Towards a Collaborative Learning Environment Through ICT: a Case Study

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Abstract
The growth in information and communication technologies (ICT) has brought fundamental changes in learning opportunities. Significantly, interactive technologies, such as web-based technologies, can enhance students’ collaboration and construction of knowledge and yield a considerable shift away from the typical teacher-centered milieu in classrooms. Such collaborative learning environment encourages the adoption of a deep learning approach that has been shown to be effective in enhancing student achievements. This paper expounds how this possibility has been put into practice in a group of ICT-based teaching and learning programmes for Mother Tongue languages, collectively known as 10’CMT. 10’CMT, which is initiated by the Educational Technology Division (ETD) of MOE Singapore, embodies a focus on the development of relevant pedagogy by which web-based technologies are embedded in meaningful learning activities in the classroom. The thoughtful fusion of face-to-face and 1:1 online learning experiences that marks this teaching approach derives that the main accent in learning must be on collaboration and interaction, as asserted by research in the education field. Through a case study of a primary school in Singapore, this paper exemplifies how 10’CMT has the ability to promote collective knowledge and, by doing so, essentially supporting the growth of the individual student’s knowledge. It draws on the students’ engagement in peer editing, peer evaluation, peer interaction and feedback with self-reflective practices through the affordances of an array of online tools. It also suggests how with web-based technologies, teachers can better capture students’ output or ideas and use them for further learning and enriched discussion. As educators also place a high premium on teaching strategies that go beyond mere mastery of content and ideas, concomitantly this paper will discuss how the 10’CMT approach promotes a larger educational agenda such as imparting all students with the essential skills needed for future contribution to society. Among others, the ability to respond flexibly to complex problems, to communicate effectively, to manage information, to work in teams, to use technology, and to produce new knowledge which are deemed to be crucial competencies for 21st century.

1. Introduction
“Student computer expertise can supplement the limited availability of the teacher. Moreover, as inherent feature of the technology is that work in progress on the screen is public in a way that paper on a student’s desk is not” (Cazden, 2001: 109). Therefore, these affordances of technology have the ability to create possibilities for students to work with each other and by doing so, learn from one another. Technology can therefore transform the structure of classroom discourse. In a traditional classroom, the teacher is the primary knower and the main traffic controller of the classroom interactions. The teacher states what to say, who can speak and when to speak. These traditional structure might short changed the students as they are very much dependant of the teacher. This paper attempts to show that technology, particularly ICT has the ability to transform the way students learn. Through ICT, a collaborative environment is readily available and thus, change the way students learn. This is a case study of a primary school in Singapore. The primary one students of a Malay Language class learnt the Mother Tongue Language in a computer-enhanced environment, namely the 10’M Programme. Through this 10’M programme, the students learnt to work collaboratively with each other. With the 1-1 computing structure of the programme, the students were able to practise self and peer evaluation and self and peer editing. The structure of the 10’M Programme has the ability to promote collective knowledge and, by doing so, support the growth of individual knowledge (Scardamalia & Bereiter, 1994). This approach is in line with 21st century skills, which is the ability of learners to work collaboratively. Therefore, collaborative learning is learning to live together.
2. Collaborative Learning through Learning Communities

Learning communities approach is being developed in America (Bielaczyc & Collins, 1999). This approach aims to advance collective knowledge and support the growth of individual knowledge. Through this approach, a culture of learning, in which everyone is involved in a collective effort of understanding, is achieved. Bielaczyc & Collins (1999) listed the four characteristics that a learning culture must have: (1) diversity of expertise among its members, (2) a shared objective of continually advancing the collective knowledge and skills, (3) an emphasis on learning how to learn, and (4) mechanisms for sharing what is learned. Referring to the education reports (1991) and Murnane & Levy (1996), it was stated that skills such as being able to direct self learning, work with and listen to others, and develop ways of dealing with complex issues and problems are not skills that are currently taught in schools. Bielaczyc & Collins (1999) suggested that education should be redesigned around learning communities for several arguments such as: (1) people learn best not by assimilating what they are told, but rather by a knowledge-construction process; (2) children will learn to read and write if the people they admire, read and write; and (3) people are required to interact and work with people from different backgrounds as world is closely connected through new communication technologies and societies are more diverse through mixing of people from different backgrounds. Therefore, the learning-communities approach addresses the needs for students to deal with complex issues, figure things out for themselves, communicate and work with people from diverse backgrounds and views, and share what they learn with others.

2.1 Framework of Collaborative Learning

Bielaczyc & Collins (1999: 3) suggested that classrooms organised as learning communities still differ from most classrooms. They proposed eight dimensions that support the framework of collaborative learning environment: (1) Goals of the community, (2) Learning activities, (3) Teacher roles and power relationships, (4) Centrality/peripherality and identity, (5) Resources, (6) Discourse, (7) Knowledge, and (8) Products.

Through the ‘Goals of the community’, the aim is to foster a culture of learning. The individuals and the community are expected to learn how to learn. This can be achieved through sharing of individual efforts which in turn, results in a deeper understanding of the subject matter under study. Students could leverage on each other’s diverse knowledge and skills as resources to collaboratively solve problems and advance their understanding.

In the ‘Learning activities’, the activities designed should ensure both individual development and collaborative construction of knowledge; sharing knowledge and skills among members of the community; and making learning processes visible and articulated. Activities such as individual and group research, class discussions, cross-age tutoring, working together to create or present, and taking on particular roles toward a common end, were suggested.

In the ‘Teacher roles and power relationships’, the teacher takes on roles of organising and facilitating student-directed activities. This is a change from traditional classroom where teachers tend to direct the activities. This change in classroom structure will result in a shift of power relationships as students become responsible for their own learning and the learning of others. The teacher is no more the authority who determines what is studied and assesses the quality of students’ work.

Lave & Wenger (1991) suggested that one’s central role and respect from the community members shaped one’s identity. In ‘Centrality/peripherality and identity’, the central roles are those that most directly contribute to the collective activities and knowledge of the community. Students develop individual expertise and identities through the different roles that they undertake. This is in contrast to traditional classrooms where students usually work on the same task and are expected to achieve the same degree of subject matter understanding.

In the dimension of ‘Resources’, Bielaczyc & Collins (1999: 5) viewed both the members themselves and the collective knowledge and skills of the community as important resources. In ‘Discourse’, the language for describing ideas and practices emerges through interaction, and co-construction and negotiation among the members of the community. Through this type of ‘Discourse’, the students develop a common language in articulating their learning processes, plans, goals and assumptions. The students are expected to provide feedback to each other, and teachers are expected to support them for doing so.

The development of both diverse individual expertise and collective knowledge is emphasised in the ‘Knowledge’ dimension. Students are required to develop an in-depth understanding about topics. In contrast, traditional classroom tends to aim covering all the topics and every student to learn the same
thing. This traditional approach emphasises breadth over depth. In ‘Products’, students do not generally give up when they fail. These students learn more from their mistakes and pursue learning in the face of failure. The culminating event or product is achieved through the joint effort of the entire class, hence helps to build community (Bielaczyc & Collins, 1999: 6).

3. Background of 10°CMT

Introduced in 2008, 10°CMT is a teaching and learning programme that fronts innovative ICT use for engaged learning to promote pupils’ interest and hone their skills in Mother Tongue Languages such as Chinese (C) Language, Malay (M) Language, and Tamil (T) Language. The 10°CMT programme makes the most of the opportunities offered by ICT in making student-centred learning relevant in a modern pedagogical environment. It enhances the teaching-learning process by providing interactive learning experience that can be customised to cater to different learning styles while fostering self-paced independent learning and providing avenues for collaboration and group work. The 10°CMT pedagogical approach incorporates time set aside for self-paced independent learning during curriculum time to promote one aspect of self directed learning (SDL) which is to further student’s own effort to acquire knowledge. Teachers in the programme can also tap on the affordances of an array of ICT tools that enable group work and collaboration to be conducted comfortably in an online learning environment. Teachers can set differentiated tasks for students to come together to learn through meaningful interactions and exchanges of ideas. Through thoughtful design of the 10°CMT lesson, students are given: (1) ample time for online reading and self-construction of knowledge; (2) ample opportunities for self-improvement before summative evaluation; and (3) appropriate avenue for online collaboration through peer writing and peer discussion tools, annotation tool, online rubrics for self-peer teacher evaluation and peer-to-peer comments and feedback. A collaborative environment is possible because of the existence of (1) an array of ICT tools for teaching and learning; (2) the capability to conduct differentiated learning in an online learning environment; and (3) the ability to increase students’ interest and motivation to learn the Mother Tongue Languages.

4. Case Study of 10’M

This paper discusses a case study of a group of seven-year-olds from a primary school in Singapore. The primary one students of a Malay Language class learnt to write compositions in a computer-enhanced environment, namely the 10’M Programme. The lesson was organised in a 2-1-1 structure that represents 50% of teacher teaching time, 25% of students practice time, and 25% of students’ output time. After briefly analyzing the 10’M lesson, comparison with the eight dimensions of collaborative environment suggested in the framework will be made. This paper will then attempt to extract the collaborative supported features of the 10’M lesson.

4.1 Analysis of Collaborative Learning Environment through 10’M

In the 50% teacher teaching time structure, students were involved in think-pair-share activities where students work in pairs to discuss, find answers or solutions, and provide feedbacks and suggestions. Students were engaged in making inferences from a video they watched. In pairs, they were encouraged to discuss on safety by making inferences from the video and linking them with the students’ real life experiences. The sharing of experiences and lessons learnt from the experiences provided deeper understanding of situations and consequences of actions to the students. The students then involved in a whole class discussion on hazardous situations posed by the teacher. It was observed that the students were able to articulate the hazardous nature of the scenario or situation and the consequences if not rectified. They were able to also link the hazardous situations with their peers’ experiences shared earlier in the lesson.

In the first 25% of students’ practice segment, they were to construct sentences on ‘Being Safe at Home’. The students work in pairs to take turns in sharing their sentences verbally with their partners. They learnt to listen attentively and were encouraged to provide inputs to each others’ sentences. The activity provided opportunity for the students to be the important resources to their peers.

In the last 25% of students’ output segment, the students logged into the 10’M portal to construct sentences on the same topic, individually. They published their writing in the portal upon completion. Students were then tasked to edit the works of their peers using the editing and annotation tools in the 10’M portal. At the end of the editing and annotating session, students checked the changes made and suggestions given by their peers, and further improved their writings based on the editing and
suggestions proposed. The final writing published in the portal was a product that had gone through several collaborative processes.

5. Conclusion
Collaborative learning environment features were observed in the 10'M lesson discussed in this paper. In particular, it fulfils the eight collaborative dimensions mentioned in the framework such as: (1) ‘Goals of the community’ when they learnt from each other in improving their writing on the given topic; (2) ‘Learning activities’ through the collaborative construction of knowledge during the pair work; (3) ‘Teacher roles and power relationships’ when the students were empowered to become responsible for their own learning and the learning of others during the editing and annotating session; (4) ‘Centrality/peripherality and identity’ when students played different roles during problem solving, sharing of experiences, and editing; (5) ‘Resources’ when the students themselves and the collective knowledge that they developed were regarded as important resources; (6) ‘Discourse’ through the articulation of their writing processes when they provided feedback to their peers’ writing; (7) ‘Knowledge’ through the sharing of diverse experiences that support the deeper understanding of the topic; and (8) ‘Products’ where the students learn from their mistakes and considered the editing made and suggestions given to them by their peers.

References