conclusion

Connections among members of a learning community is vital for networked learning. Broadly speaking, this research suggests that both distributed–diverse communications and strong–close communications are manifest in learning. However, the impact of diverse relationships on learning is considerably larger and stronger compared to denser relationships. The results strongly suggest that diversity of perspectives, approaches, frameworks, or concepts should be taken into account when teaching/learning activities are planned. Diversity is at the centre of a learning community. Of course, this does not mean that strong relationships are insignificant. On the contrary, without such strong, dense relationships, a sense of learning community is diminished and there is no learning community as such. Course designers, lecturers, module conveners, or any person involved with teaching at any capacity, then, should try to foster the ways in which strong, dense relationships are developed because students will inherently look for ways of developing distributed, diverse relationships.

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