A Model of Fostering Collective Responsibility in a Knowledge Building Community

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Abstract: This paper presents a three-level concentric model for fostering collective responsibility in a Knowledge Building community. At the center of the model, lies ideas contributed and shared by agents in the community. The second circle of the model focuses on what agents (mainly including students, teachers and administrators) can do to advance ideas in the community. The third circle of the model, which focuses on social and technical environments, addresses the community environment that need to be established in order to support the agents to assume collective responsibility. Also, the catalyst function of cognitive conflict in simulating idea improvement is discussed. This model incorporates insights from Knowledge Building, collective intelligence and creative teaching theories in hopes of providing a framework for practitioners to foster collective responsibility in classrooms, and to inspire researchers to uncover factors that support Knowledge Building in schools.
Keywords: Knowledge Building, collective responsibility, idea improvement, epistemic agent, cognitive conflict, social contexts

Introduction

This knowledge society necessitates the development of new knowledge workers, who mainly work with knowledge and apply it to create something new (Drucker, 1994; Ruffus Doerr, 2010). Knowledge workers with diverse specializations need to be able to work successfully in teams in order to accomplish complex goals (Lewis, 2004). Due to the emergent and unpredictable nature of knowledge work, no one is capable of planning and assigning tasks ahead of time, thus all group members need to take responsibility for the success of the group (Scardamalia, 2002). This condition is captured by the concept of "collective responsibility" as identified by Scardamalia (2002) from much of the business and education literature (e.g., Bereiter, 2002; Lindkvist, 2005), and this concept has been a central idea of the knowledge society.

There are some powerful examples which indicate that students can take collective responsibility for knowledge creation (Scardamalia, 2002; Zhang, Scardamalia, Reeve, & Messina, 2009; Levin, 2011). For example, Levin (2011) reported an interesting story of high school students who had built their own school. Their school had the following characteristics: students had more control over what they learned, they developed their questions carefully in a diverse manner, gave each other feedback to refine their questions used authoritative sources constructively; teachers guided and facilitated students rather than controlled them and conveyed knowledge to them directly; everyone helped cultivate an environment which was conducive to learning, sharing and growing.

The knowledge society requires students to take collective responsibility to create new knowledge, and students are willing and clearly able to do so in certain contexts. What factors foster and sustain collective responsibility in schools? This paper will attempt to address this question in the context of a Knowledge Building community, which aims at addressing the knowledge creation imperative by engaging students in collective responsibility for advancing knowledge (Scardamalia, 2002; Bereiter & Scardamalia, 2003).

A model for fostering collective responsibility

The idea (basic unit of Knowledge Building), agent (students, teachers and administrators) and community (a space for knowledge birth, sharing and improving) are three essential Knowledge Building entities (Hong, Chen, Chai, & Chan, 2011). Knowledge Building is the social process of improving ideas over sustained periods of time (Scardamalia & Bereiter, 2006). Students' roles as active agents have been highlighted in the education literature (Scardamalia & Bereiter, 1994; Paavola & Hakkarainen, 2005), as well as the importance of administrators in providing support for teachers and students to take necessary risks to create new knowledge (Hämäläinen & Vähäsantanen, 2011). We consider students, teachers and administrators as essential knowledge workers in schools. Knowledge Building is a collective process rather than an individual act, and it happens in certain community environments. We will later discuss what kind of community environment may foster collective responsibility.

In this paper, we view Knowledge Building as students', teachers' and administrators' joint efforts of advancing ideas in favorable technical and social conditions. As shown in Figure 1, in our model, ideas, marked as the first circle, are at the center of a Knowledge Building community. Students, teachers and administrators are marked as the second circle in red. The first and second circle are connected by cognitive conflict, which is the catalyst that simulate improving of ideas and creating new knowledge (Woods, 2012). Cognitive conflict arises when students confront with information which contradicts what they believe and feel dissatisfied with their prior knowledge. Also, the agents communicate with each other in order to advance their community knowledge, and their interaction is marked by grey arrows. The social and technical conditions which may facilitate agents to take collective responsibility are marked as the third circle (community environment) in blue. Figure 1 represents a preliminary model. Our aim is that it can serve as a starting point for discussing how to systematically foster collective responsibility in a Knowledge Building community.

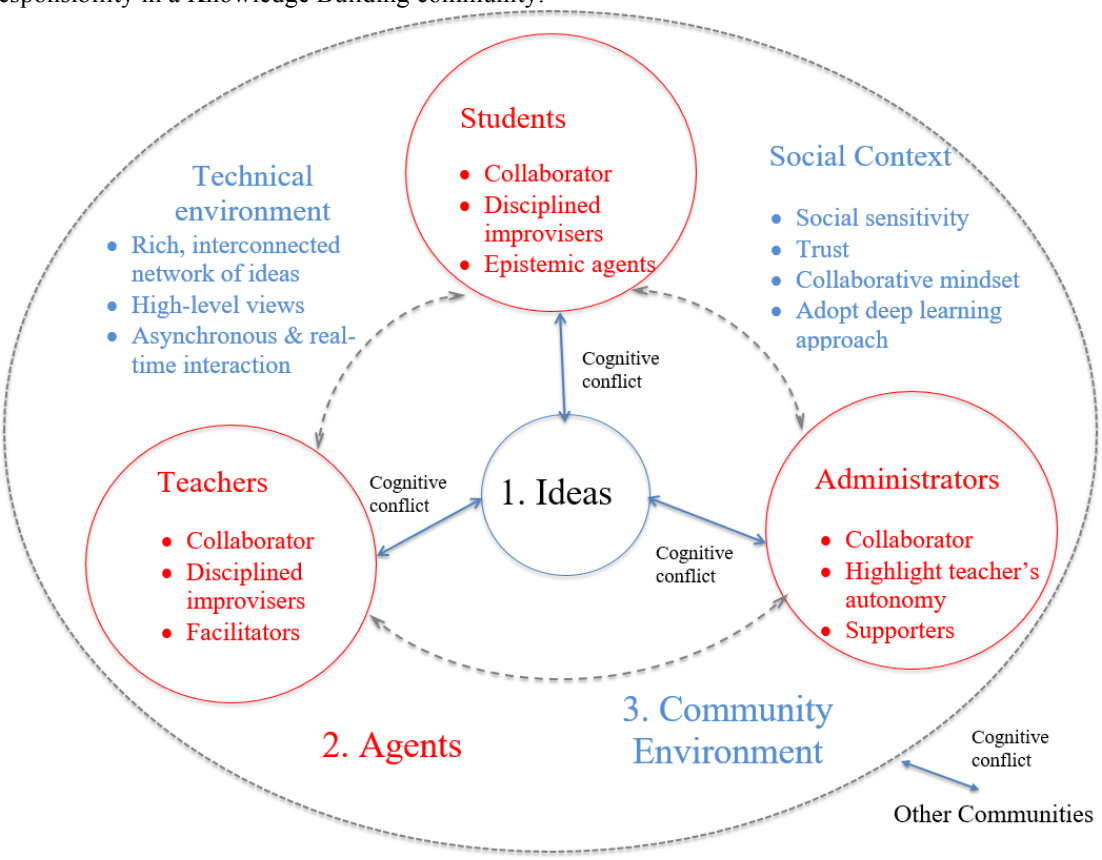

Figure 1. A Diagram of fostering collective responsibility

In these subsequent sections, we will explain ideas, roles of agents (including teachers, students and administrators) and community environment (social context and technical environment) displayed in this diagram in detail.

1. Ideas

Different from content-centered or activity-centered pedagogies, Knowledge Building is idea-centered (Scardamalia & Bereiter, 1996; Philip, 2009). This is why we put ideas in the first circle of this model. In a Knowledge Building community, agents work on ideas that they really care about (also known as real ideas and authentic problems) by proposing, reading, trying to understand, building on, combining, comparing, identifying, taking risks with ideas and working constantly to generate more powerful and coherent ones (Scardamalia, 2002). As a result, they move the frontiers of their community knowledge forward.

What makes students interact with ideas? Some researchers propose that students carry out Knowledge Building approaches – working on ideas when confronting medially with new information and feeling unsatisfied with individual knowledge. This condition is described as "cognitive conflict" (Chan, Burtis, & Bereiter, 1997;

Kimmerle, Cress, & Held, 2010). It provides opportunities for agents to engage in equilibration processes (Cress, & Kimmerle, 2008).

Ideas posted in a community should aim at causing students' cognitive conflict to help them assume collective responsibility to carry out Knowledge Building approaches. Some researchers indicate that there is a u-shaped relation between a student's cognitive conflict and the incongruity level of her knowledge and community information, which means medium-level incongruity works best (Cress, & Kimmerle, 2008). Students may not benefit from what they knew, nor will they be productive in working on off topics. In order to keep medium-level incongruity, students should keep close eyes on what is going on in the community and share their ideas frequently to foster understanding; they should try to contribute something new, rather than proposing ideas repeatedly.

Once created, ideas have their own life rather than belonging to the authors. Community norms (see section 3) should ensure that the agents feel comfortable working collaboratively and constructively to improve ideas rather than feel uneasy to question, criticize, comment on and evaluate the ideas. All efforts should be made to advance ideas to achieve the shared goals of a community.

2. Agents

In the model, students, teachers and administrators are placed in the second circle. In this section, we will discuss what roles they play and how they can support each other to assume collective responsibility. Teachers' and students' roles (e.g., collaborators and disciplined improvisers) are sometimes interchangeable, but there is also some difference, for example, teachers' facilitator and students' epistemic agent role. We will discuss their shared roles and then explain the different ones.

Teachers and Students

Collaborator

In a Knowledge Building community, teachers not only assume cognitive responsibility themselves, but also turn over this responsibility to their students (Scardamalia, 2002). They believe in students' agency and capacity to shoulder responsibility of deciding what to learn and how to schedule, to respond to emergent ideas and to figure out which directions to go. They also believe in students' ability to evaluate. They know students may even achieve more than what curricula require (Resendes, Scardamalia, Bereiter, Chen, & Halewood, 2015). Therefore, instead of being knowledge holders, teachers learn to be comfortable working with students as collaborators.

Disciplined improvisers

Because of the emergent nature of Knowledge Building process, teachers can no longer perform their regular routines and predetermined agenda. This means that learning proceeds in an open, improvisational fashion: both teachers and students do experiments, interact with ideas and people and participate in constructing knowledge (Sawyer, 2004). In this case, learning is determined by all participants rather than by teachers alone (Sawyer, 2004). Unpredictable features suggest that teachers need to improvise in the Knowledge Building community and to be granted autonomy to do so.

However, improvisation does not mean denying all the scientific knowledge of professional practice; rather, learning scientists have repeatedly emphasized the importance of scaffolds and loose structures (Sawyer, 2006). Classroom practice is confined by law, administration, curriculum objectives, time, financial issues and so forth. These constraints structure teachers and students. A balance between improvisation and structure should be found by schools and teachers (Sawyer, 2011). This is what Sawyer (2004) described as disciplined improvisation, in which teachers improvise under structured framework. For example, as a Knowledge Building teacher mentioned, when she asked the students to tell her something about trees, one student replied "lungs". Instead of informing that trees do not have lungs, the teacher improvised that "where should I put those (lungs)", and "what.. are we interested to learn more about trees?". The teacher improvised in a structured framework, which was consistent with Knowledge Building principle - improvable ideas (Scardamalia, 2002). Disciplined improvisation makes teachers' work more challenging but more rewarding.

Teachers as facilitators

Although deconstructing hierarchy is emphasized, teachers may still need to act as facilitators at certain times (Hämäläinen & Vähäsantanen, 2011). They need to have a good sense of what is going on in the community by reading students' notes and listening to student discourse so as to provide feedback and inspire the community to

do their best work. Also, as community members, teachers should present ideas and give students opportunities to refine the ideas in order to contribute to advancing community knowledge.

Also, teachers need to know students' emotions in order to help build a community which is most conducive to the growth of ideas. Particularly, the teachers may encourage, motivate, inspire students when they encounter tough periods. Teachers' facilitator role may gradually become less important as the Knowledge Building community matures, and students themselves know what they should do, feel comfortable doing whatever they need to do and can ensure a comfortable atmosphere for others.

Students as epistemic agents

In a Knowledge Building community, students no longer passively accept what teachers tell them to do, but decide how to set and pursue their goals, evaluate their progress and so forth. Specifically, the students identify problems of understanding and areas that need new knowledge; they collect and evaluate additional information; they create shared understanding by sharing, discussing and negotiating; they take collaborative actions and co-regulate their processes by setting common goals and creating joint plans; they monitor idea advancement, reflect on their ideas, problems and themselves; they create spaces for others' contributions to grow and to develop (Damşa, Kirschner, Andriessen, Erkens, & Sins, 2010).

Administrators

Administrators are also collaborators in the project because they support those involved in Knowledge Building -- it may be by connecting others, defending their work and making adaptations for them in time and space. For example, teachers play a vital role in taking collective responsibility by challenging and encouraging students, focusing learning processes, providing freedom and allowing risk taking (Pea, 2004). However, teachers themselves may be not well prepared to do so and thus need some support (Moran, 2010). There are some actions that administrators can take to support teachers to employ creative and collaborative working methods. One of these is highlighting the autonomy of teachers' work to enhance professional development and creativity. Another one is providing external administration and the work culture (Hämäläinen & Vähäsantanen, 2011).

3. Community environment

In the third level of this model, we use "community environment" to represent the social and technical conditions which facilitate the agents to take collective responsibility in a Knowledge Building community.

In practice, technology enables abstract ideas to have a place to exist and to grow (Scardamalia, 2002). Without technology, it is hard to track the advancement of ideas within a community, not to mention to deal with the challenges involved in developing ideas asynchronously across sustained periods of time. In this section, we will discuss what social and technical environments need to be established in a community to foster collective responsibility.

Social context

A social environment which favors expressing and improving ideas and interacting among members is essential for a Knowledge Building community. We have identified several social factors which are important to foster collective responsibility. The first one, social sensitivity which means being sensitive of what others are thinking and feeling, will benefit the building of trust. The second one, team trust, including team task performance and interpersonal trust, results in students' collaborative knowledge building and their sense of community (Chang, 2009). The third one, collaborative mindset, and the forth one, the adoption of deep learning approaches, are closely related to knowledge building processes (Chan & Chan, 2011).

Social sensitivity

Social sensitivity, an aspect of social intelligence, is the ability to decode and interpret others' nonverbal cues and expressive behavior (Archer, Costanzo, & Akert, 2001). The ability of being aware of others' actions, reactions, thoughts, and feelings is important and can help build a safe atmosphere. Social sensitivity can be gauged by asking students to choose words which could best describe what people on photos are thinking or feeling (Woolley, Chabris, Pentland, Hashmi, & Malone, 2010). Research shows that the average social sensitivity of group members and the number of speaking turns are strongly correlated with collective intelligence - the general ability of a group to perform a variety of tasks (Woolley, Chabris, Pentland, Hashmi, & Malone, 2010). Therefore, improving group members' awareness of caring about what their peers are thinking and feeling and ensuring that more members have opportunities to participate in conversations may help students take collective responsibility.

Team trust

Trust can facilitate collaboration and increase positive interaction. Students' competence, reliability, online communication, and caring contribute to team trust building (Chang, 2009). There are two dimensions of team trust, namely, task performance trust and interpersonal trust. The former one guarantees team efficiency and can be established mainly through competence and reliability (being punctual and predictable), while the later one benefits team climate of safety and is mainly built through communication and caring (Chang, 2009).

In a Knowledge Building community, teachers should trust their students' competence to build their knowledge and care their students; students should be responsible for and contribute to the community, trust and care each other, feel comfortable to contribute their and build on others' ideas, and also help create a safe environment; administrators should trust teachers and allow them to take risks to create new knowledge (Chang, 2009; Hämäläinen & Vähäsantanen, 2011).

Collaborative mindset and deep learning approaches

Additionally, students' views on collaboration and learning approaches also affect their ability to assume collective responsibility. The former one affects their online participation in Knowledge Forum (an online Knowledge Building environment) directly (Chan & Chan, 2011). Students who view collaboration more as working on improving and advancing ideas are more likely to assume collective responsibility (Chan & Chan, 2011). Students' views on collaboration also mediate the effects of deep learning approach. Those who adopt deep learning approaches by, for example, linking new information to their experience and previous knowledge, constructing theories to fit odd things together and employing other meaning-making strategies to construct knowledge, assume higher collective responsibility.

Technical environment

When designing digital tools to support students to assume collective responsibility, many functions need to be considered. Creating rich, interconnected network of ideas and presenting high-level views of knowledge building processes and results are two of the most important ones (Scardamalia & Bereiter, 2014). By taking courses in Knowledge Building approaches, we find that face-to-face or synchronous online interaction is necessary so members can fully discuss and collaboratively decide where to go and how to put what they have in a coherent artifact. In this section, we will discuss why the technical environment needs to meet the demand of supporting rich, interconnected network of ideas, high-level views and asynchronous & real-time interaction.

Rich, interconnected network of ideas

Due to the importance of idea diversity in a Knowledge Building community, digital tools need to help creating and visualizing a rich network of ideas. Also, Ideas need to be interconnected in the Knowledge Building space to ensure that the members can crisscross a group of ideas easily (Scardamalia & Bereiter, 2014) because community members need to understand the ideas that surround an idea in order to fully understand it (Scardamalia, 2002).

High-level views

To help students achieve a better sense of their current situation and possible working directions, higher-level views of their idea discourse should be provided (Scardamalia & Bereiter, 2014). In order to present higher-level views, different kinds of analytic tools should be built and conceptual relations among notes need to be visualized. For example, if learners have a view of their discourse progresses, they will be more aware of their idea advancement and know what needs to be improved (Zhang, Chen, Chen, & Mico, 2013). If notes are not only connected with each other by building on relations, but also are aggregated based on the big concepts in them, it may be easier for learners to make more coherent efforts (Teplovs, 2010). If digital tools can identify types of interaction between people and ideas that yield knowledge growth, students can commit more to interaction which may result in promising results.

Asynchronous & real-time interaction

Community members not only need to present diverse ideas asynchronously throughout Knowledge Building process, but also need to meet face-to-face or to interact synchronously online to make decisions, especially when they are going to synthesizing ideas. By meeting and interacting, each member will contribute to figure out what they have and lack, to evaluate and play with different ideas, and to judge promising ideas and improve them together. As a result, they move closer to their shared goals.

Communication with other communities

Although Knowledge Building is conducted within a community, capturing and sharing the ideas with near and far communities offer an international perspective to knowledge advancement. Living in an international space may result in blossoming of ideas, which cannot even be imagined by local community members. Also, sharing local Knowledge Building practice can benefit international Knowledge Building communities and knowledge societies by enriching stories and research. The practice may also provide some implications or lessons for other teachers and researchers. Joining efforts together, the local and international communities can contribute to the world's collective intelligence, making Knowledge Building public and accessible for all.

Conclusion

The model presented in this paper provides a framework for practitioners to foster collective responsibility in classrooms by putting ideas at the center of a community, clarifying what roles teachers, students, and administrators should take, and identifying how social and technical environments should be established. However, the model is mainly derived from some of the highly cited literature on Knowledge Building, collective intelligence, and creative teaching and has not been tested in practice. We hope our work can inspire researchers to uncover factors that benefit collective responsibility and motivate the practitioners to test and refine the model in practice.

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