Unit 15 – Tutor resource
Classroom Culture – Shifting the focus from Teaching to Learning

Never tell people how to do things. Tell them what to do and they will surprise you with their ingenuity.
- George Patton

Give me six hours to chop down a tree and I will spend the first four sharpening the axe.
- Abraham Lincoln

The only way to make sense out of change is to plunge into it, move with it and join the dance.
- Alan Watts

Our deepest fears are like dragons guarding our deepest treasures.
- Rainer Marie Rilke

Pain and suffering are inevitable but misery is optional.
- Anonymous

Introduction

These units are designed for educators planning to use EAC materials anywhere in an academic teaching program. They are primarily intended for use by individual tutors, although they can provide the basis for discussions about the changing nature of classroom activity in university settings.

In order of presentation the units are -

2	Being successful as a Portfolio Project Manager of student learning teams	Thinking of yourself as a Portfolio Project Manager (PPM) can help establish a useful and stable space and role for yourself when introducing interactive /experiential learning strategies. This unit introduces the PPM as a classroom role and explores how to adopt and sustain it.
1	Working with chaos and complexity	Cause and effect are familiar elements in engineering. They also exist in classrooms and workplaces. In the 21st century, cause and effect relationships are becoming more complex. This unit explores ways in which an understanding of a model of cause and effect relationships can help educators work with concepts of chaos and complexity, both in the classroom and more generally.
3	Managing the changing face of learning	This unit focuses on identifying how conflicting expectations and assumptions affect all aspects of classroom experiences. It identifies how differing classroom conditions affect specific learning strategies, and suggests ways to support and value differences rather than relying on a single teaching strategy.

Each Section begins with some practical stories of the relevance of the ideas, suggests activities for testing and application, and provides a short summary of the theoretical concepts informing the theme. It then suggests some ways for incorporating these concepts into one or more EAC Units or other planned academic units of study.

Understanding How We Learn

We are all different

The EAC project is dedicated to enabling engineering students develop and extend their understanding of cultural diversity. This unit of the EAC materials offers ways to help students focus on their learning so that changing context and circumstances can be managed effectively and sensitively. It complements Units 13 and 14, whose focus is on planning and managing the learning space from the tutor's perspective.

"Dancing her knowledge"

Sir Ken Robinson - a passionate education reformer whose TED (http://www.ted.com/talks) talks challenge dominant ideas of schools, and learning - tells [http://www.youtube.com/watch?v=iG9CE55wbtY] the story of a young girl, considered a 'problem child', whose mother took her to a specialist doctor in the 1930's. He talked to the mother in the girl's presence, then left the girl is his office with a radio on, while he and the mother watched her from outside as she responded to the music and danced around the room. His verdict – *"Gillian isn't sick, she's a dancer. Take her to a dance school."* His advice was heeded and she became a successful professional dancer and choreographer. Her name is Gillian Lynne – see http://en.wikipedia.org/wiki/Gillian_Lynne. That specialist understood the variety of ways in which we express our knowledge and, fortunately for this learner, knew how to provide relevant support.

"Thinking can be seen!"

Howard Gardner published *Frames of Mind* in 1983, introducing his 'theory of multiple intelligences' and identifying an *intelligence* as "*a biological and psychological potential to solve problems and/or create products that are valued in one or more cultural contexts*" (Gardner 2008) . His work has led many educators to re-think their approaches to learning. For example, Stephanie Martin and a colleague created 'Thinking Keys' to help their young students reflect on their own thinking. The four keys and associated questions give their children – and all of us - a vocabulary for thinking about and discussing thinking. The four keys are:

- Form: What is it like?
- Function: How does it work?
- Connection: How is this like something I have seen before?
- Reflection: How do you know?

This video shows students using the keys to "unlock their thinking" and make connections among patterns. http://www.pz.harvard.edu/vt/VisibleThinking_html_files/01_VisibleThinkingInAction/01c_VTPoP.html

"How do YOU learn?"

Consider these stories of learner drivers. As the first learner neared 17 years of age, her father offered to teach her to drive. She'd never thought about it, but as it seemed a good idea, she jumped in the driver's seat and with Dad beside her, kangaroo hopped the car down the driveway, eventually gaining control and a license. The second learner knew he wanted to learn, so commandeered the front passenger seat on the way to school and closely observed the driver's habits and routines – before asking for lessons. The third pestered his father for months to teach him to drive. When the father eventually agreed he was hugely startled to be asked, "Now, please, you tell me all you know about the internal combustion engine?" [Father knew nothing!] The fourth had already had a 30th birthday before encountering any need to drive – then began learning.

Each one approaches learning from a quite different 'preferred position'. The first needs *action* to learn. The second needs *observation and reflection*. The third needs *theory and analysis*. The fourth is motivated by *external prompts* creating a need to learn. To be effective drivers, all of them will also spent time using the other three less preferred approaches to learning, in order to fully embed the required skills and knowledge.

These four approaches constitute the "Action Learning Cycle" as developed by David Kolb. He proposed that learning is a complex and variable process. Other models of learning also worth exploring are listed in the references. All

models and theories of 'learning styles' share two essential characteristics. First, that human beings access a wide variety of approaches to learning, while patterns and tendencies enable aggregation of learners into groups with similar tendencies and preferences. Second, these tendencies or preferences are 'situation sensitive' – so the context in which learning occurs will impact learners and how they approach the task of learning.

Peter Smith and Jennifer Dalton note there is no 'best' theory about learning styles or preferred methods of learning. In "Getting to Grips with Learning Styles", they offer tips and hints on how to identify and support diverse learning preferences. This booklet is free at http://www.ncver.edu.au/publications/1600.html

Practical applications

As an academic educator you have your own preferred approach to learning. This has served you well and is by now an unconscious habit. It also influences how you teach and what you assume about how others learn. But your approach is *unlikely* to be appropriate for all students and all contexts. So those useful habits of learning you have acquired may even be counterproductive, just when you need to be most effective.

Expanding your teaching repertoire may not be easy or simple. It may even be quite daunting, yet – as Rainer Marie Rilke suggests - some of your best treasures as a successful academic may come from challenging those dragon-like habits and attempting new and different approaches.

The following suggestions offer ways to explore your own learning habits and preferences at the same time as you work with students to explore theirs.

How do you enable learning in contexts of incomplete information?

At the beginning of each semester, you and the students are both grappling with a series of 'unknowns'. They do not yet know what you know about engineering. You do not yet know anything about what they already know, nor how they learn, or what will be effective ways to help them learn. As Unit 14 suggests, you are all in the Simple Domain of knowledge, where everything seems familiar and all possible 'next steps' can be anticipated. Staying in this domain gives you total leadership and full authority to direct every action. 'Teaching' is the mode. 'Knowledge transfer' is the goal. Dependence on experts like you is the 'hidden curriculum'. Are these the 'expert-dependent' engineers you want to contribute to creating?

Examine your own thinking framework

How do you learn? What has influenced your approach to acquiring new skills, new knowledge and adapting your attitudes and beliefs to changing contexts? Remember that there is no 'right' or 'wrong' way to learn or teach. There are more and less effective ways, and most problems arise when less effective methods - that are familiar and preferred - are applied inappropriately.

Try each of the activities included below for yourself first. Explore some of the web sites in the references list. Write – or recall – some of your own stories about memorable learning moments. How did you begin to learn to drive? Does it parallel any of the four approaches described above? How did you achieve success in your initial studies? In your sporting and recreation activities, how have you learned the skills and knowledge acquired? Was this the same way you gained your professional knowledge?

Do not aim to 'change your preferences' – this is highly unlikely to succeed. 'Preferences' are like a bumper sticker proclaiming "I'd rather be sailing" displayed prominently on a car that, five days a week, takes the same route to work. The driver is affirming a clear preference, and also exercising an equally clear decision to suspend that preference for other purposes.

Do apply different strategies and observe what happens. Accept that not all attempts will succeed equally or be equally well received. Students have their own habits and expectations, and altering how you expect them to operate as learners may disturb their own hidden 'dragons'. Accept challenges as a possibility and stick to your agenda of making great learners out of the students you are with. Abraham Lincoln knew preparation is vital and assigned what may seem a disproportionate time to it. Alan Watts, on the other hand suggests that 'just doing it - 'plunging in' - is equal vital. In regard to enabling students to be more in charge of their own learning requires a balancing act from you. Prepare, prepare, prepare – and then plunge in – and keep going.

Reflective Learning

These questions are useful prompts for exploring the nature of teaching and learning. Take the time to write your answers down.

- What excites and energises you about being in the role of educator?
    - What makes you concerned about being in the role?
- Do you believe you must 'know everything' and be able to answer all questions immediately?
    - If so, how do you set about 'knowing everything'?
- Do you feel comfortable talking in front of a group?
    - If so, what are the advantages for you?
    - If not, how do you prepare for this less than welcome task?
    - When you are leading a tutorial, do you presently use any ways to 'step aside' from the talking role?

Promoting reflection on learning

The following activity adopts General Patton's approach to leading. It invites you to practice the habit of giving students the 'what' of learning and taking that Project Portfolio Manager [PPM] role of supporting them as they find out 'how' to learn for themselves.

Activity

As you are probably the only person in the tutorial who has given much thought to 'learning about learning', this exercise can help everyone get up to speed. The table at Appendix 1 suggests some responses you can use if students express dismay at this apparent diversion from learning about 'real engineering'.

Purpose

To help students identify both their own preferred learning style [using one particular framework] and gain insights into ways that other people learn.

Resources

How to handle objections to focusing on 'learning about how to learn' – Appendix 1

Worksheet for students to use – see next page

Some potential responses to the activity question arranged in relation to learning preferences

Goals

1. The goals of the activity described here are to:
    - provoke students to think about their own learning habits and strategies;
    - listen to others as they describe theirs;
    - consider similarities and differences among the various responses;
    - understand that some things will be harder for them to learn because the way they learn may differ from the way the person teaching them learns; and
    - explore the variety of ways people learn and how these create different preferences for approaching new learning tasks.

Process

1. Use any form of introduction to the session and activities that helps you settle into the PPM role for these activities.
2. Give a brief introduction to the concept of 'learning styles/preferences', using the resources here and any others you have consulted. Stress that no preferences are 'better/worse', and that when they understand both which one/s they prefer, and how to spot other's preferences, they will be more able to manage their own development and work more easily with others.
3. Ask students to use the worksheet [see last page in this document] to complete the following sentence using three or four different endings -
   "I know I know something when . . ."
4. Once they have written their answers down, ask them to share their first response. Ask others to help assign each response into one of the four categories of Action, Observation/Reflection, Theory, and Pragmatic. Note their answers either on a board or via an electronic means to project them on a screen.
5. There are no absolutely correct answers for this activity, so encourage discussion and assign items on the balance of opinion. The task is not to get things 'right', but to learn about what learning is and is like for different people.
6. Once everyone's first answer is assigned, ask for any responses that were not mentioned in any way by anyone else. Assign these in the same way, and check that everyone feels all their responses are included in the list.
   a. If you want to identify numerical trends, ask everyone, with a response similar to one being named, to put their hand up and then tally the number of hands each time. Write the total beside each item.
7. Invite everyone to look for any patterns they can see. For example there may be a larger number of only one or two preferences; there may be a very even spread of preferences; it is possible one preference does not appear at all; perhaps a large number of people indicated similar preferences - if you tallied 'like' responses.
8. Once the table is completed guide a discussion on what they are observing and understanding.
   a. Encourage questions – and where you don't have an answer, invite students to do some research and bring the answers to a future class. We all enjoy being praised, so a simple comment of - "That's a great question; and I can't give you a good answer. So, do some research and bring your answer to the next class." - will both establish that you are not afraid to say you don't know it all, and provoke individuals into useful research. Keep a note of the questions for future discussion, where this is relevant.
9. Some questions and comments to help you guide the discussion include -
   - Have you ever thought about 'how' you learn?
   - How does 'doing things' help you learn?
   - How does 'knowing about' things help you learn?
   - What does it help you learn?
   - Are there differences between 'knowing about' and 'knowing how to'?
   - What are they? And where might these be important?
   - What responses about 'how you know something' are similar?
   - How do those responses that are unlike each other highlight the differences among the various preferences?
   - Is there an order to your learning that you can identify as helpful? For example, the 'active' driver, described above, needed physical contact with the car to begin to understand how to drive – and only much later got around to learning the mechanics of cars; whereas the 'theorist' really needed to understand 'what is underneath the bonnet' before he felt comfortable about getting behind the wheel.

Appendix 1

Handling Objections to a Focus on Learning about Learning

Objections	Responses	Supporting Resources
"We are here to learn about engineering not about learning!"	There will not always be books and tutors to tell you what to learn. Learning about how to learn ensures that you continue to learn about engineering as it changes through your life.	Kolb, A. and Kolb D. A. (2001) *Experiential Learning Theory Bibliography 1971-2001*, Boston, Ma.: McBer and Co http://trgmcber.haygroup.com/Products/learning/bibliography.htm http://www.infed.org/biblio/b-explrn.htm Argyris, C. (1991*). "Teaching Smart People How to Learn."* Harvard Business Review May-June 1991: 99-109. Boud, D., R. Cohen, et al., Eds. (1997). *Using Experience for Learning*. London, UK, Open University Press. Boud, D. and N. Miller, Eds. (1996). *Working With Experience - Animating the Learning*. London, UK, Routledge. Schien, Schon, Csikszentmihalyi, M. (1991). *Flow: The Psychology of Optimal Experience*. New York, USA, Harper Perennial. Csikszentmihalyi, M. (1993). *The Evolving Self*. New York, USA, HarperCollins. Aldrich, Clark (2010) Unschooling Rules http://www.amazon.com/Unschooling-Rules-Homeschoolers-Deconstructing-Reconstructing/dp/1451567324 Peddiwell, Abner (2004) *The Saber-Tooth Curriculum* McGraw-Hill
"I need to focus on the facts – we've got exams soon."	You will have forgotten *the facts* by the time you graduate. This is about ensuring that you are able to always find relevant, new and correct facts when you need them at work. So while you may need to remember facts for this exam you will also need to be able to find facts and assess their validity in future- that is what we are doing now.	
"We need information to pass the exams."	These activities will assist you to find and remember the information better than listening to me ever will. Your task is to gather facts and assess and understand them. This is more than memorising them for the short term.	
"This is silly. We know how to learn, that's how we got here!"	Yes. You do know *some* learning strategies that work in *some* contexts. As you continue through life your contexts will change and those familiar strategies will not always work. You will benefit from having access to more ways of learning. You need to know when your usual learning methods do not work for you, and that other ways are needed. And then you need to know what those 'others' are.	
"I just want to do stuff!"	Understanding how to do 'stuff' better will come as you are able to shape your own learning strategies instead of being a blind follower of others' approaches.	
"It's more important for me to know about [name of engineering concept] than it is know how I learn."	Knowing *about*, and knowing *how to*, are two distinct skills and good engineers have both. This period of time will focus on *knowing how to learn*, so that you can be effective as a learner responsible for your own *learning about* engineering.	
I get anxious when I am not concentrating on the facts.	We all get anxious at some time in the process of learning new things. When we only use strategies that do not make us anxious we limit our ability to grow our knowledge and capabilities. Sports players who push through the 'strain barrier' understand this and consider the anxiety as merely an indicator that their efforts are working.	

Appendix 2

Indicative responses to the question "I know I know something when . . ." arranged in relation to the likely learning preferences

Action oriented	***Observation / reflection***	***Theory and analysis***	***Pragmatic prompts***
I can do it	I see someone dong it and know what they are doing and why	I can explain what is happening	I've been able to see a use for it
I can demonstrate it	I understand what I am watching	I know similar ideas and enjoy making new links	I've needed to do it and found I could learn it
I can do others things like it	I can describe it to someone else	I can describe to myself how it is done	I've had to learn it and can explain how it fits my needs
I feel comfortable attempting to do other things like it	When I read about it, it makes sense	I hear someone talk about it and understand all they are saying	When I need to learn it I know it fits with other things I need to know

Learning about How to Learn - Worksheet

Complete the following table with a different answer for each line -

I know that I know something when..	
I know that I know something when..	
I know that I know something when..	
I know that I know something when..	
I know that I know something when..	

Other people know they know something when . . . .

1	
2	
3	
4	
5	
6	
7	
8	

Some possible implications for me are –

- I can learn to be more flexible in the ways I learn
- As I observe others learning I can also see other ways to learn – and can take advantage of them
- New contexts will require different strategies – I will be better equipped for sudden changes when I am able to shift my learning strategy to suit the context I am in
- There is no 'one size fits all' approach to learning. Knowing how I learn best will be an advantage in emergencies