Exploring Social Practices that Support Knowledge Building in a Primary School

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Abstract: The goal of this study was to explore how to create a social environment that support knowledge building in an Asian classroom. This paper reports the exploratory phase (October 2007 to March 2008) of an attempt at knowledge building in a primary school in Hong Kong. 16 Primary-5 students (10 boys and 6 girls) from an International Baccalaureate school participated in the study. Two activity structures/strategies used in this class are examined: (a) Knowledge Building Contract, and (b) Quality Circle Time. Students' online discussions during the exploratory phase are also discussed. The social structure of the online discourse in Knowledge Forum™ during the exploratory phase is also discussed. The study provides an account of how knowledge building was initiated.

Keywords: knowledge building, Knowledge Forum, activity structures, social infrastructure

1. Introduction

'Knowledge building', refers to the processes experts engage in when the state of knowledge in a field is inadequate for meeting new challenges, and new knowledge is needed [1,2]. Research on knowledge building in schools over the last two decades has aimed to make such processes more prominent in education. However, knowledge building involves much more than inquiry; it requires a classroom culture that supports inquiry, epistemic agency, reflection, discourse, and idea improvement [3]. Few studies exist that describe how teachers develop the needed classroom culture.

This is especially important in Asian countries for cultural reasons. For example, in Chinese culture both effort and achievement are highly prized, and primary students need to compete for places in good secondary schools. As a result, students do not like to be seen incorrect publicly and do not like to share ideas that still need refinement; they also are reluctant to challenge the authority of the teacher [4] and are used to a high degree of structure. They often expect the teacher to tell them what to do. Such cultural influences would be expected to constrain attempts at knowledge building, which depends critically on epistemic agency and idea improvement [2]. On the other hand, a disposition towards the collective good of the family and society in Asian countries may support knowledge building.

Therefore, this study explored how to create social infrastructure in a Hong Kong primary classroom that supports knowledge building using three activity structures: (a) idea cards posted on classroom walls, (b) a knowledge building contract, and (c) Quality Circle Time. In this paper we describe the first briefly and then focus on the last two; a more detailed account of idea cards was given by Bielaczyc and Ow at the 2007 workshop. Findings from the work the students did on Knowledge Forum are also reported.

2. Method

2.1 Participants

The participants were 16 students from a Primary Five class (10 boys and 6 girls) taught by the researcher at a bilingual international school in Hong Kong. The different nationalities included Hong Kong, Singaporean, Malaysian and Mainland Chinese. At the time of the study, the teacher was trying out knowledge building for the first time as part of her Masters program in education. The students had been studying in a Primary Year Program International Baccalaureate (PYP, IB) curriculum for several years; this is an inquiry rich program for primary schools. In this study, knowledge building was considered as a way to meet inquiry goals in the school curriculum. The teacher and students had no prior exposure to knowledge building or Knowledge Forum.

2.2 Procedures and data collection

The full study consisted of two parts. (1) An exploratory phase (October 2007 to March 2008) in which the three activity structures were used to develop a classroom atmosphere and dynamics consistent with knowledge building; during this time, Knowledge Forum also was used for several short inquiries. (2) An extended inquiry unit in which the various elements were integrated (April through June 2008, a total of 9 weeks).This paper discusses only the first phase.

The paper is an exploratory and descriptive case study [5], the "case" being the classroom environment, especially a set of activity structures designed to support knowledge-building practices. Data included: teaching materials; student work; video recordings of some lessons; photographs; and regularly written reflections on teaching. Because this study was exploratory the account provided here is narrative and impressionistic emphasizing the goals of the activity structures, outcomes, and the researcher's impressions regarding the extent to which they helped to build the needed culture [6]. The Knowledge Forum database was explored using server-log data, social network analysis [7], and students' reflections on their experiences with Knowledge Forum.

3. Results

Idea cards are index cards that students use to contribute their ideas to a public space (classroom walls), and then comment on, raise questions about, and link them; it is used to make students familiar with knowledge building discourse before computers are introduced or in conjunction with computer use to make knowledge building discourse more central to the class's work. Bielaczyc and Ow pointed out that there are several limitations to idea cards: they are fixed on the wall making moving them around difficult, and other demands for wall space may result in the cards being placed too high for students to be able to read them or comment on them.

The researcher took heed of these findings. Students began using idea cards early in the school year while studying reproduction and heredity; they were able to move the cards around although they sometimes still were placed high. From the teacher's point of view the benefits of the cards were that students needed to take a risk in making their ideas public, a desired PYP IB learner characteristic, and that they learned to share and discuss ideas. The idea cards kept the students' focused on the topic of inquiry, and made students

familiar with scaffolded discourse. However, at this early stage the cards were quite fact-based and students' comments often focused on side issues such as spelling and expressing agreements.

3.1 Knowledge building contract

According to the PYP (Primary Year Program) in International Baccalaureate (IB) schools, students are expected to demonstrate so-called Learner Profile competencies; the participants were familiar with these from Primary-1. Clearly, to make knowledge building central to a class's activities it needs to be connected to the development of these competencies. A "contract" was a natural approach at this school, as students often used contracts to keep the PYP goals in focus – contracts were part of the school's culture. A point of contact was the following question from the *Learner Profile Booklet*: "Is it possible to create more experiences and opportunities in the classroom that allow students to be genuine inquirers?" The goal of the *Knowledge Building Contract* was to collaboratively develop a contract with the students that would enable them to use knowledge building to demonstrate the learner profile. To set the stage for this, the class watched a promotional video on Knowledge Forum in which Grade 5 students used it to study the human body. A poster was affixed to the walls to remind students of knowledge building principles. A specific goal for the teacher was to enable students to reflect more deeply on their learning.

The Knowledge Building Contract was developed as follows. The first few lessons were used to set the stage, encouraging the students to be inquiring, knowledgeable and caring young people as described in the IB Organization mission statement. Students needed to learn to participate in public discussions without negative consequences. It was important for the students to identify how they can participate in knowledge building activities while showing and developing their IB learner profile and attitudes. The teacher presented the ideas written on the KB poster and students brainstormed how they could demonstrate IB learner traits like inquirers, knowledgeable, thinkers and communicators. They created contracts that reminded students to reflect on their responsibilities. The teacher kept the contracts throughout the school year as a reference when students were observed showing these traits and used it for making anecdotal notes of their participation. As well, the Knowledge Building poster and contracts were visible to students on the classroom walls and the computer lab. Some of the students' ideas for the knowledge building contract are show in Fig. 1.

3.2 Quality Circle Time

Quality Circle Time (QCT) is a democratic and creative approach to allow the teacher to manage a range of issues in the interactions in a learning community. It is widely used in numerous learning settings ranging from early childhood to secondary schools around the world. The main features of the QCT are shown in Figure 2.

IB Learner Profile	Students Brainstormed Ways They Can Demonstrate the Learner Profile in KB Activities and Discussions
Inquirer	Ask questions, provide explanations, take notes
Knowledgeable	Research questions, share resources such as books, videos, models and photos
Thinker	Reply to questions, ask questions, give reasoning, gather information
Communicator	Read and write notes and reports, do presentations, add to discussions, translate information to English for discussions, conduct interviews
Principled	Don't use other people's KF passwords, don't write bad words, don't make fun of other people's spelling, grammar or ideas, take care of the computers
Open-minded	Listen and read each other's theories, find information from different places and not just from books or the Internet
Caring	Help each other out, share ideas, be patient with the computers, take care of the computer lab
Risk-takers	Participate in class discussions and the forum, share ideas, question other people's theories, go out to find information, interview people
Balanced	Don't always use the computer, use different sources for research, contribute to discussions regularly
Reflective	Write reflections in the unit notebook and forum, participate in discussions, evaluate information, edit notes, summarize discussion notes

Figure 1: Knowledge Building Contract Summary

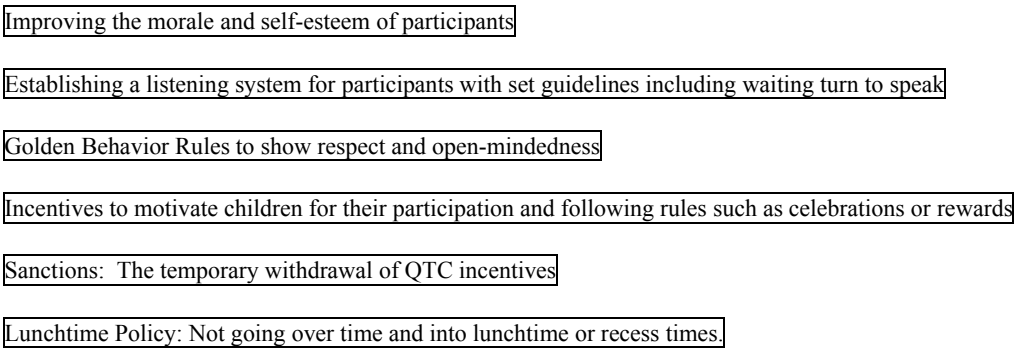

Figure 2: Quality Circle Time Features [12]

A variation on this is what Cummings refers to as 'hunkering', in which he works at the elbows with children to help them express their own ideas [8]. His approach emphasizes the importance of language in Vygotsky's theory of child development; as students struggle to express their ideas, he helps them find develop the language and communication skills they need. 'Working at the elbows' means that Cummings works with the students and that his eye level is the same as that of the students; that differs from the dominant teaching arrangement in Hong Kong schools, where the teacher is at a higher level signaling a position of authority.

In this study, the researcher implemented QCT but was also influenced by Cummings' idea of hunkering. Circle time was used early on in the classroom to help create a supportive classroom atmosphere for effective knowledge building. The researcher used this approach with a combination of other activity structures described in previous sections to establish some preferred classroom behavior outlined in the IB Learner Profile. The goal of implementing QTC was to promote better relationships with

the students and adults in the classroom culture. QCT was used weekly for various purposes including reflections and games. The topics for discussion during circle time included behavior, homework, games, upcoming events and reflection of the experiences and learning taken place throughout the week.

Cumming's strict listening rules were applied to establish a listening system. Listening is a skill that many students are developing in primary school and it is a language skill assessed in their report cards. Cummings made it very clear that students had to focus on listening to speakers; distractions such as hand-raising were not tolerated. In his study, students who raised their hands were quickly reminded to wait until the speaker was done and to only listen. In this study, the teacher enforced the same rules. Consequences varied from verbal and eye warnings, speaking sanctions to being removed from the circle. In the later case, they would be requested to sit at their desk and only listen. Students were also praised for their good listening and taking turns which made it easier for quiet and shy students to get a chance to contribute. Over time there was a general improvement as circle time and other face to face discussion activities became part of the classroom routine.

3.3 How Knowledge Forum was used

Knowledge Forum was introduced at the end of October. Students used Knowledge Forum early on for discussions including story predictions, art, sharing different designs and their functions. The online discussions were extensions of face to face discussions in class, and were with English lessons and Unit Studies. Students responded to each other and observed how their conversations were linked together in threads.

To examine participation levels, assessment tools in Knowledge Forum were used to generate the date in shown in Table 1 for the period Oct. 30 2007 to March 31 2008. These participation levels compare favorably to other studies of knowledge building. The last index, the number of words per note in sentences was 9.4 suggesting that students were writing short notes – mostly with single ideas.

Table 1: Indicators of participation

	M	SD
Notes created	33.3	14.8
Build-on Notes	26.6	15.8
Notes Read	102.8	40.6
Key words	20.5	20.5
Words in sentences per note	9.4	4.8

Figure 3 shows two sociograms of the discussions. The network on the left depicts interactions between students via reading: Each note represents a student and each arrow A→B signifies that A has read at least 10 notes by B. The network shows that each student was connected to at least one student via such a relationship. It turns out that every possible link in this network of 16 nodes (students) was realized – it is said that the *density* of the network is 100%. Furthermore, when students are placed closely together this signifies that the reading patterns are similar, in other words, that these students are

closely associated through reading. The student with ID 337 has high centrality because that student's notes are read by many students; the student with ID 365 is more peripheral in that only a few students have read that student's notes. The diagram shows that essentially the class is one clique or one community. For example, it is possible for the sociogram to have a more complicated form including "arms" or "legs". Such a community would have stronger evidence for sub-communities.

The network on the right provides similar information for build-on notes. In this case each arrow A→B indicates that A has built on (responded to) at least three notes by B. As the figure shows the network is more limited; it has a density of only 34.2%. Although all students were linked to at least one other student through building on notes, some students were quite peripheral to this activity. Nevertheless, the evidence for sub-communities is not strong.

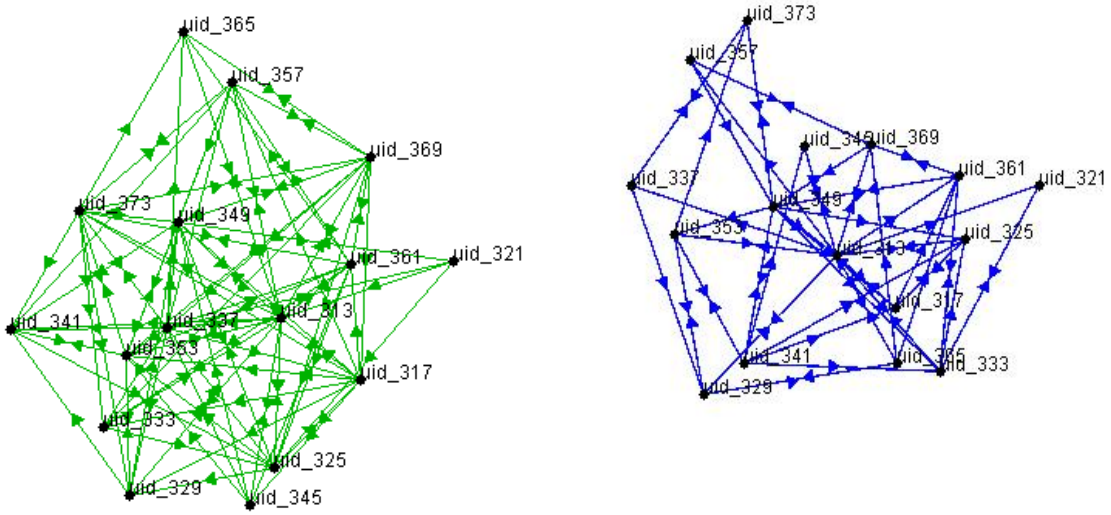

Figure 3 Sociograms for reading (10 reads, network on left) and build-on (3 build-on notes, network on right)

Initially many students saw their work on Knowledge Forum as similar to email and conversation; they wanted to have a conversation with individual students or friends and indicated this by adding the target person's name in the note title (e.g. "*Question for Nicholas*", Nov. 6). But after a few sessions students began to see that working on Knowledge Forum was different from email and became more aware of how *public* their notes were. They became more aware that their audience was all the students and the teacher.

Another shift in the way students used Knowledge Forum in the beginning was in the *focus* of their attention. The teacher often had to remind students to invest their effort into sharing their ideas and helping each other advance their knowledge. They were to focus on the questions or problems raised in the discussions rather the *convention* of their writing. Many students' initially emphasized critiquing each other's spelling and grammar (e.g. "*That's nice, but you spelled model wrong …*", .Nov. 6). Nevertheless, many of the notes remained off-topic notes or short comments in which students agreed with each other without building on ideas and offering explanations (e.g. "*Yah I agree to this*," Dec. 6). Over time, it appears that there were more notes that elaborated ideas and information (e.g. *"It's not a castle Calvin, it's actually Beijing's Forbidden City"*, Feb. 20). On the whole, it was a change to have students focus on ideas.

What did the students say they used Knowledge Forum for? Students were asked to consider this question in their written reflections. One student wrote, "I use KF to chat

with others and to spell check." Two other students wrote that they used the software to share opinions. Other responses included helping to build on classmate's knowledge, asking questions, and building on notes about different subjects. One student commented on *having fun* as an important element in the process. "I used knowledge forum for asking questions and answering questions, but we need to have fun." This was important feedback to the teacher since she wanted the students to have a positive and enjoyable experience considering there was an element of risk they were taking in making their ideas public which can lead to scrutiny under non-supportive learning environments.

4 Conclusion

This paper described a teacher's attempt to enact knowledge building in her own Primary-5 classroom. Although there was no space to provide a full account and to examine the impact on students' knowledge building later in the year, it is the author's belief that the activity structures were needed. It was suggested that the idea cards helped students focus on ideas and helped them contribute their ideas to a public space. Such work, whether it is addressed before the computers are introduced or not, is important in Asian classrooms. As mentioned earlier, Asian students are reluctant to challenge the authority of the teacher and to be seen to be incorrect in their ideas – they aim to "save face." The QCT further enabled open-minded discourse about ideas. Over time, the students became better at listening to each other, contributing ideas, and treating the ideas of others with respect. The classroom discourse – although this was only a start in the needed direction – differed considerably from dominant classroom discourse in Asian classrooms: IRE discourse, in which the teacher initiates, students respond, and the teacher evaluates the response. The knowledge building contract was a perhaps Asian response to the need to meet curricular requirements in the PYP IB curriculum. It was a student-centered way to examine knowledge building in light of external constraints. It was suggested that it is very necessary to attend to this if knowledge building is to be implemented in settings with academically challenging curricula.

The analysis of the discourse on Knowledge Forum suggested that these efforts did help. The class seemed to be a rather cohesive community, without evidence for sub-communities or cliques. The amount of connectivity in the reading network was very high, as it was for building on notes, compared to some earlier studies of initial attempts at knowledge building. The amount of participation (notes created and so forth) also was high. And from their reflections, the students generally liked to learn this way. Preliminary findings from the second phase of the study indicate that the science content learning gains during that phase were very acceptable (two standard deviations) and that the discourse in Knowledge Forum improved, with fewer notes in which students merely agreed with each other.

5. References

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