Yale-NUS College CTL Teaching Portfolio Workshop

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The Yale-NUS College Centre for Teaching and Learning (CTL) seeks to foster excellence in teaching, technology application and course design within the Yale-NUS College community and promote discussions and collaborations amongst the faculty in these areas.
CTL Service & Programming

- **Consultations**: classroom observations, course design; effective office hours; crafting assessments; managing students; advising techniques; teaching culturally diverse students; technology and teaching options; and more

- **Check out our website for the latest information and great resources**: [http://teaching.yale-nus.edu.sg](http://teaching.yale-nus.edu.sg)

- **Teaching Innovation grants**: Please email us or discuss your latest ideas - we can help you get funding for developing, implementing, assessing or presenting a new teaching innovation, or developing a collaboration for course development.

- **Upcoming events** - Lucas Swineford (Yale) “Digital Education Landscape” - Thursday 5:00PM Saga Lecture Theatre; April workshops (TBA),

- **STEM Innovation conference** - [http://steminnovation.sg](http://steminnovation.sg)
“REFLECTIVE AND INTEGRATIVE PRACTICE”

• PHILOSOPHY / THEORY OF TEACHING AND LEARNING

• INPUTS FOR TEACHING PHILOSOPHY

• TEACHING PERSPECTIVES INVENTORY

• YOUR TEACHING PRACTICE
  • TEACHING PRACTICE INVENTORY
  • EXAMPLES OF YOUR “PRACTICE”
  • HOW DO STUDENTS KNOW YOUR PHILOSOPHY?
  • HOW DO YOU KNOW WHETHER THEY ARE LEARNING?

• REFLECTIVE AND INTEGRATIVE - GROWTH

• YOUR FUTURE PLANS
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ADULT LEARNING THEORIES

Andragogy and pedagogy: Knowles views and related learning models

Towards the end of the twentieth century, there was a body of research that suggested that adults learn differently from children and that “andragogy” was a better term for this process than “pedagogy”. The key difference between adults and children is said to be that adults are differently motivated to learn. Although the arguments no longer seem quite so clear, the line described by Knowles (Knowles et al. 2005) was that adult learners differ from child learners in six respects:

(1) The need to know (Why do I need to know this?)
(2) The learners’ self-concept (I am responsible for my own decisions)
(3) The role of the learners’ experiences (I have experiences which I value, and you should respect)
(4) Readiness to learn (I need to learn because my circumstances are changing)
(5) Orientation to learning (Learning will help me deal with the situation in which I find myself)
(6) Motivation (I learn because I want to)

from Taylor and Hamdy, 2013
ADULT LEARNING THEORIES

Concrete experience (FEELING)

Testing implications of concepts in new situations (DOING)

Observations and reflections (WATCHING)

Formalisation of abstract concepts and generalisations (THINKING)

Figure 1. The Kolb Cycle after (Kolb 1984).

from Taylor and Hamdy, 2013
Figure 2. Bloom’s taxonomy, after Atherton (2011).

from Taylor and Hamdy, 2013
Figure 5. A proposed model of adult learning.

from Taylor and Hamdy, 2013
Most new faculty waste a lot of time on teaching today and next week, helping you avoid that.

Lots of time preparing lectures: details of content (studying in depth), delivery, notes, worrying about avoiding student conflict,...

little difference to student learning

seven principles of learning (from research)

~90% of what matters

from C. Wieman  CWSEI “Science of Learning”
SEVEN PRINCIPLES OF LEARNING

Principle of learning #1-- all learning involves connecting up with and building on prior thinking and knowledge base

to teach effectively-- must find out student prior thinking and connect with it.

from C. Wieman  CWSEI “Science of Learning”
Principle of learning #2  Motivation to learn is essential. Is necessary element of teaching.

Learning is inherently hard work.
Requires changing brain, much like muscle development.
Demands strenuous extended effort. Humans will not do without motivation.

from C. Wieman  CWSEI “Science of Learning”
Principle #3 -- engagement. People must think hard about a subject to learn it.

(and problems or questions can be quite ambiguous without any clear correct answer to be engaging--often best)

Unless brain is thinking hard about topic, not building proteins and putting them together to form long term memory.

from C. Wieman  CWSEI “Science of Learning”
SEVEN PRINCIPLES OF LEARNING

Principle of learning #4 Need effective feedback—Guidance that shapes thinking and learning.

Essential elements of effective feedback
a. **timely**—when still thinking about subject, not after midterm 3 weeks after topic was finished.

b. **specific**—not just right or wrong, but why right or why wrong. Guidance (“coaching”) how to think about better. Requires knowing what person is thinking!

measuring student thinking & mastery to then provide timely specific feedback= “formative assessment”

from C. Wieman  CWSEI “Science of Learning”
Principle of learning #5  Expert thinking involves more than knowing information, is also how information is organized, applied, and learned.

Develops only with active and explicit construction to change how brain is “wired”.

To teach, provide tasks that require practicing expert-like thinking—recognizing patterns, modeling, making connections, organizing information around concepts, transfer to new situations, ...

from C. Wieman  CWSEI “Science of Learning”
SEVEN PRINCIPLES OF LEARNING

Principle of Learning #6  Part of memory that remembers and process ideas on short times scales extremely limited capacity! More loaded down, less well it processes, less learned.

Maximum capacity 4-7 separate items. Beyond that can’t remember or process.

from C. Wieman  CWSEI “Science of Learning”
SEVEN PRINCIPLES OF LEARNING

Principle of learning #7 Requirements for retention well established.

1. Spaced, repeated retrieval and application (“testing”/using)

2. Multiple associations (“hooks”) with stuff in long term memory (more the better, “useful” associations--expertise)

from C. Wieman  CWSEI “Science of Learning”
SEVEN PRINCIPLES OF LEARNING

Principles of learning:

#1 -- all learning involves connecting up with and building on prior thinking and knowledge base

#2 Motivation to learn is essential. Is necessary element of teaching.

#3 -- engagement. People must think hard about a subject to learn it.

#4 Need effective feedback--Guidance that shapes thinking and learning.

#5 Expert thinking involves more than knowing information, is also how information is organized, applied, and learned.

#6 Working memory extremely limited capacity!
More demands on it, less learned.

#7 Retention by spaced repeated retrieval & multiple associations anything missing?

from C. Wieman  CWSEI “Science of Learning”
CREATING A “LIMINAL SPACE” IN YOUR CLASSROOM

“Our schools are generally still organized around answers rather than questions.”

Professor Michael Wesch
2008 CASE Carnegie US Professor of the Year

from Kathy Takayama, Columbia
CREATING A “LIMINAL SPACE” IN YOUR CLASSROOM

High impact practices for student learning: authentic, experiential learning

But authenticity requires engagement with uncertainty; uncharted paths; a focus on questions rather than answers.

from Kathy Takayama, Columbia
CREATING A “LIMINAL SPACE” IN YOUR CLASSROOM

Knowing is the position of realizing and producing epistemological gaps (Barnett 2004).

- such knowing produces uncertainty

from Kathy Takayama, Columbia
Creating a “liminal space” in your classroom:

Threshold concepts

Liminal states
Meyer and Land (2006, p.22) suggest that learning involves the occupation of a liminal space during the process of mastery of a threshold concept. This space is likened to that which adolescents inhabit: not yet adults; not quite children. It is an unstable space in which the learner may oscillate between old and emergent understandings just as adolescents often move between adult-like and child-like responses to their transitional status. But once a learner enters this liminal space, she is engaged with the project of mastery unlike the learner who remains in a state of pre-liminality in which understandings are at best vague.
CREATING A "LIMINAL SPACE" IN YOUR CLASSROOM

Curriculum design

I do not have the space to cover all of the design principles associated with threshold concept mastery and will limit my discussion to four of them (see Land, Cousin, Meyer and Davies, 2006 for a much fuller discussion).

1. Jewels in the curriculum

Threshold concepts can be used to define potentially powerful transformative points in the student’s learning experience. They are the ‘jewels in the curriculum’ because they identify key areas that need mastery. “A focus on these jewels” write Land et al. (2006, p. 198),

“allows for richer and more complex insights into aspects of the subjects students are studying; it plays a diagnostic role in alerting tutors to areas of the curriculum where students are likely to encounter troublesome knowledge and experience conceptual difficulty”.

The first design principle, then, is to explore (ideally with students) what appear to be the threshold concepts in need of mastery.
2. Listening for understanding

Because it is difficult for teachers to gaze backwards across thresholds, they need to hear what the students’ misunderstandings and uncertainties are in order to sympathetically engage with them. Why do some students productively negotiate the liminal space of understanding and others do not? Rather than fall back on lazy classifications of our students, teachers can cultivate a “third ear that listens not for what a student knows ... but for the terms that shape a student’s knowledge” (Land et al., 2006, p. 200).
CREATING A "LIMINAL SPACE" IN YOUR CLASSROOM

Figure 4. The Johari Window after Luft & Ingham (1955).
Active Learning

Active learning is a process whereby students engage in activities, such as reading, writing, discussion, or problem solving that promote analysis, synthesis, and evaluation of class content.
Another influential force in the move away from lectures and toward active learning in class is Carl Wieman, 2001 Nobel Laureate in physics, and director of science education initiatives at the University of British Columbia and the University of Colorado. His journey as a teacher is described in a very thoughtful article in Change magazine. Carl describes what he calls the “learning puzzle.”

When I first taught physics as a young assistant professor, I used the approach that is all too common when someone is called upon to teach something. First I thought very hard about the topic and got it clear in my own mind. Then I explained it to my students so that they would understand it with the same clarity I had. At least that was the theory. But I am a devout believer in the experimental method, so I always measure results. And whenever I made any serious attempt to determine what my students were learning, it was clear that this approach just didn’t work. [5]
ACTIVE LEARNING - MORE ADVICE

Adopting these new approaches can be difficult for professors, however, as Carl describes in his article “The Curse of Knowledge - or Why Intuition about Teaching Often Fails.” Many professors who have advanced knowledge have a very difficult time seeing the subject from the perspective of someone who does not. Brain scans show that the cognitive patterns within “experts” are substantially different from the “novices” and instructors need to recognize the profound differences in thinking of their students. In Carl’s words:

This fundamental difference between the novice and expert brain explains many of the findings reported by those who study student learning of physics. Students can think about a topic in ways quite unimagined by the instructor, and so a lesson that is very carefully thought out and is beautifully clear and logical to experts may be interpreted totally differently (and incorrectly) by the student. Another example is that the standard lecture demonstration has been shown to have negligible impact on learning. Many teachers find this hard to believe because the demonstration attracts students’ attention and usually demonstrates an important idea in a compelling fashion.

This “curse of knowledge” means is that it is dangerous, and often profoundly incorrect to think about student learning based on what appears best to faculty members, as opposed to what has been verified with students. However, the former approach tends to dominate discussions on how to improve physics education. There are great debates in faculty meetings as to what order to present material, or different approaches for introducing quantum mechanics or other topics, all based on how the faculty now think about the subject. Evaluations of teaching are often based upon how a senior faculty member perceives the organization, complexity, and pace of a junior faculty member’s lecture. In the pages of the APS news, this same expert-centered approach to assessing educational experiences has played out recently in the debate over the use of interactive simulations vs. hands-on labs.[6]

“TRADE CONTENT FOR COMPREHENSION”
Mazur’s peer instruction model

“Peers make the best instructors because they remember what it is not to understand.”

Mazur’s peer instruction model is a systematic process for encouraging collaborative learning amongst peers. This model is easy to implement, cost-effective, and applicable to nearly any subject or class. The model in its most basic form typically includes the following steps:

1. Instructor poses question
2. Students reflect on the question
3. Students commit to an answer
4. Instructor reviews student responses
5. Students discuss thinking with peers
6. Students commit again to an individual answer
7. Instructor again reviews responses and moves on to the next concept unless more explanation is needed

“TRADE CONTENT FOR COMPREHENSION”
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  - TEACHING PRACTICE INVENTORY
  - EXAMPLES OF YOUR "PRACTICE"
  - HOW DO STUDENTS KNOW YOUR PHILOSOPHY?
  - HOW DO YOU KNOW WHETHER THEY ARE LEARNING?
- REFLECTIVE AND INTEGRATIVE - GROWTH
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- PHILOSOPHY / THEORY OF TEACHING AND LEARNING
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  - TEACHING PRACTICE INVENTORY
  - EXAMPLES OF YOUR “PRACTICE”
  - HOW DO STUDENTS KNOW YOUR PHILOSOPHY?
  - HOW DO YOU KNOW WHETHER THEY ARE LEARNING?
- REFLECTIVE AND INTEGRATIVE - GROWTH
- YOUR FUTURE PLANS
TEACHING PORTFOLIOS

- YALE-NUS GUIDELINES
- DISCUSSION OF T&P REVIEW CRITERIA
- TEACHING PORTFOLIO PRINCIPLES
- EXAMPLES OF TEACHING PORTFOLIOS
  - EXAMPLES FROM LUND UNIVERSITY
  - EXAMPLE FROM NUS - ADRIAN LEE
  - EXAMPLE FROM NUS - CHRIS MCMORRAN
- BUILDING YOUR PORTFOLIO - BEGINNING OUTLINES
- REFLECTIVE AND INTEGRATIVE - GROWTH
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- YOUR FUTURE PLANS
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A teaching portfolio is about a practice

the actual teaching practice

\[ \downarrow \uparrow \]

description and analysis of the practice

\[ \uparrow \]

evidence (artefacts)

from Thomas Olsson, Lund University
TEACHING PORTFOLIO PRINCIPLES

Reflective portfolio text

Teaching philosophy

selected examples from the actual practice

from Thomas Olsson, Lund University
TEACHING PORTFOLIO PRINCIPLES

WHAT IS MY TEACHING PHILOSOPHY?

HOW DO I EMBODY THIS IN MY TEACHING?

HOW DO STUDENTS KNOW?

HOW DO I KNOW IF THEY ARE LEARNING?
TEACHING PORTFOLIO PRINCIPLES

The structure of a teaching portfolio

• Brief teaching biography (educational cv)

• Teaching philosophy (scholarly reflection including references to relevant literature)

• Concrete (integrated with the philosophy) examples from the teaching practice (a representative selection)
  – Why did you develop your teaching/supervision/leadership/… practice?
  – How did you develop your teaching/supervision/leadership/… practice?
  – Discussions of student learning results

• Supporting documentation

from Thomas Olsson, Lund University
TEACHING PORTFOLIO PRINCIPLES

Struggling portfolio-writers

- Philosophy detached from teaching practice
- Active, possibly successful change of teaching practice without well established arguments for this change
- Not accepting that the teaching practice might need to be developed (not only the portfolio text)
- No future visions
- No observations

from Thomas Olsson, Lund University
To be **concrete** in the portfolio is of fundamental importance . . .

the portfolio is about your teaching and the students learning – it is not about your knowledge of teaching and student learning in general

from Thomas Olsson, Lund University
TEACHING PORTFOLIO PRINCIPLES

Significant teaching and learning situations …

- What happened?
- What was positive / problematic?
- Why?
- How do we know this?
- How will this influence your teaching in the future?

from Thomas Olsson, Lund University
# Teaching Portfolio Principles

<table>
<thead>
<tr>
<th>Action</th>
<th>Consequences</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>My view on education is ...</td>
<td>... and therefore I do...</td>
<td>... which has resulted in...</td>
</tr>
<tr>
<td>I participated in a pedagogical course ...</td>
<td>... which made me change my practise in the following way...</td>
<td>... which in turn has resulted in clearer student understanding of...</td>
</tr>
<tr>
<td>I analysed the learning outcome of last years course (frustration..)</td>
<td>... which made me change the structure of the exercises as follows ...</td>
<td>... reports now reveal better understanding and abilities in ...</td>
</tr>
</tbody>
</table>

After Apelgren & Giertz (2001)

from Thomas Olsson, Lund University
TEACHING PORTFOLIOS

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  - EXAMPLES FROM LUND UNIVERSITY
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  - EXAMPLE FROM NUS - CHRIS MCMORRAN
- BUILDING YOUR PORTFOLIO - BEGINNING OUTLINES
- REFLECTIVE AND INTEGRATITIVE - GROWTH
- YOUR FUTURE PLANS
# EXAMPLES OF TEACHING PORTFOLIOS

## Table of contents

1. Teaching and learning philosophy ................................................................. 1
   1.1 Teaching approach ........................................................................ 1
2. Teaching subjects and responsibilities ......................................................... 2
   2.1 Packaging Logistics, MTT215 ................................................... 3
   2.2 Simulation of Packaging and Logistics Systems, MTTN10 ............ 3
3. Student learning examples ........................................................................... 3
   3.1 From projects to project-based learning ....................................... 3
   3.2 Combining assessment modes ....................................................... 4
   3.3 Introducing feedback seminars ..................................................... 5
   3.4 Facilitate co-operative learning via group formation .................... 7
4. Scholarship of teaching ............................................................................... 7
5. My learning and teaching journey .............................................................. 8
6. Goals and vision .......................................................................................... 10

References ........................................................................................................ 10

from Thomas Olsson, Lund University
EXAMPLES OF TEACHING PORTFOLIOS

Table of Contents

1. Introduction .................................................................................................................... 1
2. Teaching philosophy ........................................................................................................ 1
3. Short Biography with respect to my teaching career ...................................................... 3
4. Examples from my teaching practice – illustration and reflection ............................. 4
   4.1 Case 1: Teaching Quality Management at Leeds School of Business .................. 5
   4.2 Case 2: Business Process Design and Simulation at Leeds School of Business ...... 6
   4.3 Case 3: Experiential Learning in Production and Inventory Management at LTH .... 7
   4.4 Case 4: Development of case oriented computer lab exercises for learning simulation modeling .............................................................. 9
5. Sharing teaching experiences and pedagogical ideas with others ................................. 10
6. Challenges and goals for the future ............................................................................... 11
References .......................................................................................................................... 11

Appendix A - Evidence to support Case 1: Teaching Quality Management at Leeds School of Business

Appendix B - Evidence to support Case 2: Business Process Design and Simulation at Leeds School of Business

Appendix C - Evidence to support Case 3: Experiential Learning in Production and Inventory Management at LTH

Appendix D - Evidence to support Case 4: Development of case oriented computer lab exercises for learning simulation modeling

Appendix E - Published conference papers

from Thomas Olsson, Lund University
2. Teaching philosophy

It would not be fair to say that I subscribe to a single outspoken teaching philosophy. Instead I have some basic ideas and beliefs that guide my approach to teaching and my interactions with students. These ideas and beliefs are based on thorough reflection and analysis of my experiences acquired in the classroom, and from designing courses and course material. They are also a product of the pedagogical training I have received, of the pedagogical literature I have read, and of the ongoing discussion with colleagues about teaching related matters. It follows that as my experiences change, and my pedagogical expertise evolve over time, so does my approach to teaching. Still, there are some underlying ideas that have remained, and that have been reinforced over the years. I consider these to be the foundation for my continuously evolving teaching philosophy. One such core idea is the importance of “learning by doing” as a means to internalize knowledge, to really understand a subject, and thereby make it meaningful. Dewey (1938) characterize “learning by doing” as a process where the student should: (i) encounter a problem, (ii) face difficulties, (iii) gather facts to be used for solving the problem, (iv) assess in what direction a solution may be found, (v) formulate hypotheses based on known facts, (vi) construct theories, and (vii) practice to experimentally verify hypotheses and theories. Although desirable, this ambitious definition of “learning by doing” may in my experience be difficult to achieve, especially in more basic courses. Hence, in my pragmatic interpretation, “learning by doing” means to in some way apply the factual knowledge, concepts, theories, and methods that are being presented in a course, in a meaningful context. In my own teaching practice this means frequent use of exercises, projects, games, cases, discussions, experiments etc. to complement traditional lectures. In some cases these activities will achieve Dewey’s definition, but in other cases only some of the seven process steps above will be covered.

My belief in hands-on application as an important part of the learning process also means that I find theories concerning Experiential Learning (see for example Lewin (1951) and Kolb (1984)) very relevant to my deed and as a teacher. I particularly find the experiential learning cycle conceptually appealing. Figure 1 displays the four phases in Kolb’s learning cycle from Kolb (1984) (a similar learning cycle is available in Lewin (1951)). According to Kolb, learning can begin in any of the four phases (Concrete experience, Reflective observation, Abstract conceptualization, Active experimentation), but effective learning requires that the cycle be completed. I cannot say that I always manage to close the experiential learning cycle in the way Kolb (or Lewin) describes it, but I try to design my courses so that there is room for all four learning phases. I believe this is an important way to stimulate the students to deep learning approaches, see, for example, Biggs (2003). To illustrate my
EXAMPLES OF TEACHING PORTFOLIOS

1. Teaching and learning philosophy

My teaching philosophy is based on establishing active learning environments which provide students with in-depth knowledge and skills, and critical and creative new ways of thinking. In my opinion, an active learning environment which promotes discussion and debate, and which questions the opinions and viewpoints of fellow students and teachers is vital in providing the students with advanced reasoning skills.

My teaching philosophy also rests in providing students with motivation, encouraging participation, and making students take responsibility for their learning process. Two teaching activities I consider important in creating engaging and active learning settings are assessment and feedback. Assessment and student learning are inextricably linked (Hargreaves, 1997; Rust, 2002). I strongly agree with Biggs (2002) that what and how students learn depend to a great extent on how they think they will be assessed. I see assessment as an important tool for learning, which I use to encourage and motivate students. Providing feedback to assist students in their learning process is a fundamental teaching activity. I agree with Brown et al. (1997) that feedback is most effective when it is timely, perceived as relevant, meaningful and encouraging, and offers constructive suggestions for improvement which are within a student's grasp. For me, feedback is also a formative assessment providing students with the feeling that they are making progress, which improves their motivation to learn. To improve and complement feedback, which focuses on the past, "feedback" is an important teaching activity for me. By giving students suggestions and ideas for the future and not only on the past, I try to further engage them in their learning process.

Another central aspect in my teaching philosophy is to "see" the individual student. All students are unique and have their own learning style (Honey and Mumford, 2006). They also have different previous knowledge and experience of the subject taught. It must not be forgotten that students have different learning goals, abilities and interests. Therefore, in order to try to reach and connect to all students I use a variety of teaching methods and approaches.

Based on the above description of my teaching philosophy there are two teaching principles which I need to highlight, even though I consider them as fundamental. Teachers and students must have respect for each other. If students spend their valuable time and money getting higher education, teachers must make sure that students gain the knowledge and skills needed to succeed in industry or academia. Another fundamental aspect of my teaching philosophy is to be open-minded, especially as regards dealing with different viewpoints and opinions which may arise in discussions. As I want my students to learn critical and creative new ways of thinking, not merely accept what is presented, being open-minded to new ideas and solutions is a basic, but important, aspect of my teaching philosophy.
EXAMPLES OF TEACHING PORTFOLIOS

Outstanding Educator Award Application

Chris McMorran
Department of Japanese Studies
National University of Singapore

Contents

Teaching Portfolio
I. Teaching Impact in Brief 4
II. Teaching Philosophy 5
III. Teaching Approaches 6
IV. Teaching History and Student Feedback Summary 8
V. Scholarship of Teaching and Learning (SoTL) Research 10
VI. SoTL-specific Research Awards 11
VII. SoTL Presentations at International Conferences 12
VIII. SoTL Presentations at NUS 12
IX. Pedagogical Innovations 13
   A. Student response systems (clickers) 13
   B. Peer review 14
   C. Author meets critics 14
   D. Field-based learning 15
   E. Flipped lectures 16
X. Reflections on Student Feedback 18
XI. Reflections on Peer Reviews 20
   A. GEM1046: Home (2016) 20
   B. JS2101: Approaches to Japanese Studies (2013) 21
XII. Efforts to Improve Teaching 21
    A. Attendance at SoTL conferences 21
    B. Attendance at Center for the Development of Teaching
       and Learning courses 22
    C. Other efforts to improve teaching 22
XIII. Curriculum Consultation 22

from Chris McMorran, NUS Social Sciences
II. Teaching Philosophy

My teaching philosophy and desired learning outcomes of self-discovery, effective communication, and synthesis of knowledge are all illustrated in Edgar Degas’ “La classe de danse” (The Dance Class, 1874).

At first glance we see an instructor in the center of the room, surrounded by pupils, seemingly embodying a wise lecturer in a gendered, power-laden encounter.

However, a closer look reveals complexity. I imagine class is about to begin, students are warming up, and the instructor is briefly setting the lesson goals and offering encouragement. He does not remain front and center. He soon steps aside and lets students fill the space. They practice individually and in groups, and most learning comes through self-practice and peer learning. Some students grasp theory more quickly than others. Some model good posture, while others perfect new steps. They know their strengths and weaknesses, and they look to each other for advice and inspiration. The teacher moves about the room, maximizing individual interaction, providing guidance when necessary, and setting new tasks that help students work through their difficulties.

For me, the beauty of this image, and the guiding principle behind my teaching philosophy, lies in recognizing students’ raw talent, curiosity, and restlessness, then creating a learning environment that fosters self-discovery, effective communication, and synthesis of knowledge.
Self-discovery: Observe the girl seated on the piano in the foreground; she scratches her back in boredom, anxious to get started. When creating a syllabus, planning lessons, developing activities, and advising students, I often return to Degas’ masterpiece and think about this girl. Her boredom pushes me to pare back lectures, devise active learning projects that will help students learn a new idea or skill on their own, and teach research methods that empower students to explore their own questions.

Effective communication: Like dancers, it is only through experience and repetition that students gradually gain the confidence and skills to effectively communicate ideas and beliefs to others. Each of my modules involves pair work, small-group discussion, large-group discussion, presentations, and/or peer review in order to develop communication skills. I also use reflective notebooks, Wiki articles, author meets critics exercises, and public presentations of student work to provide alternative avenues of communication for students.

Synthesis of knowledge: Dance is learned one step at a time, with the eventual goal of combining those steps into a flowing whole. The same process occurs in and across modules. Whether in introductory or honor’s modules, I aim to write lectures that connect ideas across time and space. More importantly, I create exercises, like role-play, Wiki assignments, and on-the-ground research opportunities, that enable students to make connections on their own.

from Chris McMorran, NUS Social Sciences
EXAMPLES OF TEACHING PORTFOLIOS

CONTENTS
Teaching Philosophy ......................................................... 1
Teaching Methodology ..................................................... 4
Teaching Record ............................................................. 7
   CM2101 (Physical Chemistry 2) ..................................... 7
   GEK1535 (Our Atmosphere: A Chemical Perspective) .... 7
   CM3231 (Quantum Mechanics and Statistical Thermodynamics) .................. 8
   SP3175 (The Earth) .................................................... 8
   CM1131 (Physical Chemistry 1) .................................... 8
   CM2132 (Physical Chemistry) ...................................... 8
   SP1201C (Freshmen Seminar — Idols of the Mind) ............. 8
Teaching Development ..................................................... 9
   The Flipped Classroom in Core Chemistry ....................... 9
   Interactive Chemistry Laboratory Manual ...................... 11
   The Special Programme in Science ............................... 13
   Environmental Chemistry Minor Programme ................... 14
   M. Sc. in Science Communication ............................... 14
Publications ................................................................. 15
   Institutional Presentations, Workshops and Educational Conferences ... 15
   Workshops and Educational Conferences Organised ........... 16
   Impact on the Teaching Community ............................ 17
   Professional Development ......................................... 18
   Teaching Awards and Fellowships ............................... 19
   Approach to Teaching ............................................... 19
   Communications from Past Students ............................ 19

from Adrian Lee, NUS Chemistry
EXAMPLES OF TEACHING PORTFOLIOS

“It is important that students bring a certain ragamuffin, barefoot irreverence to their studies; they are not here to worship what is known, but to question it.”

Jacob Bronowski (1973)\(^1\)

TEACHING PHILOSOPHY

In 1923, the respected biochemist and philosopher of science Haldane stated, “It is the whole business of the university teacher to induce people to think.”\(^2\) When I first heard this quotation, I was struck by how it seemed to fully encapsulate in a single statement my own teaching philosophy. It is, I believe, this goal of “inducing students to think” that separates tertiary and secondary education.

However, we also need to consider what we want our students to learn. de Bono wrote, “It must be more important to be skilled in thinking than to be stuffed with facts.”\(^3\) In the context of science education, Biggs stated, “Rote learning scientific formulae may be one of the things scientists do, but it is not the way scientists think.”\(^4\) Some students believe that in science there are right answers to everything and that the mastery of a particular body of scientific knowledge allows one to become an expert in the field. It is partly this belief that leads to public misconceptions about what science can and cannot do. My own philosophy of the goal of science education is certainly not original; but in my mind, rather than purely adding to a student’s existing store of knowledge, we should be promoting science education as a way of thinking.\(^5\)

Consequently if we are to help students learn, we need to understand how students learn. We need to predicable our teaching on enabling learning to happen. The literature on how people learn is vast, but perhaps the most influential and accessible theories of learning, and one that certainly strikes a chord with me, is that of constructivism.\(^6\) Constructivism can be summarised in the phrase: “Knowledge is constructed in the mind of the learner.”\(^7\) When we teach, we need to remember that the new facts that we propound do not become directly incorporated

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Figure 1: Graph showing my survey results from the Teaching Perspectives Inventory. The yellow bars represent the cumulative result from beliefs, intentions and actions for each of the five teaching perspectives.

To conclude my methodology statement, Figure 1 provides the results from a Teaching Perspectives Inventory survey. The survey suggests that my dominant teaching perspective is Developmental, that my back-up perspectives are Transmission and Apprenticeship, whilst my recessive perspective is Social Reform. The identification of my dominant perspective as Developmental and one of my back-up perspectives as Transmission reflects the change in my teaching practice that has occurred over the last few years as I have implemented the flipped...
TEACHING PORTFOLIOS

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• DISCUSSION OF T&P REVIEW CRITERIA

• TEACHING PORTFOLIO PRINCIPLES

• EXAMPLES OF TEACHING PORTFOLIOS
  • EXAMPLES FROM LUND UNIVERSITY
  • EXAMPLE FROM NUS - ADRIAN LEE
  • EXAMPLE FROM NUS - CHRIS McMORRAN

• BUILDING YOUR PORTFOLIO - BEGINNING OUTLINES

• REFLECTIVE AND INTEGRATIVE - GROWTH

• YOUR FUTURE PLANS
THANKS FOR YOUR ATTENTION!

PLEASE LET US KNOW HOW WE AT CTL CAN HELP YOU!

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