Fostering Learning Communities among Teachers and Students: Potentials and Issues

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Abstract. This paper explores some potentials and issues of fostering learning communities through Computer-Supported Collaborative Learning (CSCL) technology in Singapore classrooms. The subjects were eight teachers who attended a professional development course conducted at the National Institute of Education. The course focused on preparing teachers in integrating information technology into teaching and learning. CSCL, in particular, Knowledge Forum\textsuperscript{®}, was adopted as a platform for online discussion and knowledge building on these technology integration issues. Interviews with these teachers and analysis of their online discussion suggest that they appreciate the knowledge building approach as a means for the students and themselves to learn beyond classroom and in promoting in-depth learning. However, the teachers felt that the approach was time consuming and was more suitable for high-ability students.

Keywords: Learning Community, Knowledge Building, Professional Development

1. Rationale for Adopting Knowledge Building Community

This paper describes a study on the perceptions of two groups of Singapore teachers, all of whom experienced teaching and learning in a learning community mediated through Knowledge Forum (KF). Since teachers are the key agent for changes in effective classroom practices, the perceptions of these teachers towards the potentials and barriers of building learning communities are important to the development of more effective teacher training.

Many of us are familiar with the role of a teacher as the sage-on-the-stage, transmitting knowledge that the teacher has conscientiously analysed and chunked for the students’ consumption. While one important task of the teacher is to provide information, this approach becomes problematic when it is the sole strategy used. Many educators have criticized this didactic approach for its epistemological assumption that knowledge can be transmitted as well as the assumption that learners are motivated to receive knowledge and they can re-create the same understanding intended by the teachers [1]. Dissatisfied with the didactic approach, educators have begun to look for alternatives.

Among many recent education reform movements, constructivist learning, situated cognition, and communities of learners are rapidly gaining acceptance [2, 3]. These approaches have some commonalities: active engagement of learners, intentional learning, use of authentic problems and contexts, social collaboration, student-centred learning, and engagement of higher-order thinking. These reforms call for transformation of classrooms into learning environments for students to construct knowledge in authentic and collaborative settings. They also call for a change in teachers’ beliefs and practices about teaching and learning. In terms of beliefs, the change is from a realist/objectivist to that of relativist/constructivist view. Prawat and Windschitl had articulated the breadth and depth of the change involved in such conversion [4,5]. Teachers need to be dissatisfied with
current approach, understand the alternatives, assess them as plausible and useful, and integrate the new practices into their existing understanding and practices. In terms of practice, teachers need to be able to elicit students’ ideas, diagnose students’ understandings and scaffold students in constructing personally meaningful knowledge. Embracing this form of student-centred teaching requires teachers to be “practical intellectuals, curriculum developers, and generators of knowledge in practice” [6]. To facilitate teachers’ developments for the changes, it is necessary for teachers to test their ideas in their respective classrooms and observe the effects.

In this study, the Knowledge Building Community (KBC) was adopted to engage teachers in solving authentic problems that they faced in integrating information technology into teaching [8]. The KBC is modelled after real-life knowledge workers like scientists who engage themselves in collaborative advancement of the understanding of a domain. Typical tasks of knowledge workers include identification of problems, formulating hypotheses, gathering relevant information, designing solutions, conducting empirical studies, and reflecting on the processes. These knowledge works are usually conducted in a community where members build on each other’s ideas. To engage learners in a KBC is equivalent to asking the learners to assume the role of knowledge creators in a particular field of practice or discipline. It allows the learners to deal directly with the problems that the practitioners are concerned with, thereby cultivating the necessary competencies and dispositions needed for knowledge work [9]. Case studies, conducted mostly in the Western context, have demonstrated that it is possible to engage schoolchildren in knowledge works [10]. Research has also shown that engaging students in KB promote depth of learning, inquiry and reflection [11].

The KBC model seems to be an appropriate model in facilitating the development of in-service teachers in constructivist-oriented teaching. Recent studies in teacher development provide further support that it may be beneficial to engage teachers as a community of practice supported by networked environments [12]. A community of practice affords valuable opportunities for the participants to appropriate ways of conceptualizing and solving problems [13]. Some teacher educators have recognized the potentials of engaging teachers in a KBC. However, the studies conducted to date have been confined to pre-service teachers [10,14]. In one study, Yuen interviewed teachers in Hong Kong who have implemented KF [15]. The teachers reported conceptions of learning and the knowledge construction processes seemed to be incongruent with the theories of the KBC. The study suggested further research in teacher professional development for the implementation of KBC as necessary.

2. Method

In this study, the KBC model was adapted for two teacher professional development courses designed to develop appropriate epistemology and knowledge in in-service teachers for effective integration of a range of Information Technology (IT) for teaching and learning. Treating integrating IT into curriculum as an ill-defined problem, it was hoped that engaging teachers in a KBC would provide opportunities for teachers to co-construct understanding about IT integration, observe different ways of integration, test out their ideas, reflect and discuss the emerging issues and evolving ideas with peers and experts [16].

The main research question guiding this study is “How do in-service teachers perceive teaching and learning in a KBC?” The findings will allow the researchers in assessing and refining the teacher KBC for future professional development.

The participants for this study came from two groups of teachers who had attended
in-service program that led to the award of Advanced Diploma for IT. There were 33 teachers in total. All teachers experienced learning in a KBC for the first 8 weeks, with the use of Knowledge Forum (figure 1).

In the subsequent module, they were tasked to design lessons that employed computers as Mindtools. Mindtools are “computer applications that require students to think in a meaningful ways in order to use the application to represent what they know” [1]. The teachers were free to select the Mindtools they deemed appropriate for implementation. Some of them chose KF, which was classified as conversational Mindtool, while others selected spreadsheets and semantic networks. They shared their lesson plans, implementation records, and reflections in the database. They also performed peer critiques with the purpose of improving their lessons and discussed theoretical issues.

This study adopted the purposeful sampling strategy for selecting research participants. The selection criterion was that the participants had experienced both teaching and learning in the KBC. Eight teachers who had implemented KBC in their classrooms were identified. The participants’ backgrounds were rather diverse. Their years of teaching ranged from 2 years to 22 years, and levels of teaching from Primary One (Grade One) to Secondary 4 (Grade 10). They granted the researchers permission for the interviews and the use of their online posts. The online posts were included as a source of data for the researcher to triangulate the teachers’ views.

The participants were interviewed after they had completed the module. Each interview lasted for about 30 to 45 minutes. Semi-structured interviews were employed to allow probing or elaboration of pertinent issues. The interview questions asked were:

1. How do you feel about your learning experience in this module?
2. Do you think it is possible to create Knowledge-Building community in our local classrooms? Why or why not?
3. What are the barriers that you had experienced or you can foresee in implementing the CSCL technology?

The study is qualitative in nature. The data from the interviews, participants’ reflections, and online discussions were analysed for recurring patterns and themes that
might indicate the teachers’ perceptions of the potentials and issues involved in the implementation of KBC. Such method is commonly recommended in qualitative research [17]. Themes identified by at least four teachers are reported in the following section.

3. Research Findings

Analysis of the data revealed that the teachers appreciated the technical and the social affordances of the KBC and they perceived that they had learnt better compared to their usual learning experiences. However, they were concerned about not having enough time to facilitate students’ learning and about students’ ability to cope with the KBC model. These findings are elaborated below.

3.1 Knowledge Building Community fosters social constructivist learning through dialogic interactions and allows participants’ voices to be heard

Teachers generally perceived that learning in a KBC allowed them to voice their ideas and improve their understandings through social interactions. For example, when asked about her learning experience in the module, Ann said, “I’ve just graduated so basically it’s just like different. There is a discussion here, for the rest there is no discussion there. Maybe it’s like here I teach, you listen, then you just fall out and it’s more exam-based. For this, there’s a panel to voice out your ideas.”

Sue, Clare and GL believed that KBC helps them to learn better as the members challenged each other’s ideas. Sue said, “Especially when people question me about why is it that I make the decision against another decision… the line of questioning makes you think from another angle.” Clare reflected that “one strong point is that different people have different perspectives. You have a range of different ideas, which is pretty good. Because all along it’s like, okay you think in this way. You didn’t realized that the other person thinks in different ways so it’s like you open up your mind a bit more. That way you learn a bit more.” GL differentiated KBC with other online discussion experience: “I’ve used forum before but not like this one. This one is more active. In a way, you submit the assignment, they give you comments and then you give the comments back and so on. So it’s more like an educational forum.”

3.2 Knowledge Building Community leads to idea improvement

The participants felt that the collaborative learning environment and inter-subjectivity afforded by KBC were important conditions for idea improvement. GL provided an account of how she experienced idea improvement: “Like for example when I post my lesson plan, they will try to like come to modify it, give me suggestions and so on. And then, by looking at other posts, I find that they are also doing the same thing for other people. So we’re actually helping one another, and the questions that they ask make you think maybe you should change your way of doing things a bit.”

Other participants had also expressed their appreciation for the opportunities to be exposed to multiple perspectives which helped to improve their ideas. For example, Clare stated, “We can build upon our ideas, reflect upon them after reading peers' input, opinions and comments. By being aware of how others look at things from a different perspective, I feel that I can actually improve upon my own learning or ideas. Sue echoed similar opinion, “It is a great place for the advancement of ideas and practice as in a knowledge
building community, different people have differing opinions and perspectives of a certain problem or situation. Hence, with differing opinions, people are able to compare and make connections of what they know against new knowledge.”

Carol related her experience, “When we were asked to peer critique, I was initially quite apprehensive. I was worried that I may offend my peers if I ‘over-critiqued’ … However, as we got used to the idea, I thought that the critiques were actually beneficial, especially when I was given concrete feedback on my draft. These feedbacks helped me to become more aware of my writing and highlighted points that I may have overlooked. We naturally began to show genuine interest in each other’s draft and were becoming more spontaneous in our response.” Carol’s reflection highlighted that teachers’ need to develop trust before they could provide substantial feedbacks for their peers. Thus, it is important to look into the social dimensions of teaching and learning in this environment.

3.3 Knowledge Building Community is feasible in school classrooms and is beneficial to the school students.

The teachers perceived that the KBC model helped to promote research and collaboration among students. They reported that their students seemed to be more active, motivated, intentional and independent in their learning. “Pupils actually explore, research and they gather more information. It actually develops the knowledge because through self-discovery and some sort of inquiry learning,” Bill opined. Clare explained why her children became more active, “because in this KBC…they go about learning on their own… when they are asking questions, when they are trying to put in input, they have to read. If they don’t read, they don’t know what to put in…The more they do thing voluntarily on their own, it seems that they learn better. They learn faster.” Fiona felt that online discussion benefits her students because “they have more time for research…they get more info… Like it is also a knowledge base where you can actually give each other views.” Dorothy, in her reflection note, highlighted the progressive advancement of knowledge afforded by Knowledge Forum, “KF is great for collaborative learning and inquiry. As compared to traditional classroom discussions, knowledge is built progressively and captured in a database. As a result, participants can refer to and improve upon a rich network of information at any time.”

The teachers’ opinions indicate their appreciation of the values of KBC supported by KF, both for the teachers and the school students. All of them recognized the potentials of the KBC approach in realising some of the important goals related to the local reform efforts [24] such as equipping students with learning, thinking and communication skills. The communal nature of learning in a KBC and the permanent records of interactions had stimulated some of the teachers to reflect and improve their practice. However, there were some perceived barriers that could prevent the teachers from fostering KBC.

3.4 The teachers believed that the KBC approach is more appropriate for high-ability students who have good command of language.

The teachers mentioned that high ability students with good command of language are better suited for the KBC approach to learning. Most teachers implemented the KBC in the form of project-based learning. A substantial proportion of the students’ posts were reports of factual information as well as peripheral discussions like coordination of project work. In other words, since project-based learning usually had some pre-specified end products, the students’ attention was directed to task completion. Dorothy and her students
created the only database that did not have any product pre-specified. The focus was solely on creating explanations on “How cuts heal”. This resulted in a qualitatively different online discourse that was inquiry driven. When Bill, Carol and Fiona were asked to view Dorothy’s database, they were seemingly impressed but they attributed the success of Dorothy’s students to their ability. They also seemed to express a sense of disbelief that their students could conduct successful inquiry in a KBC. Bill said, “But East Top (fictitious name for the school), possible. You see, this is East Top standard. You get my school students, they can’t write like that.” Fiona opined that “if you are a good pupil, you want to learn more. But for the weaker students, they don’t even know what kind of question to ask.” Carol lamented that she didn’t have students will that high ability.

When we asked the teachers about the possibility of implementing KBC in the form of student-initiated inquiry approach, their responses were similar. They believed that the approach is suitable for students with high motivation, as well as strong academic and language abilities. Clare questioned, “if they are on the average and the lower average, they are not motivated, so how to be student initiated?” Ann felt uncomfortable with her students’ language ability, “Their language usage, then may be their spelling everything…most likely.” GL felt that is it not suitable for lower primary students because “their language is not very good… if you ask them to type the question, they can’t really phrase the questions properly. They may not even know the correct terms to use.”

In other words, the teachers seemed to believe that the students’ abilities to think and verbalize their thoughts are important pre-requisites for the KBC approach to work. Such perceptions may act as a barrier to the scalability of KBC. Another potential barrier perceived by the teachers is that of the time constraint imposed by other teaching tasks.

3.5 The teachers perceived time limitation as a major barrier to the implementation of KBC.

Both for their own learning and facilitating students learning in a KBC approach, time constraint was perceived to be a major barrier by the teachers. In term of time constraints in implementing KBC in classroom learning, Dorothy was most explicit. She said, “I am alright with it (the KBC approach) but where is the time to do all this?” Bill echoed, “I would say that given the time, I would like to have more of this kind of activities. But I think in a normal classroom situation, it is quite difficult considering the syllabus that you have to complete.”

The teachers also faced the problem of time constraints for their personal learning, as illustrated by Sue’s comment “I don’t have time to sit down and think through it really. The…the process of reflection, evaluation. It’s a very difficult process for me.”

In summary, the teachers seemed to recognize that the KBC model enhanced teaching and learning by actively engaging students in the co-construction of knowledge. However, they were not confident about its applicability in a tightly scheduled curriculum, especially if the implementation were to include students with lower academic inclination. These concerns will be addressed in the discussion.

4. Discussion

In this study, the teachers believed that participation in KBC could lead to construction of deeper understanding and idea refinement. This is an important goal of KBC [8, 11]. Similar benefits were reported by in a number of studies [10, 14]. Similarly, potential
barriers of time constraints and student ability were also reported [18]. At this stage, it is important to find ways to help teachers negotiate the barriers.

Through the interview, we realised that teachers’ reflection in the interview has “nudging” effect on their own beliefs, which could possibly lead to a change in attitudes later. Ideas that flowed naturally out of the interviews had resulted in some possible ways to negotiate the barriers. One possible solution to the time constraint imposed by the tight-scheduled curriculum is to shift KBC implementation to the school vacation. The teachers felt that school vacations might be a better time to implement KBC. Currently, it is a common practice for teachers to give holiday assignments, usually in the form of drill-and-practice worksheets, to the students. Consequently, the teachers have to grade many assignments when school starts again. Students’ motivation in doing repetitive assignments is also low. The teachers believed that it is more efficient to replace assignments with meaningful inquiry that could help their students to apply and extend knowledge they acquired during the school terms. Teachers could monitor students’ progress and facilitate students’ learning during the vacations, thus eliminating the need to grade students’ holiday assignments. They could also evaluate students’ learning through their presentations when school term commences again. This seems more meaningful for both the teachers and the students.

Another potential hurdle was teachers’ perception that KBC is primarily appropriate for high ability students. There seemed to be no apparent solution for this barrier. However, the interview process itself again served to “nudge” the teachers’ beliefs. The teachers seemed to be engaged in self-examination after they had voiced their views on this. Two teachers questioned the soundness of their view and proceeded to conduct further inquiry. They were interviewed for a second time. Fiona reflected on how she encouraged her students, “My point to the children is there is no such thing as stupid question… I told them I am not going to give answer. It is basically going to be interaction among all of you. I may go in to question you answer but I will not give you an answer.” Carol felt taking that extra step is important, “I just want to see if the students are able to pick up the important information and see its relationship, and then to think how this information can lead to other information which they feel are related.”

Two factors seemed to motivate the teachers to embark on the second experiment. First, they were not sure about their views. Second, they wanted their students to be more inquisitive. One way to help teachers in negotiating the barriers is to provide opportunity for them to articulate their concerns and to confront their apprehensions. In this case, the teachers weighed their concerns with the potential instructional benefits of KBC. They decided that the KBC approach is worthy of further experimentation. This historical development of the events showed the conditions and pathways of conceptual change, echoing Prawat’s suggestion that teachers may change their pedagogy when they are dissatisfied with their current practice and be exposed to new alternatives [4].

5. Conclusion

This paper documented preliminary findings on how some Singapore teachers view KBC as an innovative use of technology for teaching and learning. In particular, the teachers interviewed provided generally positive accounts of teaching and learning experiences in a learning community supported by CSCL. However, they felt that time constraint is an issue and that the approach is more suitable for students with higher academic ability.

Implementing innovative approaches to teaching and learning inevitably involve complex changes. Among them, the change in teachers’ belief is essential for effective integration. However, changing a belief is a difficult process. It requires the teacher to first
encounter that situation that calls for the necessary changes. The KBC model seems to be a promising approach. It provides an appropriately challenging environment for teachers “to reflect on their own beliefs about teaching and technology, as well as to consider the real-world limits that exist in today classroom” [20]. The text-based nature of the discourse provides a means for the teachers to articulate the issues they encountered. Once the issues have been identified and articulated, teachers could examine the issues and embark on a professional problem solving discourse with colleagues and researchers.

The community of practice afford multiple ways of conceptualizing and solving the problems when teachers are faced with difficulties. Building on current understanding of teachers’ perception, the next step is to engage more teachers in design experiments. It is hoped that future research efforts invested in this line of study would help the teachers and the researcher to co-construct adaptations of the KBC that help to better equip Singapore learners for the knowledge society.

References