**Master of Education**

# MEDD 7108

# Fostering 21st Century Skills with Knowledge Building (2014-15)

## Overview
This module is core to the M. Ed. specialism <u>Designing Powerful Learning Environments (DPLE)</u>, offered by the Faculty of Education, University of Hong Kong. The module presents one of the main models produced by this field, knowledge building, and then analyzes it from several angles.

The module is organized in such a way so as to provide an experiential process for participants to learn about the main ideas of knowledge building, to implement aspects of it, and to take a critical stance toward it.

## Aims
The module has three overarching aims, which also are the aims of the specialism:
- Enabling students to develop competence in locating and understanding research on learning
- Enabling students to develop competence in analyzing learning
- Enabling students to develop competence in designing and evaluating learning environments

## Pre-requisites and Co-requisites
There is no pre-requisites or co-requisite for this module.

## Module Learning Outcomes (MLO)

| MLO No. | MLO Statement | Assessment Task |
|---|---|---|
| 1 | Knowledge and understanding of main concepts, results, and methods of knowledge building. | 1, 2, 3 |
| 2 | More advanced ability to gather and analyze evidence on learning in a personally relevant learning context, building on MLO2 of MEDD 6201. | 1, 2 |
| 3 | More advanced ability to implement ideas from the module in the design of learning experiences, building on MLO3 of MEDD 6201. | 1, 2 |
| 4 | Beginning ability to participate and analyze knowledge building | 3 |

These <u>Module Learning Outcomes</u> integrate aspects of three of the <u>Specialism Outcomes</u>:
- Understand the learning sciences as a field and a foundation for educational design
- Ability to locate and evaluate research relevant to a question, and design a research investigation of design study
- Ability to conceive, plan, carry out, and evaluate educational designs

The Specialism Learning Outcomes are addressed in each core module (MEDD 6201, MEDD 6202, MEDD 6203, MEDD 7108 and MEDD 6014), and the level to which students are expected to demonstrate the outcomes improves each semester. This module covers only three of them, and the Module Learning Outcomes target the ways to demonstrate them.

The specialism and modules also address the <u>University Educational Aims</u> and 21st century skills through the work students do in class and in professional contexts:
1. Pursuit of academic/professional excellence, critical intellectual inquiry, lifelong learning
2. Tackling novel situations and ill-defined problems

3. Critical self-reflection, greater understanding of others, and upholding personal and professional ethics
4. Intercultural understanding and global citizenship
5. Leadership and advocacy for the improvement of the human condition

## Module Facilitator

Professor Carol K. K. Chan, ckkchan@hku.hk

## Structure

The module is based on 10 sessions of 2.4 hours duration each, totaling 24 hours as well as an additional 80 hours of additional study time, to be spent on reading, group work, self-directed study, preparation and assessments. All sessions are on Thursdays from 18:00 to 20:30.

Details about the due dates for the assignments will be provided at the first session, but final papers will be due before the commencement of the second semester (around the middle of January).

| *Schedule* |
|---|

| | **January 22, 2015** |
|---|---|
| *Session 1* | **Introduction; Expertise as a Process** |
| | We begin by examining the question, "Who is an expert?" The argument underlying knowledge building is that expertise is not an end state but a process, and that students can learn the skills necessary for participating in this process. The argument turns the purpose of education on its head, and claims that students need to go beyond "learning" what others in their culture already know to learning how to create new knowledge. This goal has become increasingly important in the 21st century. |
| | ➔ The need to shift more agency from the teacher to students |
| | ➔ The need for creativity—going beyond learning |
| | ➔ An example: Expert-like versus inexpert learning to play music |
| | ➔ Other examples from students' own experience |
| | ➔ Module overview |
| | **Activities** |
| | - Introduction: Teacher ABC models, and challenging existing classroom teaching |
| | - Provide definition of knowledge building |
| | - Brief lecture on the music learning example, and draw from student's own examples of knowledge building |
| | - Introduction to Knowledge Forum® |
| | **Resources** |
| | • Bereiter, C., & Scardamalia, M. (1993). *Surpassing ourselves: An inquiry into the nature and implications of expertise* (chap. 6). Chicago: Open Court. |

**January 29, 2014, 18:00 to 20:30**
**Revisiting Metacognition and Learning Communities**
Teachers frequently express the opinion that only their best students are metacognitive. There is something to that, as metacognition is a powerful learning mechanism that can regulate learning. But this does not mean that lower-performing students are unable to learn metacognitive learning strategies and enhance their learning. This session looks at the evidence in support of metacognitive strategies for students of different achievement levels.

➔ Review of metacognition
➔ A case – inquiry learning for all students
➔ Fostering Communities of Learners and Mathematical discourse communities
➔ Other evidence

**Activities**
- Lecture based on White and Fredriksen study to examine results for students with different achievement levels
- Examining FCL
- Exploring results from Hong Kong
- Knowledge Forum

**Resources**
- Bielaczyc, K., & Collins, A. (1999). Learning communities in classrooms: A reconceptualization of educational practice. In C. M. Reigeluth (Ed.), *Instructional design theories and models, Vol II* (pp. 269-292). Mahwah, NJ: Lawrence Erlbaum Associates.
- White, B. Y., & Frederiksen, J. (1998). Inquiry, modeling, and metacognition: Making science accessible to all students. *Cognition and Instruction, 16*, 1-118.

**February 5, 2015, 18:00 to 20:30**
**Knowledge Building Theory and Principles**

➔ Knowledge building explained (CHLS chap. 20)
➔ Linking knowledge building to expertise and metacognition

**Activities**
- Explanation of the theory, KB principles, KBTN
- Teacher sharing

**Resources**
- Scardamalia, M. (2002). Collective cognitive responsibility for the advancement of knowledge. In B. Smith (Ed.), *Liberal education in a knowledge society* (pp. 67-98). Chicago, IL: Open Court.
- Chan, C. K. K. (2013). Collaborative knowledge building: Towards a knowledge creation perspective. In. C. E. Hmelo-Silver, C. A. Chin, C. K. K. Chan, & A. O'Donnell (Eds.). *The international handbook of collaborative learning* (pp. 437-461). New York; Routledge.

**February 12, 2015, 18:00 to 20:30**
**Knowledge Building II: Examples**
This session continues our exploration of knowledge building, especially implementations in the Asia-Pacific region.

➔ Primary education
➔ Secondary education
➔ Higher educatin

**Activities**
- Brief lecture on the Zhang et al. (2007) study
- Unpacking some other studies
- Teacher's sharing
- Knowledge Forum

**Resources**

- Chan, C. K. K., & Lam, I. C. K. (2010). Conceptual change and epistemic growth through reflective assessment in computer-supported knowledge building. In K. Gomez, L. Lyons & J. Radinsky (Eds.), *Learning in the disciplines: Proceedings of the 9th International Conference of the Learning Sciences* (Vol. 1, pp. 1063-1070). Chicago: ISLS.
- Lin, F., Chan, C. K. K., & van Aalst, J. (in press, 2014). Improving 5th graders' epistemic and conceptual understanding in an epistemic-enriched knowledge-building environment. Proc. 11th Int. Conf. Learning Sciences, Boulder CO.
- Van Aalst, J., & Truong, M. S. (2011). Promoting knowledge-creation discourse in an Asian Primary Five classroom: Results from an inquiry into life cycles. *International Journal of Science Education, 33*, 487-515.
- Zhang, J., Scardamalia, M., Lamon, M., Messina, R., & Reeve, R. (2007). Socio-cognitive dynamics of knowledge building in the work of 9- and 10-year-olds. *Educational Technology Research & Development, 55*, 117-145.
- Zhao, K., & Chan, C. K. K. (2014). Fostering collective and individual learning through knowledge building. *International Journal of Computer-Supported Collaborative Learning, 9*, 63-95.

**February 26, 2015, 18:00 to 20:30**
**Online Discourse in Knowledge Building**
Online discourse is an essential feature of knowledge building. This session examines its characteristics and strategies for promoting knowledge building

➔ Knowledge building vs. knowledge sharing and argumentation
➔ Common discourse patterns

**Activities**
- Examine your own classroom discourse techniques
- Examine different approaches to creating a collaborative discourse community
- Explore different approaches in your own teaching
- Knowledge Forum

**Resources**

- Extracts from Fu, E. L. F. (2014). Characterizing the discourse patterns of collaborative knowledge building. Unpublished Ph. D. dissertation, the University of Hong Kong.
- Van Aalst, J. (2009). Distinguishing knowledge sharing, construction, and creation discourses. *International Journal of Computer-Supported Collaborative Learning, 4*, 259-288.
- Oshima, J., Oshima, R., & Matsuzawa, Y. (2012). Knowledge building discourse explorer: A social network analysis application for knowledge building discourse. *Educational Technology Research and Development, 60*, 903-921.
- Extracts from research of Christina Yang Yuqin.

*Session 6*

**March 5, 2015, 18:00 to 20:30**
**Pedagogical Designs for Knowledge Building**
This session explore the role of the teacher and pedagogical designs that promote knowledge building.

➔ Stages—are they necessary?
➔ Linking knowledge building to the curriculum
➔ Institutional objectives and knowledge building

**Activities**
- Introduction to these approaches
- Examine instructional materials
- Examine implications for pedagogical design
- Knowledge Forum

**Resources**
- Bielaczyc, K. (2013). Informing design research: Learning from teachers' designs of social infrastructure. *Journal of the Learning Sciences, 22*, 258-311.
- Zhang, J., Hong, H. Y., Scardamalia, M., Teo, C. L., & Morley, E. A. (2011). Sustaining knowledge building as a principle-based innovation at an elementary school. *Journal of the Learning Sciences, 20*, 262-307.
- Zhang, J., Scardamalia, M., Reeve, R., & Messina, R. (2009). Designs for collective cognitive responsibility in knowledge-building communities. *Journal of the Learning Sciences, 18*, 7-44.

*Session 7*

**March 19, 2015, 18:00 to 20:30**
**Knowledge Building and Assessment**
In this session we analyze both formative and summative in relation to knowledge building.

➔ Knowledge building and achievement
➔ Portfolio assessment
➔ Knowledge Connections Analyzer
➔ The idea mapper software

**Activities**
- Review of formative and summative assessment strategies
- Brief lecture on achievement results from knowledge building
- Exploring different assessment tools used with Knowledge Forum
- Knowledge Forum

**Resources**
- Lee, E. Y. C., Chan, C. K. K., & van Aalst, J. (2006). Students assessing their own collaborative knowlegde building. *International Journal of Computer-Supported Collaborative Learning, 1*, 277-307.
- Scardamalia, M., Bereiter, C., & Lamon, M. (1994). The CSILE Project: Trying to bring the classroom into World 3. In K. McGilly (Ed.), *Classroom lessons: Integrating cognitive theory and classroom practice* (pp. 201-228). Cambridge, MA: MIT Press.
- Sun, Y., Zhang, J., & Scardamalia, M. (2010). Knowledge building and vocabulary growth over two years, Grades 3 and 4. *Instructional Science*, 1-25.
- Van Aalst, J., & Chan, C. K. K. (2007). Student-directed assessment of knowledge building using electronic portfolios. *Journal of the Learning Sciences, 16*, 175-220.

**Session 8**

**March 26, 2015**
**Knowledge building versus learning**
In this session we return to the fundamental distinction between learning and knowledge building that was introduced in the first session, and try to understand how knowledge building could transform education.

➔ The depth of understanding that emerges from knowledge building
➔ The narrative for building new knowledge vs. the narrative for learning what has already widely been understood by others
➔ Increasing emphasis on knowledge creation in Web. 2.0 and Web. 3.0

**Activities**
- Examine the distinctiveness of knowledge building, and its limitations
- Place knowledge building in the context of formal education in the 21st century
- Knowledge Forum

**Resources**
• Various articles already studied in the core modules.

**Session 9**

**April 9, 2015, 18:00 to 20:30**
**Related Approaches**
This session briefly explores some other approaches that are similar to Bereiter and Scardamalia's model of knowledge building, and applications of its main concepts.

➔ Knowledge building using chat
➔ Knowledge-building discourse in PBL
➔ Asynchronous knowledge building in Wikipedia
➔ Epistemic agency in classroom discourse

**Activities**
- Brief lecture to explore different possibilities that may bear family resemblance to knowledge building
- Exploring some related research in CSCL and other fields

**Resources**
• Damsa, C. I., Kirschner, P. A., Andriessen, J. E. B., Erkens, G., & Sins, P. H. M. (2010). Shared epistemic agency: An empirical study of an emergent construct. *Journal of the Learning Sciences, 19*, 143-186.
• Hmelo-Silver, C. E., & Barrows, H. S. (2008). Facilitating collaborative knowledge building. *Cognition and Instruction, 26*(1), 48-94.
• Oebherst, A., Halatchliyski, Y., Kimmerle, J., & Cress, U. (2014). Knowledge construction in Wikipedia: A systemic-constructivist analysis. *Journal of the Learning Sciences*, *23*, 149-176.
• Stahl, G. (2009). *Studying virtual math teams*. New York, NY: Springer.
• Yoon, S. A., et al. (2012). Using augmented reality and knowledge-building scaffolds to improve learning in a science museum. *International Journal of Computer-Supported Collaborative Learning, 7*, 519-541.

**Session 10**

**April 16, 2015, 18:00 to 20:30**
**Summary and Future Directions**

➔ Summing up lessons learned

**Activities**
- Present emerging insights, classroom experiments

**Resources**

## Assessment Components

There are two components of assessment for this course. You are required to achieve a pass for each of these components for successful completion of this course. Your assignments must be completed by TBA, 2014. Online feedback will be provided by TBA, 2014.

*Assessment Component 1*

| Component | Title | Format | Weight | Due Date |
|---|---|---|---|---|
| 1 | **Electronic portfolio** | Individual | 30% | April 27, 2015 |

In this specialism we will use an electronic portfolio in the DPLE domain on Google to reflect on and showcase learning in each of the four core modules and MEDD 6014, using the four Specialism Learning Outcomes as a guide. In this module, students are expected to <u>create a few entries to self-assess their emerging understanding of the Specialism Learning Outcomes</u> relevant to this module. These outcomes are further articulated for this module by means of the Module Learning Outcomes.

*Assessment Component 2*

| Component | Title | Format | Weight | Due Date |
|---|---|---|---|---|
| 2 | **Paper** | Individual | 50% | May 11, 2015 |

Students are required to write a paper of 2000 to 2500 words, including references; the paper should follow APA style. Students have two options:

- Carry out a brief exploration of knowledge building in a classroom. Our understanding of knowledge building in this task is broad: it can use an environment like Knowledge Forum® or try another environment, such as blogging or a wiki, or a chat environment; it may also focus on collaborative classroom processes and not use technology. Your paper should describe what you attempted to do, how it worked out, and your suggestions for someone trying it in the future.
- Write a paper that analyzes the (technological) pedagogical content knowledge involved in some form of knowledge building or another approach from CSCL that interests you. Thus in this paper, you should write about the changes in pedagogical knowledge and knowledge about teaching with technology that are involved in knowledge building. What pedagogical knowledge would be needed for a teacher to move the class from knowledge sharing to knowledge building, and how can a teacher acquire such knowledge?

*Assessment Component 3*

| Component | Title | Format | Weight | Due Date |
|---|---|---|---|---|
| 3 | **Knowledge Building** | Collaborative or Individual | 20% | April 16, 2015 |

We put a small part of the grade on your effort and achievements in your experiential learning of knowledge building—i.e., for the knowledge advances that the class makes by means of its discourse. This is a class-level assessment unless a specific student does not contribute at a threshold level