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Pedagogical Transformation and Knowledge-Building for the Chinese Learner

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Evaluation & Research in Education

Pedagogical Transformation and Knowledge-Building for the Chinese Learner

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This study examines the Chinese learner in the current changing education contexts with their emphasis on 21st century learning goals of inquiry, teamwork, and learning how to learn. With socioeconomic and technological changes, internationalisation and educational reforms, pedagogical approaches developed in the Western countries, such as inquiry-oriented and technology-based learning are becoming increasingly common in Confucian-Heritage Culture (CHC) classrooms. This paper reports on a case study of an expert teacher implementing a computer-supported knowledge-building approach in Hong Kong classrooms over a period of three years. The analyses indicated that the Chinese learners used seemingly contradictory approaches to make meaning, given the contextual dynamics. Similarly, the teacher did not merely adopt the Western model; he developed a transformed pedagogy integrating Chinese and Western approaches to scaffold student learning. The Chinese learners and Chinese teachers employed approaches that transcended the polarised categorisation of surface vs. deep, student-centred vs. teacher-centred, and didactic vs. constructivist approaches in the Chinese classroom. Implications for teaching and learning for Chinese learners in the changing educational contexts are discussed.

Introduction

There is now increasing interest in examining student learning and teacher thinking with respect to Chinese learners (Chan & Rao, in press; Watkins & Biggs, 1996a, 2001). Despite the general perceptions that Chinese students are surface and rote learners, they consistently perform better than their counterparts in international tests. Biggs (1996a, 1996b) coined the phrase 'the paradox of the Chinese Learner' and discussed Western misperceptions of Chinese learners based on polarised ways of distinguishing surface versus deep learning approaches. Marton postulated the notion of 'meaningful memorization', proposing that memorisation and understanding are intertwined processes among Chinese learners (Marton *et al.*, 1996, 2005). The research on teaching Chinese learners has examined the role of Western-based constructivist learning (Biggs, 1996b; Chan, 2001; Ho & Watkins, 2004; Stokes, 2001), the uniqueness of Chinese pedagogy such as the 'virtuoso' model focusing on

mastery teaching (Paine, 1990) and the use of the 'variation' approach in Chinese classrooms (Lo *et al.*, 2006; Marton & Tsui, 2004; Mok *et al.*, 2001).

Since the publication of the first volume of *The Chinese Learner* (Watkins & Biggs, 1996), there have been pendulum shifts from viewing Chinese learners as rote learners to viewing them as good learners, sometimes to either extreme. Despite increasing enthusiasm for examining Chinese learners (e.g. Fan *et al.*, 2004; Rastall, 2006), it is only recently that particular interest has been given to examining the Chinese learner in the light of changing societal, technological and educational contexts (Chan & Rao, in press). With the advent of the knowledge era, there are now paradigmatic shifts in learning theories as well as major shifts in sociocultural, ecological and technological contexts that impinge on teaching and learning. Educational and curriculum reforms worldwide, and particularly in Asian-Pacific regions, are now placing emphasis on developing citizens' capabilities for problem-solving, teamwork and learning how to learn, as well as on developing their competence to work with knowledge (Hargreaves, 2003). These changes have raised new chal-lenges for students and teachers worldwide as well as questions about how to teach the 21st century Chinese learners.

In response to global changes and international development, Hong Kong is now engaged in major reform initiatives including 'Learning how to Learn' (Curriculum Development Institute, 2001) and other large scale structural changes such as the introduction of the subject 'Liberal Studies' in the senior secondary curriculum. These current changes require new paradigms and approaches involving epistemological and pedagogical changes among teachers and students. How can we conceptualise the characteristics of the Chinese Learner and understand the nature of pedagogy required for Chinese learners in the face of changing educational demands in 21st century learning?

The Paradox of the Chinese Learner

Since the last decade, researchers have observed a most intriguing phenomenon called 'The paradox of the Chinese Learner' (Watkins & Biggs, 1996). Whereas memorisation and understanding are often examined as distinctive and polarised constructs in Western research, Marton and his colleagues found memorisation and understanding to be intertwined pro-cesses (Marton *et al.*, 1997, 2005). Another explanation, proposed by Biggs (1996a, 1996b) is that psychological constructs used in the West cannot explain Chinese students' performance adequately because teaching and learning need to be interpreted in relation to sociocultural influences and systems perspectives (see also Kember, 2000; Watkins, 2000). Chinese students are highly attuned to contextual influences and the different contextual demands can lead to different manifestations in learning approaches. For example, while collaboration as group learning is uncommon in the Hong Kong classroom, collaborative learning is widely practiced informally among Chinese students (Tang, 1996).

These interpretations are important for understanding the nature and character of Chinese learners influenced by sociocultural context. Chinese learners might develop a *memorisation-understanding* approach much more

than their counterparts because of the perceived task demands related to *cultural, historical and contextual influences*. The historical tradition and contextual demands require students to use memorisation-understanding processes in public examinations more than do learners from other cultures. With the current educational reforms bringing new perceived demands on learning, questions arise as to how Chinese learners will respond to these new demands, and what it would mean for characterising the Chinese learner.

Teaching the Chinese Learner

Teaching is a cultural activity (Stigler & Hiebert, 1999) and much interest has been given to examining teaching in Chinese and Western contexts. Similar to their Western counterparts, Hong Kong teachers have been shown holding contrastive notions of 'transmission' versus 'constructivism' in their conceptions of teaching (So & Watkins, 2005). Yet differences in Chinese and Western teachers' conceptions of teaching have also been observed; for example, research has shown that Mainland Chinese teachers hold conceptions of teaching as both 'preparation for examination' and 'conduct guidance' (Gao & Watkins, 2002). The research has also examined the 'Chineseness' of pedagogy: for example, in Mainland China, there is much focus on master teachers emphasising teaching as performing (Paine, 1990). Teachers also have highly effective ways of orchestrating learning with large classes (Jin & Cortazzi, 1998).

Biggs (1996a) discussed the importance of a systems perspective in examining teaching and learning and noted that there are various levels for understanding teaching and learning. The first of these levels focuses on examining the characteristics of the 'students'; the second focuses on identifying what 'teachers do'; and the third level examines how teachers engage students in tasks that are appropriate to their cognitive levels in the broader context of cultural and contextual influences. Good teaching is not merely a matter of adding on or rejecting the Western approach, it involves designing instruction and engaging students in learning in ways that are aligned with the cultural and contextual forces in order to transform student learning. The researchers have examined how Chinese teachers use Western-based approaches, such as constructivist learning (Chan, 2001), problem-based learning (Stokes, 2001; Taplin & Chan, 2001), conceptual change approach (Ho & Watkins, 2004), and knowledge-building (Chan & van Aalst, 2006) to improve teaching and learning in Hong Kong. It may be useful to note that there is no specific Western pedagogy or approach. By Western-based approaches, we mean pedagogy developed and adopted more widely in Western countries. Chan (2001) discussed how constructivist approaches work in Hong Kong classrooms when the Chinese teachers align their pedagogy and beliefs with contextual demands – how Chinese teachers make pedagogical transformation in the light of changing educational goals and demands is an important question still to be examined.

With the advent of educational reforms, teachers need to help students to develop their capacity for problem–solving, learning to learn, and teamwork. In addition, they need to undergo changes themselves in order to face the new

demands continually brought on by education change. While the concept of memorisation-understanding might inform us about how Chinese learners go about the learning of subject knowledge and skills, questions now exist as to how Chinese learners learn how to learn. The research in the Western context has examined student inquiry (Bransford *et al.*, 1999; Sawyer, 2006) and teachers' self-sustaining and generative changes (Franke *et al.*, 1998). However, while educational reforms have taken major strides in Confucian-Heritage Culture (CHC) classrooms in Asian-Pacific regions, little work has been conducted to examine learning and pedagogy for Chinese learners in dealing with new educational goals and demands.

Knowledge-Building as Collective Learning for Chinese Learners

This paper reports on a longitudinal study of an expert teacher designing new pedagogy for Chinese learners using a computer-supported inquiry-based 'knowledge-building' approach. The education model of knowledge-building, developed over the last two decades (Bereiter, 2002; Bereiter & Scardamalia, 2006; Scardamalia & Bereiter, 1994, 2003), is defined as 'the production and continual improvement of ideas of value to a community'. Bereiter and Scardamalia argue that for 21st century learning, students need to go beyond completing school tasks; they need to coconstruct, create and improve ideas. Schools are to become knowledge-building communities where members make progress not only in increasing their personal knowledge, but also in advancing the community's collective growth. To support collaboration and discourse, a computer platform called Knowledge Forum (formerly called Computer Supported Intentional Learning Environments [CSILE]) was developed, through which students write into a computer database as they pose ideas and questions, comment and elaborate upon others' viewpoints, and synthesise different perspectives as they work together to improve the community's knowledge, supported by classroom discourse (Scardamalia & Bereiter, 2006).

Knowledge-building has been adopted in this study because of its emphasis on 21st century learning and because the key notions of 'improvable ideas' and 'collective cognitive responsibility', with their emphasis on constructive effort and collective learning, seem particularly relevant for Chinese students. Currently, knowledge-building projects have been implemented in many Asian countries including China, Taiwan, Singapore, Japan and Hong Kong. The research has shown the role of knowledge-building with regard to Chinese students and teachers (Chan & van Aalst, 2006; Lai & Law, 2007; Lee *et al.*, 2006; van Aalst & Chan, 2007) from the perspective of learning theories; deeper analyses of cultural and contextual influences would illuminate aspects of the Chinese learner.

To summarise, this paper addresses the problem of the paradox of the Chinese learner in the context of examining 21st century learning for Chinese learners. The author examined the question through tracking how an expert teacher implemented the knowledge-building approach in his classrooms over

a period of three years. Specifically, two major research questions were addressed:

(1) What characterised the teaching approach to the Chinese learners for 21st century learning? Specifically, how did the teacher implement pedagogical transformation of the knowledge-building approach in his classroom, and what were the views of the teacher on the knowledge-building approach?
(2) What characterised the nature of the Chinese learners and how did they approach 21st century learning? Specifically, was the knowledge-building approach effective for students and if so, how? And what were the views of the students about their learning using the knowledge-building approach?

Pedagogical Transformation: The Classroom Study

This article reports on a case study of knowledge-building, examining how the Chinese teacher transformed the pedagogy and integrated Western and Chinese pedagogy, taking into account sociocultural constraints and deep student understanding.

The expert teacher in this study, Mr Ho, had 10 years of teaching experience when he first started to use the knowledge-building approach in his teaching. He had a master's degree and as a graduate student, he experienced how the knowledge-building approach could work well for inquiry and learning how to learn among teachers (Chan & van Aalst, 2006). This paper reports Mr Ho's experience over several years as he sustained his work in knowledge-building, beginning with a group of Form Six students (Age 16–17), and then extending this to large groups of Form Two (Age 12–13), and Form Three (Age 13–14) students. Over the years, he worked closely with a team of researchers and teachers in developing knowledge-building in his classrooms. The students attended a school in which English was used as the medium of instruction, and they were of high–average ability. Mr Ho taught geography and his students used knowledge-building in the context of studying geography in his classes.

Year One: The Initial Success in Implementing the New Approach

Pedagogical transformation

In the first year, the teacher taught 14 Form Six students (14 male and 4 female) in a geography class. Working with the research team, Mr Ho developed an approach for implementing Western-based knowledge-building in the Chinese classroom.

Developing a collaborative classroom culture

Mr Ho prepared his students for the new learning experiences by starting with the development of a collaborative culture in the Chinese classroom. He did not merely follow the commonly used Western model of asking students to work on the computer forum directly, but developed his practice based on

the needs of these local students. Generally, students in Hong Kong are not used to expressing their views and teachers will often dismiss this as being a characteristic of Chinese learners, but Mr Ho believed students could be taught to do so. From the start, the students were guided to help each other, and he used both open-ended discussion and everyday school tasks such as asking students to present textbook readings and classroom notes as well as to ask questions.

- *Integrating online with classroom discourse.* After the initial phase, the students were introduced to Knowledge Forum, learning how to ask questions relevant to the curriculum and everyday life and to interact with each other. The Western model usually involves students working on Knowledge Forum at school, but Mr Ho had students work on the Forum as homework instead of practicing essays. Often teachers in Hong Kong feel that they do not have enough time to teach and thus avoid innovation; Mr Ho juxtaposed homework with discussion while addressing the problem of the packed syllabus in Hong Kong.
- *Deepening knowledge-building discourse.* Mr Ho was not satisfied with the surface form of using computers; he was concerned with helping students to engage in deep learning. As the number of notes increased in the computer database, the teacher worked with students identifying key themes and questions that need further inquiry. Mr Ho used a pedagogical strategy commonly used in Hong Kong to help develop deep inquiry on Knowledge Forum: students were asked to be 'view managers' (group leaders) looking after the forum discussion. The idea of agency and ownership was developed in the context of Chinese pedagogy. In addition, affective dimensions of helping each other to learn were emphasised in developing community learning in the Chinese context.
- *Aligning assessment with knowledge-building.* As assessment is pivotal in the Hong Kong classroom, Mr Ho capitalised on this and made assessment a central part of his pedagogical transformation. As part of school grades, students were asked to submit a portfolio, in which they identified the best instances of knowledge-building examples in the database. To help students identify their best work, students were provided with a set of cognitive knowledge-building principles (e.g. progressive problem solving). In this way, the teacher combined sophisticated notions of self and peer assessments and cognitive principles with the school grades used in the Hong Kong classroom.

This theme of transformed pedagogy juxtaposing Chinese and Western pedagogy became even clearer as students moved to Form Seven (Age 17–18). These students continued with Knowledge Forum, though with lower frequency and intensity. While engaging students with Knowledge Forum, Mr Ho also employed drills and practice to prepare them for the Advanced Level examination. Interestingly, he did not see that open inquiry on Knowledge Forum would conflict with drilling to help students to prepare for the examination.

Effects on student learning

Evaluations were conducted to determine whether or not the transformed pedagogical approach was effective for the Chinese learners. First, the author examined whether and to what extent the Chinese learners participated and whether they collaborated with others in the discussion forum. The descriptive database usage indicated a good level of participation and collaboration: over a period of five months, students wrote an average of 59 notes, read 66% of the notes, and 86% of the notes were linked to other notes in the discussion database. These figures indicate that students were actively involved and were interacting with each other. In addition, the author examined student growth over time and divided the semester into two equal periods. Analyses using paired t-tests indicated that there were significant increases from Periods 1–2 in the number of notes written, t (13) = 4.2, $p < 0.01$, and in the percentage of linked notes, t (13) = 3.6, $p < 0.04$.

Second, the same pattern was observed in examining the quality of the student questions written in the discussion forum. Question-asking was examined because it is an important skill for developing learning how to learn. Paired t-tests showed significant differences from Periods 1–2 in the frequency of high-level explanation-based questions, t (13) = 3.8, $p < 0.03$. These results suggest that when students were engaged in knowledge-building, they gradually moved towards asking better and deeper questions.

Third, we examined the relations between students' engagement in knowledge-building discussion and the learning outcomes. The results showed that students' essay writing scores were significantly correlated with reflective portfolios ($r = 0.67$, $p < 0.05$) and high-level explanation-based questions ($r = 0.53$, $p < 0.05$) on Knowledge Forum, controlling for students' academic achievement based on their public examination results (i.e. Hong Kong Certificate in Education Examination). Taken together, these results suggest that students actively engaged in collaboration on the Forum; they interacted more with each other and asked better questions over time, and those students who participated more deeply on Knowledge Forum also learned more.

There are longer term effects on student learning. This group of Form Six students took the Advanced Level Examination one year later after working with Knowledge Forum. The pass rate for this group of students was 92%, the highest pass rate for students of Humanities subjects in the school and comparatively higher than other cohorts in earlier years from that school.

Year Two: Learning from Unsuccessful Experience

After a successful initial attempt, Mr Ho set out to implement Knowledge Forum with his Form Two students. He taught four Form Two classes comprising about 160 students. Year 2 results were included to show how an expert teacher reflected on the obstacles and difficulties. He started with the same four-phase model, but over time, he found that the student writing was shallow. For instance, some students would ask a question 'What is a landslide?' and other students would simply find some definitions from the textbook to use as the answer, and the inquiry was considered completed.

Similarly another student might ask a question, 'What are the ways to prevent pollution?', and some would find a paragraph in the textbook and copy the information in the reply note. Students merely used a copy and paste approach and then moved on to other questions instead of engaging in deep inquiry. Unlike the Form Six students, lower form students predominantly relied on textbooks and they generally considered writing on the Forum as merely a matter of finding the correct answers.

However, instead of considering the approach as unsuitable for junior form Chinese students, Mr Ho used this experience as part of learning in using Western-based pedagogy in the Chinese context. He examined the database and discussed with the students, identifying the problems and difficulties. He tried to learn from what had gone wrong – primarily, the topics and views were structured according to topics in the textbook. Typically, textbooks in Hong Kong have many short chapters with fragmented topics, a problem that is usually not found in the West because the curriculum there is much less textbook-bound.

There was no systematic student evaluation in Year 2, but the somewhat unsuccessful experience was pivotal to Mr Ho's growth. Instead of copying the Western approach wholesale or rejecting the approach, Mr Lee reflected upon the nature of the approach and the context of Hong Kong education. His efforts to recognise problems and to redesign the curriculum indicated how an effective teacher needs to reflect. He portrayed the model of a teacher as learner seeking to inquire, to learn, and to improve on existing practice. Moreover, he also showed how a knowledge-building teacher in the Chinese context can address contextual constraints and student needs in redesigning the curriculum.

Year Three – Moving Beyond Constraints with Pedagogical Transformation

Using his experience from Year 2, Mr Lee improved on his instructional design. In Year 3, he taught four classes of Form Three students using the four-phase model with various improvements.

Pedagogical transformation

More sophistication was shown as the teacher employed different tactics and seemingly contradictory approaches integrating Chinese and Western approaches.

- 'Big ideas' AND textbook chapters. To tackle the problem of the textbook, Mr Ho redesigned the curriculum. He pooled the 26 chapters of the textbook and integrated them under a key question called 'How to look after the world' with three major themes – 'Ocean in Trouble', 'Tropical Rainforest' and 'Rich and Poor' and posed them as 'discussion questions' on Knowledge Forum. Students could refer to the information in different textbook chapters and other resources. In restructuring the curriculum, Mr Ho was attempting to circumvent the problem of the fragmented textbook and demonstrated how inquiry-based learning and the textbook may be combined for effective learning.

- 'Rise above' AND structured discussion. To deal with the problem of superficial and unsustained discussion, Mr Ho made use of 'rise-above' views and 'rise-above' notes to reorganise students' different ideas and themes of questions. The teacher employed both the Western idea of open inquiry and the Chinese idea of 'structure' to help students work better on their collaborative discussion. At times he assigned the more capable students as leaders to take charge of these rise-above notes and views. Rather than merely following the Western model of emerging threads, the teacher skilfully blended the emphasis on 'structure' in Chinese pedagogy with the emergent inquiry of the Western model.
- 'Knowledge-building portfolio assessment' AND examination grade. Another key design component was deepening and strengthening the use of assessment and aligning it with the school context. The teacher fine-tuned the design of Analytic Toolkit (a software for tracking student participation on Knowledge Forum) for both self-assessment and grades. In addition, he improved on the portfolio design: students were asked to submit the 'knowledge-building' portfolio, a sophisticated cognitive design for capturing knowledge-building (Lee *et al.*, 2006; van Aalst & Chan, 2007), and he tried out different designs in different classrooms. He examined how assessment can be used for both deep cognitive purposes employing knowledge-building principles and making the assessment approach relevant to students' emphasis on grades. Mr Ho combined sophisticated cognitive assessment with everyday classroom tasks in the Chinese classroom.

Effects on student learning

Evaluation was conducted to examine the role of the transformed approach (for details of analyses, see Lee *et al.*, 2006). I summarise the key findings as background to illustrate the role of the transformed pedagogy.

In Year 3, students were grouped into four classes: (1) No Knowledge Forum; (2) Knowledge Forum only; (3) Knowledge Forum with peer assessment; and (4) Knowledge Forum with peer assessment guided by principles. The design was intended to assess whether it was the novelty of the computer or the transformed pedagogical designs that led to improved learning. First, the author examined students' participation and collaboration scores on Knowledge Forum. The results showed that the students who were supported by the transformed knowledge-building pedagogy outperformed the other classes who just wrote notes on Knowledge Forum. They also asked deeper and better questions than their counterparts. Second, in terms of learning outcomes, students working with the transformed approach with principles outperformed their counterparts in essay writing, controlling for prior academic achievements. Third, as with Study 1, students with more engagement and deeper reflection on the Forum performed better in essay writing, controlling for academic achievements. Primarily, it was not just the use of the computer forum, but how the teacher adapted the transformed approach taking into account student cognitive level and contextual influences that made the differences.

Views of Learning among Chinese Learners and Chinese Teachers

The students' and teachers' views about teaching and learning were also examined. Focus group interviews for students were conducted at the end of each year to examine their views on, and practices in, using knowledge-building and Knowledge Forum. Analyses of teachers' and students' views illustrate several interesting dimensions reflecting teaching and learning for Chinese learners.

Learning to learn

When asked why they would use Knowledge Forum, one Form Six student said:

> After the lessons we will have some questions on the topic that we learned and we will continue the discussion after school . . . Sometimes there will be some interesting topics that are very debatable . . . and we would really like to . . . um . . . and we have the . . . incentive to continue the discussion. However, the lesson time is short and it does not allow us to continue because one lesson only lasts for 40 minutes, but it is not enough . . . So we will continue our discussion on Knowledge Forum that night and *many of us will sit in front of the computer and do it together*, but we are sitting in different places. (Excerpt #1)

Whereas most considered that Chinese learners did not like to express their views and prefer to work individually, this student suggested how they could learn independently and collaboratively after school. Teachers in Hong Kong are often concerned with the tight syllabus, and the student noted the problem, but pointed out how they could still learn on their own together after school. The idea of learning together was shown in another excerpt. One student said:

> When working on Knowledge Forum, we can discuss things that *we need to know or we want to know*. It is like conversation, but it is also working. It is *learning in group* because *everyone can raise his opinions and his ideas.* (Excerpt #2)

Using the transformed knowledge-building approach appeared to help students to develop learning how to learn strategies – one student noted what he had learned (i.e. linking topics, asking questions, concept maps) and how he could transfer the use of strategies to other contexts. He said:

> From this year of learning geography, I learn . . . useful way to study such as linking topics together, useful discussion by asking more questions, and further learning using concept mapping. Our teacher, Mr Ho, forced us to think a lot in class. I also used these skills in other subjects. For example, in History, one time, teacher asked us to do group discussion about USA and USSR and Cuban Missile Crisis. Now we all asked a lot of questions before making our own opinions on this question. When I am reading newspaper especially international news, I always asked myself why this or that happens . . . (Excerpt #3)

These excerpts suggest that the students seemed to be moving towards more sophisticated notions of learning. Even though many consider Chinese learners as surface and rote learners, when provided with appropriate instructional support, the students in the study were able to develop in different directions towards learning how to learn as advocated in educational reforms.

Intertwined views of learning

While these students seemed to be shifting towards new ideas about learning, the picture is more complex. Another interesting theme that emerged from the interviews is the intertwined views of Chinese and Western ways of learning – students connected the inquiry-based learning of Knowledge Forum with preparation for the examination. When asked how he felt about Knowledge Forum, one student said:

> Because of Knowledge Forum, I think I really study geography. I think you can say that I will keep on having some revision at least once a week on geography because once you are working on the Forum, you will need to read some notes first. Because if you don't read the notes, you will not have any ideas so you cannot type any notes. You need to know something first and then you can elaborate or collaborate with others and you can draw another conclusion or summary. So you need to read something first. (Excerpt #4)

Another student made the connection between collaboration on Knowledge Forum and preparation for the examination even more explicit. She discussed her views as follows:

> Knowledge Forum is time consuming but it is valuable to use this time ... because *it can help with our revision*. During the process we can learn much more with Knowledge Forum. *For example, if we just have individual learning by ourselves, we can only read the teacher notes, that way we must have some missing points but all the classmates adding up (laughing) and working together, then now there are 14 people and 14 brains must be better than one brain*. (Excerpt #5)

Whereas collaboration is seen in Western-based pedagogy as a way to deepen inquiry, these Chinese students developed interesting ways of integrating new and existing ideas – they viewed discussion on the Forum as a way to help them in their revision and preparation for the examination. Such a phenomenon is unlikely to be observed among Western students; these different, if not contradictory, concepts were juxtaposed by the Chinese learners.

Didactic constructivism and transformed pedagogy

Mr Ho also showed growth over the years as he learned from both successful and unsuccessful experiences. Although many believe in a dichotomy between student-centred and teacher-centred approaches, Mr Ho's approach was somewhat mixed in that he considered the importance of both open inquiry and practice for examination outcomes; he was both didactic and constructivist. As one of his students said 'Mr Ho forced us to think a lot in class'. In the interview, Mr Ho said:

> I look at Knowledge Forum as a source of improving the *learning process*, but I also believe that it will help to improve the *product* finally. By product I mean the Advanced Level examination or final school examination. I can use Knowledge Forum to check my students' progress; I can check their type of questions, their explanations, their theories or the linkages. I can find out if there is some improvement, or if they are following the lesson or whatever. I can see how well they can learn all these things. (Excerpt #6)

When asked how he viewed the approach of knowledge-building, it was interesting to note the hybrid approach that he used. He said:

> It is not adequate just to use the knowledge-building approach. I also use drill and practice with examination papers to help students learn. As they are doing much with Knowledge Forum in Form 6, I continued with practice exam papers for preparation for their A-Level examination. But the deep understanding they have derived when they are engaged in knowledge-building would be important for them to remember and recall the information for the examination. (Excerpt #7)

Mr Ho's idea that Knowledge Forum might help the students with their examination resonated well with the students' views about how they combined discussion on Knowledge Forum with revision for the examination. The Chinese learners and teacher used a hybrid and transformed approach well suited to the cognitive and contextual demands of learning in the Chinese context.

There are also other long term benefits and effects: earlier we noted that the Form Six students had good public examination results. The teacher is currently continuing with his innovation of transformed pedagogy with his students in different grades. Furthermore, Mr Ho has emerged as a teacher leader helping other teachers in his school and other teachers interested in understanding the use of knowledge-building in the classroom. These developments suggest that the teacher is sustaining the practice. In addition, the locally developed 'knowledge-building portfolio' artefact developed over these years by the teacher and research team has led to international recognition (i.e. A best research paper in a conference on Computer Supported Collaborative Learning, and a most usable research award in Learning Sciences, 2006). The ingenuity of designing knowledge-building integrating both Chinese and Western wisdom might have been responsible for these positive results.

Discussion

This paper addressed the question of teaching and learning for the 21st century Chinese learner in the light of changing educational contexts and reforms in the knowledge era. The notion of the Chinese learner has attracted much attention, and research has shown complex and nuanced aspects such as the intertwined process of memorisation-understanding (Marton *et al.*, 1997, 2005) influenced by cultural and contextual factors (Watkins & Biggs, 1996, 2001). This study provides a detailed analysis of how an expert teacher developed a pedagogical transformation of the knowledge-building approach to scaffold student inquiry and collaboration in the Chinese context. Various

issues and implications for understanding the Chinese learner of the 21st century are now discussed.

The Chinese Learner – transcending the dichotomy of learning approaches

How can we characterise the nature of the Chinese learner in the light of changing educational goals? This study showed that the Chinese students were able to adopt new goals and new strategies with new perceived task demands. The findings showed that the students participated actively in Knowledge Forum, and collaborated with one another; they improved in their participation and collaboration over time; and there was also some evidence of gains in subject-related understanding compared to students not using the transformed knowledge-building approach. We also found students were not just learning specific knowledge; student interviews suggested that they used learning to learn strategies and that they could use what they learned in other contexts. Contrary to common belief that Chinese students are rote and surface learners, when instruction was appropriately gauged to students' levels, the Chinese learners in the study could be constructivist learners engaging in learning how to learn. This study is consistent with earlier research on roles of constructivist approaches to student learning, given consideration of student cognition and contextual dynamics (Biggs, 1996a; Chan, 2001; Chan & Rao, in press).

This study also showed new emerging views of conceptions of learning among the Chinese learners with the changing educational context. Earlier studies tended to focus on the analyses of memorisation and understanding; the notion of collaboration is usually not considered when examining student views of learning. Learning with the transformed approach, these Chinese students collaborated well, as evidenced by their participation on Knowledge Forum and their changing views of learning. Through working together on Knowledge Forum, the students also developed more sophisticated notions about learning that align well with the new educational goals advocated in the current reforms. These findings support Biggs' notion that Chinese learners are highly adaptive and attuned to contextual demands. The changing educational goals and contexts will provide important opportunities for expanding the nature and dynamics of learning for the Chinese learner.

More importantly, this study shows that when this innovative approach was used, these Chinese students often used a hybrid approach encompassing different notions of learning. Specifically, they juxtaposed discussion and collaboration with preparation for the examination. For example, some discussed how working on the Forum helped them with revision as they had to revisit the materials; and how they needed to know something before they could discuss; some even said that if they studied on their own, they would miss some points for the examination, but now when working together on the forum, they were able to gather more points for the examination. In the West, knowledge-building is designed for inquiry and collaboration, but in the Chinese classroom, students aligned inquiry with revision and they inter-preted collaboration in the context of examinations.

Just as memorisation and understanding are intertwined, when learning how to learn, the Chinese students viewed metacognition and collaboration as

useful strategies to help them remember and prepare for the examination.
These findings suggest that learning needs to be considered in relation to
cultural, psychological and contextual influences (Biggs, 1996a, 1996b). The
Chinese learners in this study dealt with contextual tensions via integrating
different notions and approaches. Deep learners in the Chinese context do not
necessarily use deep approaches in the same sense as in the West but create the
kinds of approaches that help them make meaning in their context and
community. Consistent with Biggs' criticisms of Western misperceptions
(Biggs, 1996a, 1996b), the Chinese students seemed to blur and transcend
the dichotomy: the polarised distinctions of surface versus deep approach,
memorisation versus understanding, and individual versus collaboration in
the West was much more of an intertwined process among the Chinese
learners. They were attuned to contextual demands and employed approaches
to learning that they could make the most meaning to them.

Teaching the Chinese Learner – transformation of pedagogy

This study also illuminates how teachers could design pedagogy for
helping students develop inquiry and collaboration in the Chinese classroom.
The expert teacher used a transformed pedagogy: he did not just copy the
Western model, but he transformed it in ways that made it work given student
cognition level and contextual dynamics. Emphasis was given to deeper
notions of learning, not just the mere form of following a Western approach to
learning. Specifically, the teacher first initiated students into a collaborative
learning culture using common Hong Kong classroom tasks to help students
engage in discussion; he addressed the problem of time constraints using the
innovation rather than making it another 'add-on' component; he adopted the
open inquiry approach, but improved on it by combining it with a structured
way of conducting 'rise-above' discussion. Learning from failure, he reconfi-
gured the use of the textbook so that students could engage in open inquiry
while relating inquiry to the textbook and curriculum guidelines. He
combined an advanced cognitive approach, using 'knowledge-building'
portfolio assessments, with school grades usually emphasised by students in
the Chinese classroom. The expert teacher used seemingly contradictory
approaches, transforming the pedagogy in ways that made learning effective.

The study also shows that Chinese teachers' conceptions of teaching can
encompass different and varied notions. As the teacher noted, he emphasised
both process and product, using both open inquiry and drill and practice.
Whereas there is a general dichotomy between student versus teacher
centredness, Mr Ho had a more nuanced and sophisticated version: he used
both teacher-directed and student-centred approaches in his pedagogy; he
designed the environments in ways he saw most useful to engage students so
that they could grow as independent learners; he helped students to move
towards a high level of cognitive and collaborative processing; he was both
didactic and constructivist. Various structures were developed to help
students engage in deep processing. He carefully structured and designed
the learning environment so that students could take control.

Similar to the Chinese learners who transcended dichotomy in learning
approaches, the Chinese teacher went beyond merely using a student-centred

or teacher-centred approach. Moreover, the transformed pedagogy was not just a combination of different tactics, but was a pedagogy that took into careful consideration student understanding, classroom structure, and contextual demands. For any innovation to succeed, there needs to be a careful consideration of cultural and contextual influences. The effective Chinese teachers of the 21st century are those who engage themselves in learning how to make the transformation. The implementation of innovation may manifest itself in different forms in the West and the East, but its essence of focusing on student understanding transcends culture: teachers from different cultures may use different approaches for achieving these deep learning goals.

While the emphasis of this study is to identify distinctive patterns about the Chinese learner and Chinese teacher, the results also reveal general patterns and principles of good teaching and learning. Good teaching is about making the best use of contextual information and dynamics and aligning pedagogy and innovation with cultural contexts and conditions. The account of knowledge-building among the Chinese teacher and students in the study shows how knowledge-building can take place in the Chinese context; at the same time, it also illustrates the importance of how innovations can take place in different systems; how ingenious teachers can make use of social infra-structures and contextual dynamics working within constraints in creating new learning.

In conclusion, this study explored the question of how to characterise the Chinese learner and Chinese teacher in the light of changing educational contexts and found that when provided with the appropriate learning context, Chinese students can shift to new modes of learning that align with new educational goals. Teaching for new education goals involves using a transformed pedagogy, incorporating different dimensions, as teachers attend to deep understanding of curriculum, student cognitive level, and socio-cultural constraints. Chinese learners are well attuned to contextual demands, and thus learning is more of an intertwined process that transcends the polarised distinctions of surface versus deep, memorisation versus understanding, and individual versus collaboration.

This study of a transformed pedagogy of knowledge-building shows a possible new education model for developing learning how to learn among Chinese learners and illustrates the importance of examining cultural and contextual influences in understanding the Chinese learner. Although the study is about Chinese learners, the notion of transformed pedagogy and evolutionary practice is relevant for teachers in different parts of the world facing the challenges of educational reforms and innovation.

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