

Teaching Portfolio

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I have a long-cherished passion for teaching from my early student-life. The formal teaching experiences I had thereafter, during my tenure as a university lecturer in computer science, greatly enriched my understanding and vision on teaching and learning processes. My latest understanding on teaching and learning are formed based on a recent experience of teaching an introductory course in computer science at McGill. Here I was able to evaluate my understanding of formal teaching methodologies achieved through several teaching development workshops.

Teaching Approach

Constructivist view: I see learning as the process of integrating the collected information into one's previous knowledge and re-structuring the previous knowledge into new ones, rather than storing the information in pieces. Therefore my role as an instructor is to – a) understand the current mental models possessed by the students and b) guide them to construct a valid and extensible mental model of a new concept. I think both traditional mediums such as lectures and participative learning tools such as group assignments can be designed to facilitate the constructive learning process of the students.

Problem based learning: I extensively use examples in my lectures, because, I believe, posing real-life example problems and gradually guiding the students towards a complete solution provides a very useful tool for learning the underlying rules as well as creating high motivation for learning. This approach is very suitable for computer science because of the availability of the low-cost and easy to use experimental tools such as programming and software tools

Nevertheless, I believe that the well-understood concepts need to be presented to the students somehow, besides letting them construct their own knowledge through problem solving. This is needed in order to help the students to tune-up with the established vocabulary that represents the well-understood concepts. In this regard, I emphasize on the order and timing of revealing new concepts so that it closely matches the process of internalizing the concept by the students.

As an example, in the introduction to computing course, before introducing some new programming structures like iterations or recursions, I presented several example problems that helped the students to realize the need for the new technique. Then I gradually revealed an example program that uses the new technique, even before going into details of the technique. This helped students to think of the underlying rules present in the example and create a mental picture of the technique. Then I presented the technique formally, which allowed the students to reinforce or rectify the mental picture they have already built. At this point, to further evaluate their own understanding, I usually asked the students to solve one more problem using the new programming structure.

Learning as a social process: I believe learning is also a social process. By engaging themselves in discussions with peers, students can rectify their misconceptions and learn about alternative viewpoints. To facilitate this social aspect of learning, I prefer the students to work in groups, especially in small tutorials and home works. I have applied these techniques when I conducted lab sessions or tutorials as a TA. Also in the larger lecture class, I often paused to let the students think over a problem and discuss their ideas with neighboring students.

Errors as an integral part of learning: Students do mistake and build misconceptions in their mind. Rather than looking at the mistakes as students' faults, I see them as a result of creating an alternative picture of the concept I presented, and I try figure out and correct the concept through discussion. Also, I believe, the mistakes sometimes allow the students to explore alternative learning routes and build a more generalized conceptual model.

Critical thinking and evolution of knowledge: One problem we often face in teaching, especially in undergraduate level, is that the students tend to accept the presented concepts as static and unchangeable truths. This gradually erodes the critical thinking attitudes inherent in human beings. To avoid this, I always try to introduce the historical evolutionary path that lead to the present concept before or at the time of presenting the concept itself. This reminds the students of the fact that the presented concept is only the current human understanding and belief, which may or may not alter with future evolution of knowledge.

Courses I would like to Teach

According to my area of expertise, I would like to teach the following undergraduate computer science courses in future –

- Operating Systems
- Computer Networks
- Systems Programming
- Network Programming
- Parallel and Distributed Computing
- Introductory courses in computer science

According to my research agenda, I would like to hold graduate courses in one or more of the following topics –

- Distributed Computing Systems
- Scalability and Fault-tolerance in Network Computing Systems
- Self-organizing Decentralized Systems/ Peer-to-Peer Systems
- Distributed Algorithms

Previous Teaching Responsibilities

Here I summarize the teaching opportunities I availed, in reverse chronological order -

- **Thesis/Project Supervision**
As a postdoctoral fellow, I assist in supervising one PhD student, Ms. Ying Qiao. I often discuss research issues and encourage her in critically analyzing different issues. I also helped her in scientific writing skills as she co-authored two papers with me. Earlier, I supervised two undergrad students Mohammad Nazmus Shakeeb and Mohammad Imrul Hasan for their final projects. I also supervised implementation of part of my PhD thesis by an undergraduate student Karim Ghouli in McGill. All these activities helped me to develop the skills necessary to manage research projects, to respond to student expectations and to inspire the students to develop critical thinking.
- **Course lecturer, Introduction to Computing, School of Computer Science, McGill University, Fall 2006 –**
This was a challenging experience in lecturing, with a big class of 120 students from a wide range of backgrounds. Although much of the materials were pre-authored, I took

the opportunity to redesign the lectures, applied innovative techniques according to my latest understanding on teaching and learning.

- **Teaching Assistant, School of Computer Science, McGill University, Winter 2003 ~ Winter 2006**, Assisted on the following courses –
 - Computer Systems and Organization (Operating Systems) – Winter 2006, Winter 2005, Fall 2004, Winter 2003
I have designed the materials for a couple of tutorials, assignment problems and grading schemes. Other responsibilities include grading assignments and exams and responding to students' problems during office hours
 - Computer Networks – Winter 2005
My responsibilities were to lead the laboratory sessions, delivering tutorials and grading
 - Network Programming – Winter 2004
 - Introduction to Computing – Summer 2003
- **Lecturer, Computer Science and Engineering, Bangladesh University of Engineering and Technology, November 1999 ~ August 2002**
My early understanding of learning and teaching management activities came from the three years I spent in teaching students in computer science major in this university. The courses I taught here include –
 - Modeling and Simulation, 4th level course
 - Structured Programming, introductory course
 - Discrete Mathematics, introductory course
 - Digital Logic Design, introductory course for electrical engineering students

Reflection

I have taken every teaching opportunity as a way of developing and experimenting new methods of teaching and rectifying my approaches through the feedbacks from students. For example, when I first applied a policy of interleaving my lectures with some exercises and peer discussion among students, a number of students, if not all, seemed not liking it. Later I realized that such an interesting approach may turn into a dull one simply because of inappropriate timing. I was not allowing the students enough time for thinking and integrating the new concepts.

Teaching Development

A lot of my latest understandings on formal teaching methodologies come from the teaching training workshops I participated in –

- **Group Management**, organized by TLSS, University of Ottawa, Nov. 2008
- **Teaching Critical Thinking**, organized by TLSS, University of Ottawa, Nov. 2008
- **Science Teaching**, conducted by Dr. Craig Nelson, Indiana University, organized by TPULSE, McGill University, August 29-31, 2006
- **Graduate Teaching**, organized by TPULSE, McGill University, January 5-6, 2005
- **Teaching Management**, Bangladesh University of Engineering and Technology, June 13-14, 2002