



Postgraduate Certificate in University Teaching and Learning

Module 2 Submission Cover Sheet

Participant number:

Participant name: Vincent Knight

School: Cardiff School of Mathematics

Mentor: Professor Paul Harper

This portfolio is submitted in fulfilment of the requirements for PCUTL: Module 2.

I declare that I have completed the compulsory elements of the programme as follows:

- a) workshops;
- b) resource critique;
- c) one PCUTL-peer reciprocal Peer Review of Learning and Teaching;
- d) two annotated lesson plan with resources;
- e) response to previous PCUTL assessment feedback;
- f) mentor discussions sign off;
- g) Mapping of learning to date against the UKPSF.

I confirm that the evidence contained within this submission has been collected by me during the last 3 years, while teaching and/or supporting learning on recognised H.E. provision at Cardiff University

Unfair Practice: Plagiarism and Collusion

Plagiarism: In the University Academic Regulations Handbook, plagiarism is defined as 'using the words or ideas of others without acknowledging them as such and submitting them for assessment as though they were one's own work' (para 2.1.1). Plagiarism includes direct copying, close paraphrase, the unacknowledged use of ideas developed by others and commercial essay bank services.

Collusion: In the University Academic Regulations Handbook, collusion is said to occur when 'work that has been undertaken by or with others is submitted and passed off as solely the work of one person' (para 2.1.2). Where this is done with the knowledge of the originator, both parties can be considered to be at fault.

By submitting this portfolio, you are confirming that it is your own work and does not involve plagiarism or collusion.

The word count for the text of this submission is:

Signed:

Date:

Note: Portfolio assessors are entitled to reject any portfolio that does not have a signed copy of this form attached.



Postgraduate Certificate in University Teaching and Learning

Module 2: Summative assessment

To be completed by Participant

Name of participant:

School:

Verification of contents

Please state the location of the following evidence:

	Linked ILO	Location of compulsory evidence	Confirmed by marker
1) One PCUTL-peer reciprocal PRLT with accompanying resources and reflections	2	PRLT outputs	
2) Two annotated lesson plans and accompanying resources	1 +3	Lesson plans.	
3) Lesson and resource design rationale and critique		Module 2 Lesson plan, covering claim and "Pedagogic Models, Inclusive Teaching and Technology" document.	
4) Response to feedback received from Module 1 assessment		Response to feedback document.	
5) Mentor discussion sign off sheet and accompanying resources as appropriate		Attached sign off sheet.	

6) Mapping of learning against the UKPSF		Attached mapping.	



Postgraduate Certificate in University Teaching and Learning
Summative Assessment of Reflective Teaching Portfolio: *To be completed by Participant*

Name of participant:

School:

Self assessment of your achievement of the Module's Intended Learning Outcomes: ILOs in red = core ILOs for Module

Learning Outcome	Location of evidence (e.g. page number)	Self-assessment including commentary to assessors
<p>1. Describe key pedagogical models relevant to teaching and supporting learning in their subject discipline, and relate them to their own practice.</p>	<p>Covering claim, Section 3 of Pedagogic Models, Inclusive Teaching and Technology (PMITT) document and my PRLT outputs.</p>	<p>I expected to find this ILO very difficult as it was very far from my comfort zone. Having said that I've thoroughly enjoyed this and feel I have done very well at achieving this ILO. I have demonstrated a sophisticated grasp of the ideas as well as a personal critique of these as applied to my own field. Furthermore I demonstrated a wider understanding of pedagogic models in my PRLT.</p>
<p>2. Plan and run teaching sessions that explicitly considers contact and non-contact learning support and account for individual differences between learners. Critique the use of technology to enhance learning during contact and non-contact time learning.</p>	<p>Covering claim, Section 2, 3 and 4 of PMITT and my lesson plan.</p>	<p>As opposed to the previous ILO I was looking forward to tackling this one as it is very much in my comfort zone. I have thoroughly investigated a range of sources to justify my use of technology in a way that enhances the value of contact and non-contact time</p>
<p>3. Draw on multi-source data to evaluate the impact of their teaching and/or support for learning on the breadth / diversity of students' learning, and plan modifications accordingly.</p>	<p>Covering claim, Section 1 and 3 of PMITT and PRLT.</p>	<p>I have evaluated my teaching in two ways, firstly by rigorously analysing feedback from students and secondly by evaluating a wide range of pedagogic models to identify myself within them. The modifications of my lesson planning take all of this in to account and the planned modifications have been evaluated for my PRLT.</p>

4. Identify further professional development needs in relation to teaching and/or supporting student learning.	Section 5 of PMITT.	I have identified a wide range of further dimensions for professional development in a comprehensive and imaginative way.
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Evidencing the Programme Values:

Programme Value	Location of evidence (e.g. page number)	Self-assessment including commentary to assessors
1. An understanding of how students learn.	Section 1, 2 and 3 of PMITT.	<p>I have addressed this programme value through a careful consideration of multiple pedagogic models in the literature. I have also carefully considered the learning of my own students through analysis of feedback. I feel I have done this in a critical manner showing insight in to my personal processes.</p> <p>I feel I have addressed ILO 1,2 and 3 through this programme value.</p>
2. A commitment to reflection and evaluation and consequent improvement of professional practice.	The entire PMITT document addresses this.	The immediate fact that I am doing PCUTL shows this. Furthermore the large amount of work I have put in to this portfolio is a further demonstration of this.

		<p>Finally my ideas for further development that are both general and precise are a good demonstration of this programme value.</p> <p>I address all ILOs through this programme value.</p>
3. A respect for individual learners and for their development and empowerment, no matter what their circumstances.	My covering claim, Section 2 of PMITT as well as my lesson plan.	<p>My particular consideration of inclusivity and diversity in my lesson plan and PMITT demonstrate this in a logical manner.</p> <p>I have addressed ILO 1,2 and 3 through this programme value.</p>
4. A commitment to scholarship in teaching, both generally and within their own discipline.	PMITT.	<p>I have committed myself fully to this portfolio (at the detriment of quite a lot of my other responsibilities). Further more I have shared a variety of my findings both within the university and to a wider audience through my blog and social media and even participated in a HEA workshop.</p> <p>I have addressed all the ILOs through this programme value.</p>
5. A commitment to the development of learning communities, including students, teachers and those engaged in learning support.	Section 4 of PMITT.	I demonstrate this at multiple levels, firstly my communication on the PCUTL discussion boards, my consideration of non contact time with students, and my wider

		<p>dissemination of resources and findings through social media and my blog.</p> <p>I have addressed ILO 2 and 3 through this programme value.</p>
<p>6. A commitment to encouraging participation in higher education with respect to the issues of equality and diversity. In this regard, professional practice should be informed by equal opportunities legislation, policy and best practice.</p>	<p>This is shown throughout PMITT.</p>	<p>Whilst I have not considered this programme value directly, the points raised in my first portfolio are still valid (with regard to a majority of my outreach work) as well as the specific considerations of inclusivity I give in this portfolio.</p> <p>I have addressed ILO 1,2 and 3.</p>

PCUTL activities	Areas of Activity					Core Knowledge Knowledge and understanding of:					Professional Values				
	Design and plan learning activities and / or programmes of study	Teach and / or support learning	Assess and give feedback to learners	Develop effective learning environments and approaches to student support and guidance	Engage in continuing professional development in subjects / disciplines and their pedagogy, incorporating research, scholarship and the evaluation of professional practices	The subject material	Appropriate methods for teaching and learning in the subject area and at the level of the academic programme	How students learn, both generally and in their subject /disciplinary area(s)	The use and value of appropriate learning technologies	Methods for evaluating the effectiveness of teaching	The implications of QA and QE for academic and professional practice with a particular focus on teaching	Respect for individual learners and diverse learning communities	Promote participation in higher education and equality of opportunity for learners	Use evidence-informed approaches and the outcomes from research, scholarship and CPD	Acknowledge the wider context in which HE operates recognising the implications for professional practice.
Module 2 UKPSF mapping															
Peer PRLT, resources, reflections	✓	✓	✓	✓		✓	✓	✓	✓			✓	✓	✓	✓
Lesson plans + resources	✓	✓	✓	✓		✓	✓	✓	✓			✓	✓	✓	✓
Resource design + critique	✓	✓	✓	✓		✓	✓	✓	✓						
Written text	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Discussions with mentor	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other experiences illustrated in appendices and reflections	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓

Postgraduate Certificate in University Teaching and Learning
Module 2: Summative assessment

To be completed by the Mentor

This form is used to confirm that participants and mentors have met during the course of Module 2 for PCUTL-related discussions. Participants will submit the form in their portfolio and discuss issues arising as appropriate within the text of their submission.

I confirm that we have discussed some generic and discipline-specific pedagogic literature with respect to the core themes of the module i.e.:

- Curricular inclusion and accessibility
- Evaluation of Student learning
- Supporting contact and non-contact learning through the use of appropriate learning technologies

We have also:

- Discussed what the participant gained by undergoing PRLT with a colleague in another School
- Started to think about how we could most usefully use our mentored PRLT in Module 3 to help evidence both the Module 3 ILOs and on-going teaching practice that is underpinned by the Programme Values.

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Please use the box below to note a few key points that have been discussed / explored that are useful to the Department / School and which perhaps your mentee is interested in exploring further (perhaps in Module 3).

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Signed (Mentor) _____ **Date:** _____

(Please give this sheet to the participant for inclusion in their Module 2 portfolio. Thank you!)

PCUTL - Response to Module 1 Feedback

Vincent Knight

February 12, 2013

In this document I will respond to each element of feedback from my module 1 portfolio.

1 Learning Outcome One

“Your portfolio is soundly located within a range of UK and MATHS specific agenda. You adopted a spiral structure to your journals that enabled you to think, apply, rethink ect. But did you ever actually arrive at a position? Where are you at now in your thinking about all these ideas and agenda may mean for your creation of opportunities for students to learn?”

I think I agree with this comment: I did not necessarily arrive at a robust position.

I found this learning outcome and the whole process of reflective writing difficult. I enjoy structure in my work and felt that I had to ‘let go’ to make progress in my portfolio. Perhaps as a result I lost direction.

Having said that I certainly feel that the process was very beneficial to myself as an educator. In particular it helped me focus a bit more on my teaching methodologies in Module 2. I feel that I have in Module 2 been able to arrive at a robust position.

2 Learning Outcome Two

“You created a lesson plan specifically to engage students in their learning and have done well to also explore how Kolb’s ideas might work in your context. By the end of the journals you came

back to the plan and suggested some very appropriate adjustments - well done!”

I appreciate the kind words of feedback here. I put a lot of effort in to this lesson plan and thanks to various discussions with my mentor I was able to fine tune it further.

Having said that I feel that in this module I have been able to conceptualise and justify the approaches I use as well as find further ways of placing the learning opportunities I try to create in a constructivist framework.

3 Learning Outcome Three

“The portfolio demonstrates your deepening engagement with some generic and MATHS specific literature. In Module 2 have a look at other pedagogies and perhaps also the writing of inclusive and level appropriate ILOs - something like Biggs’ SOLO taxonomy may take you helpfully out of your comfort zone.”

I certainly feel that I have left my comfort zone in this module! I have taken this advice to heart and invested a lot of time in to learning about a variety of pedagogies. Exploring philosophical and psychological ideas is not something I expected to enjoy but having said that I’ve thoroughly enjoyed it! It’s been very rewarding to learn about theories of learning and reflect with these on various teaching styles that I feel are appropriate to me. (I also found a mapping of Biggs’ taxonomy to mathematics that could be a useful resource for future Mathematics PCUTLers).

4 Learning Outcome Four

“You and your mentor have worked well together to discuss your sessions. In Module 2 use your PRLT to seek an outsider’s perspective and draw on the literature to support/contest your observations.”

I agree that the PRLT with my mentor was valuable. I have taken advantage of my PRLT in this module and enjoyed the perspective offered by my peer. I’ve also investigated as much of the literature as I was able to in the time allowed.

5 Learning Outcome Five

“The structure of your portfolio has enabled you to revisit some ideas a number of times and demonstrates your deepening ‘noticing’ and plans for development - excellent!”

I agree that the reflective part of the previous portfolio allowed me to ‘notice’ a variety of things about my teaching. I’ve enjoyed being able to justify these things in this portfolio.

6 Programme Values

“Your practice is clearly underpinned by a commitment to facilitating student learning. As you go through PCUTL perhaps extend your ideas about learning communities and create a group to discuss teaching among your MATHS colleagues perhaps?”

I feel that I’ve invested a lot in building and participating in learning communities amongst my peers (details of this are given in my PMITT document). I have not been able to create a group in MATHS however will give this some more thought.

7 Engagement with the UKPSF

“The map provide good evidence of your explicit engagement with the UKHE teaching agenda.”

I have hopefully been able to do the same for this module.

8 General comment/thoughts for Module 2

“Well done Vince! This has been an honest and carefully conceived submission. In Module 2 take the opportunity to move out of your safe (Kolby) spaces and explore ideas that support peer learning.”

I appreciate the feedback and feel that I’ve managed to step out of my comfort zone (as described previously). I’m really beginning to enjoy the process (I must admit that I found the reflective journals in the previous module difficult) and look forward to Module 3!

PCUTL - Module 2: Covering Claim

Vincent Knight

February 13, 2013

In this short covering claim I will describe my portfolio for this module in general as well as how I meet the various ILOs.

This portfolio contains the following documents (in order):

- My response to feedback for Module 1;
- “Pedagogic Models, Inclusive Teaching and Technology” (PMITT);
- My annotated Module 1 lesson plan;
- My lesson plans for Module 2:
 - A detailed plan for an MSc module;
 - 4 detailed lesson plans for that module.
- A page with a url for all relevant teaching resources;
- Nikos Savva’s peer review of the above lesson plans with my response;
- My peer review of Nikos Savva.

The main body of work for this module is contained in the second document (PMITT). In fact that document was originally going to be the covering claim for this portfolio, unfortunately the word count for that document began to grow quite substantially as I continued through my journey. As such, I will now describe the various parts of my portfolio highlighting how I have met the prescribed ILOs and where the various parts of interest can be located.

It is my understanding that one of the aims of the ILOs for this module aims to lead “us” (PCUTL students) down the road of innovation. As described throughout my Module 1 portfolio (which can be found here: <http://www.vincent-knight.com/home/teaching/pcutl>) I was already quite innovative in my classroom. In particular through the use of videos in pre and post contact time. Based on this, this module has been of very high value to myself as it has allowed me to situate my methods in an evidenced framework. Furthermore, thanks to a detailed analysis of the literature and conversations with my peers, I’ve been able to identify and put in place further innovations.

The starting point for my portfolio is the analysis of feedback for the MAT001 module that I used for my Module 1 PRLT. This is located in Section 1 of PMITT. The feedback was designed in such a way as to evaluate how the students engaged with certain technological innovations that I use in my teaching such as social networks and videos. **This section of my portfolio addresses ILOs 3 and 4 as I use it to evaluate the effectiveness of some of my teaching methods. I also identify certain things that can be improved which lead me on to further exploration.**

In Module 1 I considered inclusivity and diversity briefly but not in a detailed way which I was able to do in this module. In particular I’ve addressed a particular aspect of inclusivity concerning the distribution of teaching resources which was something I had not considered prior to this module. This is described in Section 2 of PMITT. **This section of my portfolio address ILO 2 as I use it to design methods to take account of individual differences in learners. In particular I design a technique for creating inclusive mathematical notes through the use of technology.**

The next section (3) of PMITT is a detailed look at Pedagogic models. I start by going back to basics so to speak and describe three models (Behaviouralism, Cognitivism and Constructivism). Further to this I mapped these models on to the teaching of mathematics was able to place myself in a social constructive framework. Formalising my teaching approach was valuable as I was able to evidence my previous methods as well as see what was missing. In this section I also describe cultural and social learning and decide on ways to improve my teaching by incorporating more group work. **This section very addresses ILOs 1, 2 and 3 as I clearly evidence a broad understanding of pedagogic models as well as identify what their definition implies for my teaching. I also discuss the use of technology when talking about flipped classrooms which correspond to non-contact time learning opportunities. Being able to identify**

myself within a well understood teaching model has helped me to improve my teaching through the use of group work and formalised scaffolding in Vygotsky's ZPD.

Section 4 of PMITT is a detailed discussion of my involvement in learning communities. I discuss my engagement with the PCUTL discussion boards, my use of social networks and also my participation in a HEA workshop. **This section partly address ILO 3 as it shows how I've drawn on interaction with my peers to improve my teaching.**

The final section of PMITT identifies various ways in which I can continue to develop as a teacher. **This section addresses ILO 4.**

To summarise, this portfolio and PMITT in particular is an account of my journey through Module 2. I began this module having already some experience of using technology in an innovative way however this was not based on evidence of good practice. Through this module I have not only been able to find such evidence but also improve my methodologies in various ways such as developing methods of creating inclusive mathematical notes and incorporate more group work in my teaching. I feel that I end this module as a much more complete teacher with a better understanding of teaching and learning.

I look forward to finding the next things that I need to understand.

PCUTL - Module 2: Pedagogic Models, Inclusive Teaching and Technology

Vincent Knight

February 12, 2013

R. L. Moore (1882-1974):

“The student is taught the best who is told the least”

This portfolio contains material relevant to my Module 2 submission of pcutl. In this portfolio I have explored at a more detailed level various aspects of my teaching and my students' learning:

- Thanks to an analysis of feedback received from students I have evaluated my effectiveness as a teacher;
- I have carefully explored issues of inclusivity and diversity through interactions with my peers and careful exploration of the literature. I will describe in this document the potential for various technological tools available to improve my consideration of these issues;
- Through a detailed review of the literature I have evaluated in detail various pedagogic models and I will in this document describe a particular pedagogy that I feel is appropriate to myself and my students.

1 Analysis of feedback from previously taught module

The feedback was given via an online questionnaire and was mainly concerned with my use and in particular the student engagement with technology in the class (I already use my own website, videos, social networks and various

other interactive tools in my teaching). The general consensus of the student feedback is positive. 70% of my students watched various videos made available to them prior to lectures and 60% of my students viewed my posts on Google Plus (a social network). I collected similar encouraging statistics with regards to the use of my own website for hosting notes, the use of an open source mathematics package and the uptake of non-contact time use of all of the above.

I also requested of the students to highlight the sections of the course that they felt were the most troublesome and the most motivating. The two subjects that the students seemed to ‘prefer’ were taught in a student led way, encouraging role play and interactivity. The subjects that however were least ‘enjoyed’ were taught in a much dryer fashion and had less pre and post contact time resources made available to the students.

I’m of course very aware that there is no causation to be inferred from this very informal causation but I nevertheless plan to concentrate (whilst considering a wide range of pedagogies) my investigation of the literature around the use of technology as well as student led activities.

It is also worth noting that in the class, there were quite a few non English first language speakers. Despite this none of the feedback seemed to indicate that these students had problems with regards to my communication. In fact some students mentioned appreciating my screencasts as they allowed the information to be viewed and re-viewed at a personal pace.

2 Inclusivity and diversity

There are various aspects of inclusivity and diversity that I have carefully considered in my Module 2 lesson plan. I will not expand on them in detail here but note that they are influenced from the literature on the subject [10]:

- I have carefully considered aspects linked to physical disabilities;
- I have considered aspects linked to diversity when designing teaching resources and also when selecting groups;

A final aspect of inclusivity that I need to consider and will detail here is linked to the fact that I plan on sharing all my lecture materials prior to class. To cater for students with physical disabilities that might make reading of materials difficult I will deliver my materials in as many formats as possible.

In mathematics, the most common form of distribution of teaching materials are pdfs. This is mainly due to LaTeX (a mathematics typesetting language) and has numerous advantages:

- No need for proprietary software to view (this addresses potential inclusivity issues linked to economic status of students and/or simply preferred operating systems);
- Consistency of formatting;
- Ease of use on multiple platforms (notes can be easily viewed on mobile devices).

Potential disadvantages lie in the fact that students may prefer to change the format, color and/or size of a document. This is not possible using pdfs. An immediate solution is presented in Figure 1.

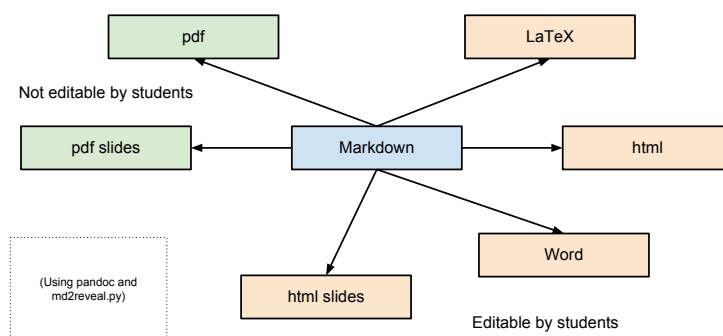


Figure 1: Universal formatting of materials.

Markdown is a very simple language that allows for the rapid creation of teaching materials. Combined with pandoc it can be used to create teaching materials in a variety of formats with little effort. Figure 2 shows various formats of a document all created from the markdown source.

I have also created a short programme that makes the creation of these universal notes more efficient. There is an accompanying youtube video available <http://www.vincent-knight.com/home/teaching/pcut1>.

From a mathematics point of view an added benefit is that mathematical formulae can also be included.

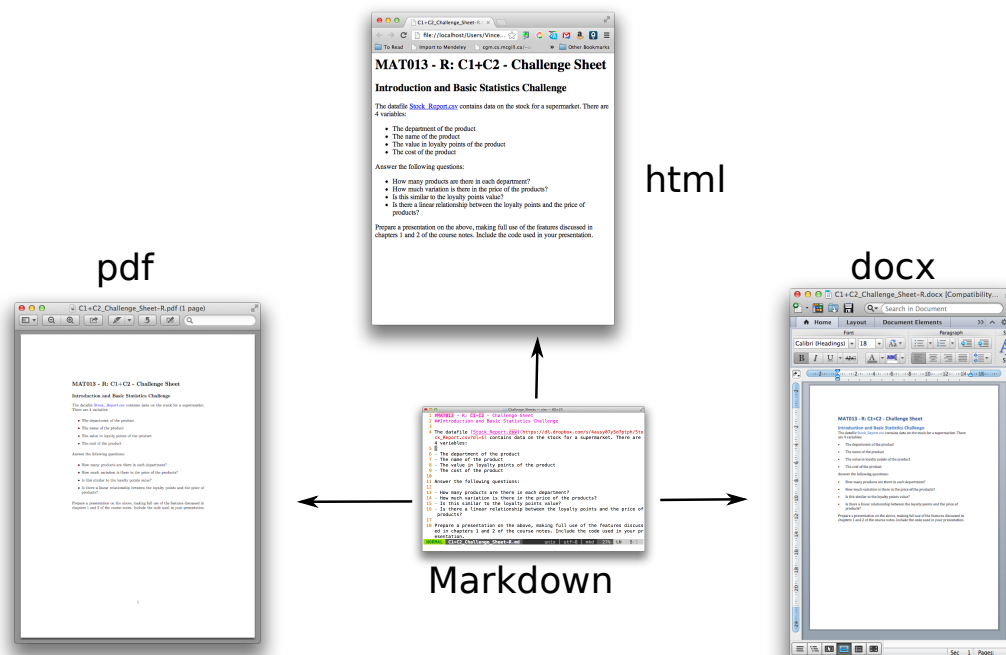


Figure 2: Creating universal notes using pandoc

3 Informing pedagogy

I have taken the opportunity to investigate a wide variety of pedagogies through this module. In this section I will discuss a variety of them before describing the particular pedagogy I believe I want to adopt. I obviously understand that I'm at a very early part of my career and my teaching methodologies will surely evolve. Furthermore I am not attempting to find "the best" pedagogy but more so the pedagogy that is "best for me". Having said that, in [12] a range of award winning teachers are interviewed and it seems that a general set of principles of good teaching can be identified. Here is a quote from [12]:

"The outcomes of the analysis was a set of principles of good teaching practice. Given the diversity of the sample there was a remarkably high degree of consistency to the principles. There was no evidence of any cultural disparity between East and West, indicating perhaps that academics in reputable universities constitute an international culture. The set of principles of good university teaching can, therefore, be seen as having international applicability."

As such I will now evaluate various pedagogical models in an attempt to identify a good practice of teaching.

3.1 Philosophy of education

There are three basic notions of educational philosophy ([10] gives an excellent account of these):

1. Ideas
2. Experience
3. Development

Ideas: With concepts such as Socratic dialog [18] an emphasis is placed on logic and a questioning of conceptions. In it's essence this is well suited to Mathematics although whether or not ideas relating to the encouraging of discussion of interpretation of ideas is relevant is an interesting question. I asked the question on Google Plus and was quickly answered by a fellow educator (Theron Hitchman from the University of Northern Iowa) who often enters in to a Socratic dialog with his students when using an 'Inquiry Based Learning' (IBL) approach [12] (including discussions of Theorems), the discussion can be seen here: <http://goo.gl/LakrE>.

“IBL teaching has a Socratic feel to it, and I find my classes are full of alternate interpretations of everything. common concepts, theorems,... everything. Allowing (requiring?) the students to share and defend their ideas at every meeting has a couple of benefits.

1) you get a better window onto the variety of student misconceptions. Some are quite subtle, and some are so far away from your expectations!

2) students seem to change their minds easier when these subtle errors are pointed out and explained by peers. I think maybe it is partly a ‘let me down easy’ thing, and partly it is that the students will choose more comfortable language to get the point across.

3) If you give them time, and focus your energy on asking questions, each class will eventually come around to the commonly accepted ‘mathematician’s understanding’, and they will be much less likely to make that same mistake again. (not that they won’t, but...)”

I found this short exchange with Theron very worthwhile. It was great to hear that Socratic dialog allowed for the discussion of *Interpretation* of mathematical facts.

As stated in [10] the philosophical notion of Idea has 3 main implications for teaching:

- an emphasis on theory before practice;
- an emphasis on logical thinking;
- a high value attached to liberal education.

Mathematics is of course very concerned with ideas and concepts and the above comment by Theron Hitchman seems to confirm that a Socratic dialogue is well suited to Mathematics. On the other side of the coin Mathematics is also very concerned with computation and applicability of ideas, this brings us to the next philosophical idea.

Experience: This notion is opposed to the previous in that it states that experience is more important than theory. There are two strands in this category:

- Empiricism (claiming that students are passive recipients of experience)
- Romanticism (claiming that students are active recipients of experience)

The educational implications of empiricism is that learning is a science and has general principles. Sitting well within this idea is Bloom's Taxonomy [4] which specifies different levels of learning as well as how they can be evaluated. In [22] Bloom's Taxonomy is mapped on to mathematics, highlighting particular examples and wording for questions that evaluate various levels of learning.

The implications of romanticism include that the purpose of education is the development of the whole person and that all learners are different.

The final philosophical idea builds on the notion of Experience.

Development: This notion compares a teacher to a gardener aiming to grow a plant 'to its full potential'.

The corresponding philosophy is 'Teleology' which is closely linked to ideas of Aristotle (plants grow, animals, grow and feel, humans, grow feel and think) [1]. Unlike the ideas of empiricism which places teachers at the center of the learning experience, this places students at the center of the learning experience.

Various implications correspond to this notion including that students must know why they are learning a topic and that they are motivated by goals.

3.2 Learning models

The three philosophical notions described in the previous section are worth being familiar with when looking at the three following pedagogies which aim to explain how students learn:

1. Behaviourism
2. Cognitivism
3. Constructivism

I am purposefully choosing to not discuss other more modern pedagogies (such as ‘social learning’, and/or ‘cultural learning’) as in particular the Social Constructivism of [24] seems to encompass them. I will briefly address some of the issues linked to those models in a latter section. How these pedagogies lie within the educational philosophies previously described can be seen in Figure 3.

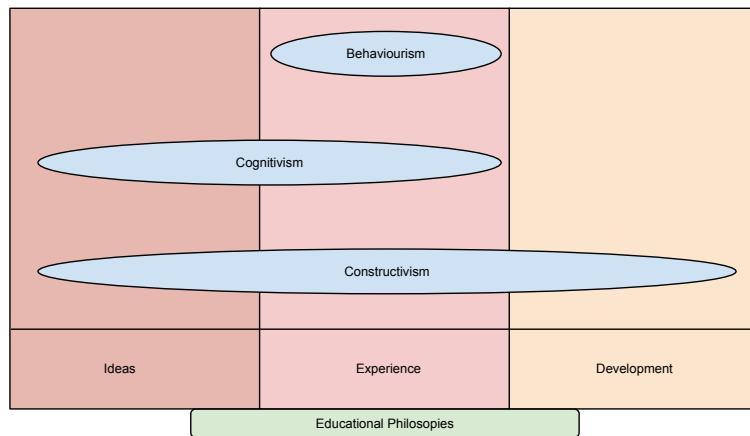


Figure 3: The philosophical basis to some pedagogies.

3.2.1 Behaviouralism

Behaviourism relates to classical ideas of conditioning and the early work of Pavlov [17] which for example showed how to train a dog to salivate when ringing a bell. There are various sub models within behaviourism but the class model is described in [10]:

“The classical behaviourist view has the stimulus leading directly to the response.”

In [23] teaching machines are described that could potentially put students through a series of stimuli which would let them “learn”. This notion is perhaps a reality today with the various Massive Open Online Courses (MOOCs) run for example by Coursera (www.coursera.org) and Udacity (www.udacity.com) in particular and flipped classrooms in general [3, 8, 15]. A further description of MOOCs and other modern teaching approaches can be found in [21].

Behaviourism is an efficient pedagogy in promoting rapid learning although it does not promote deep learning (with my experience of MOOCs I can relate to this). Behaviourism also has many negative connotations related to ‘power and control and has connotations of animal training’. Behaviourism is a deterministic theory: students are all the same. In general MOOCs attempt to remedy this by encouraging the use of social networks and flipped classrooms aiming to make valuable use of the gained lecture time.

3.2.2 Cognitivism

The way Cognitivism builds on Behaviourism is nicely explained in a single sentence in [10]:

“[...] stimulus-response does not explain how children can generate sentences they have not heard before.”

Cognitivism treats students as computers. It assumes that learning is the individual application of a mental process. Cognitivism places education in a technico-rational setting (recall the empiricism philosophy of education). As such it ignores the individualisation of learning by students.

3.2.3 Constructivism

Finally this leaves us with Constructivism which builds on Cognitivism by understanding not just how a student ‘perceives’ information but also how a student gives the information their own ‘meaning’.

There are various ‘schools of thought’ in constructivism:

- ‘Trivial constructivism’: teachers must not interfere with the individual process of reconfiguring perceived information.
- ‘Social constructivism’: teachers should act as a support for the learners thinking. This takes place in the **Zone of Proximal Development** [24].
- ‘Critical constructivism’: learners should construct ‘meaning’ of information by questioning ‘hierarchy’. This in essence aims to place teachers as peers.

I particularly like the ideas of Vygotsky [24] (the father of social Constructivism) . As an implication to education the idea of Scaffolding appears acting as a support which aims to help learners construct new knowledge.

A particular aspect of Social constructivism that I find attractive is that it indeed takes account of the social factor of learning. Social Learning and Cultural Learning are sometimes considered as pedagogic models in their own right yet I feel that for the purposes of teaching Mathematics it is sufficient to consider a Social Constructive model as the ideas of Mathematics are often independent of culture. Indeed, on a personal note, having experience learning in a variety of countries, cultures and as a result: social groups. My liking for Mathematics is not surprising: it was the one subject that did not change as and when I moved from country to country.

With regards to Mathematics and my own teaching, reflecting on the feedback analysed in Section 1 the above review of pedagogic models seems to strengthen my observation that student enjoyed and performed well in subjects that were taught in a student lead approach where students are encouraged to discover topics and construct a meaning on their own. This Social Constructivism approach is very similar to IBL approaches [14] and project based learning [2, 20]. The IBL approach in general is based on students working through problems alone and presenting them to the class with a high degree of flexibility allowed for students to discover further notions on their own. The quote given at the beginning of this document is by R. L. Moore the father of IBL. As such the lectures are extremely valuable as peer learning takes place, active assessment of student comprehension is always taking place and finally students are always constructing meaning themselves.

Note that some themes of this approach can be found in the interviews of award winning teachers, here are certain quotes from [12] that I found of value:

“[...] we established that the award winning teachers believed that teaching was a process of facilitating student learning”

“The real learning had taken place when I reflected on the material outside of the lectures, or I read about it or talked about it with colleagues”

3.2.4 What teaching pedagogy for me.

When considering Mathematics, there are various threshold concepts that can be described [5, 9, 16]. In particular the ability to not just carry out a computation but understand the computation is an important one. In [19] an account of a particular course that in a traditional sense would be noted as a success is given (for example learning outcomes where achieved). While [19] does not describe threshold concepts per say it defines 4 beliefs that are almost the opposite:

1. Formal mathematical concepts such as “proof” has very little to do with “real world problem solving”.
2. If a student is going to manage a mathematical problem they will do so in less than 5 minutes (implying that if students don’t solve a problem in 5 minutes they might as well stop).
3. Really ‘getting’ mathematics is only doable by geniuses.
4. Students do well in class by performing tasks and doing well in school (implying that ‘getting the work done’ will do).

Moving away from these beliefs is achieved using a constructivist approach in general and IBL in particular.

The issues related to an IBL approach correspond to inclusivity of this approach which might not cater well to students less comfortable with expressing themselves in front of a class. Further problems might arise with the direction of the course as students are encouraged to explore various directions of independently ensuring that intended learning outcomes are achieved could prove problematic.

I plan to address this issue by ensuring that all my class content is available to the class prior to the lectures. Indeed, the content will be prepared as if a classic lecture style course was going to be delivered. Further to this, student will also have access to videos of the lecture content: a flipped classroom. The reason behind such an approach is that a flipped classroom will ensure that the required scaffolding as prescribed in classic Vygotskian models [24] is in place to ensure a certain direction for the IBL approach.

This approach should ensure that students will gain maximal value from contact time, however if content is to be made completely available to students how can I be sure that they will even turn up?

This is a common concern about a flipped class methodology but [3] gives evidence for the fallacy of this concern:

“An often-heard comment relating to provision of material to students (usually lecture notes) in advance of class sessions is ‘If you give them the lecture notes, they might not or won’t turn up’. We gave students not just lecture notes, but in effect the entire course content in advance of class sessions: it might reasonably be asked did we not have empty lecture theatres by week 5? In fact, we did not see any evidence of a significant decline in lecture attendance 1, which we were able to ‘measure’ by observing a relatively constant number of total clicker votes per question (across 140 individual clicker question episodes) as function of a time period spanning 11 weeks of the course. There was a slight decline towards the final week of teaching in the semester, perhaps partly explained by the effects of a long teaching semester taking its toll and the looming shadow of degree examinations 2 weeks after the course concludes. This teaching methodology, therefore, provides evidence against the ‘no notes in advance’ argument as a technique to maintain student attendance and engagement.”

Further to this in [3] a detailed account is given as to the effectiveness of a flipped classroom approach as far as learning is concerned which I feel further evidences the effectiveness of this approach for Mathematics. As shown in Figure 4 the delivery of content which is often quite intense in a classic Mathematics lecture can take place independently to ensure that comprehension and construction of meaning can take place with the help of a lecturer.

A potential negative aspect to a flipped classroom is non-engagement of students, to ensure that this is not a concern, the IBL approach will encourage students to present, explain, and work on solutions to various challenges that I shall present to them. As such it is hoped that construction of meaning will also take place outside of the class and activities in the class will ensure peer learning and further scaffolding to ensure that all ILOs are met.

I feel that placing myself as a Social Constructivist with a hybrid IBL/flipped classroom approach will fully enable me to take advantage of both models whilst avoiding the potential negatives. As noted in [12] the use of technology in particular and flipped classrooms in general sit well in a Constructivist framework. Furthermore an IBL approach and the corresponding socratic dialogs surrounding student presentations sit very well in the ZPD of Vygot-

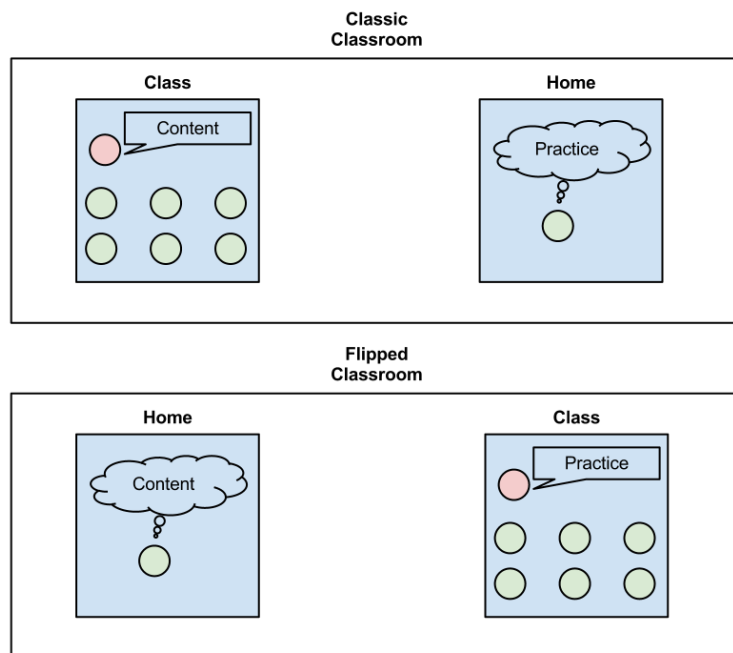


Figure 4: A diagrammatic explanation of a flipped classroom.

skyan models.

Returning again to the feedback discussed in Section 1 I feel that investing myself fully in this approach will improve the learning experience of my students.

In an upcoming course (the lesson plans of which have been peer reviewed for this portfolio), I have decided to use this approach. A talk I've prepared explaining the slightly unorthodox methodology can be found in the documentations accompanying my lesson plan.

3.3 Consider social and cultural learning

In Figure 3 and in my previous discussion I have purposefully ignored certain learning models concerned with the group interactions related to student learning [10]:

- Social Learning

- Cultural Learning

These two models are concerned with the placement of a learner within a group setting and the impact of the group on learning. The first states that ‘learning does not occur in isolation; it is socially constructed’ whilst the second is interested with concepts more closely linked to inclusivity saying that ‘students’ cultural perspectives influence how they construct knowledge’ [10].

Initially the IBL aspect of my proposed teaching approach should ensure that learning does not take part in isolation for my students, however due to certain cultural aspects in a multi-cultural class it might prove difficult for students to engage fully. To remedy this I plan to encourage group work as much as possible in my teaching. Groups will be constructed in a way as to ensure that students are able to fully reach their potential.

As such I will also look at using virtual communities. There are various papers that look at the use of discussion boards and/or social media in teaching [6, 7]. There are various benefits to this: in [11] it is in fact shown that engagement with twitter improved students’ marks. As highlighted in [25] there are various pitfalls, to avoid these I plan on using a Google Plus community. In [6] various social networks are analysed and an advantage seems to be allocated to Google Plus due to it’s versatility, interestingly the paper was written prior to ‘communities’ being made available. I believe that communities will allow for students to interact and peer learn. Importantly students do not need to join Google Plus to use it, this in itself (from a technological point of view) is a strength.

4 Building and participating in learning communities

I have participated and contributed in many ways to learning communities:

- Participated in discussions on the PCUTL discussion boards;
- Participated in various discussions on social media on the subject
- Blogged reviewing various pieces of educational literature;
- Participated in an HEA meeting looking at the teaching of programming in Mathematics programs.

4.1 PCUTL Discussion board

I participated in various ways with the PCUTL discussion board. Figure 5 shows a screenshot of my Module 1 lesson plan on the discussion board.

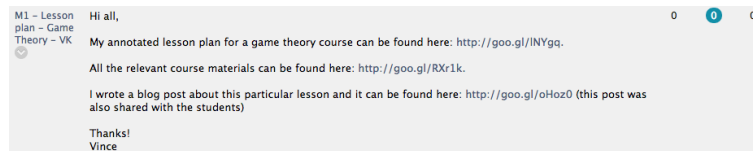


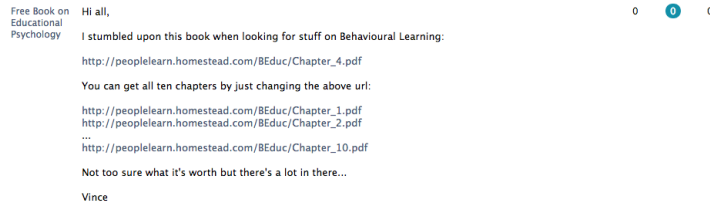
Figure 5: My Module 1 lesson plan on the PCUTL discussion board

Figure 6 shows a screenshot of my Module 2 lesson plan on the discussion board.

```
Hi all,  
  
Here is my second lesson plan. It is in fact an entire plan for a module as it involves a variety of teaching methodologies.  
  
The "module plan" can be found here:  
  
https://www.dropbox.com/s/ha16rxjw0ot74gi/Module\_Lesson\_Plan.pdf  
  
This plan is for a module on our MSc teaching programming in two statistical packages: SAS and R. This module is taught over 5 weeks with 4 mornings worth of teaching and 1 class test at the end. The lesson plan for each day of teaching can be found here.  
  
- Week 1 - Chapters 1 and 2: https://www.dropbox.com/s/rintlgu3po0hr50/C1%2BC2\_Lesson\_Plan.pdf  
- Week 2 - Chapter 2: https://www.dropbox.com/s/xaxmf22elcm3ewd/C3\_Lesson\_Plan.pdf  
- Week 3 - Chapter 3: https://www.dropbox.com/s/joxcsq83jkkock/C4\_Lesson\_Plan.pdf  
- Week 4 - Chapter 4: https://www.dropbox.com/s/4doodv8m73s6d5y/C5\_Lesson\_Plan.pdf  
  
and Week 5 is the class test.  
  
Each of those lesson plans details the particular ILOs of each day while the overarching document (the module plan) describes in detail how I plan on creating learning opportunities during contact time as well as non-contact time. In particular I'm using a flipped classroom approach as well as an Inquiry Based Learning approach (similar to project based approaches). In that document I also consider aspects related to inclusivity.  
  
The course starts on the 13th of March and I'm still working on preparing a few things but most resources are already done and you can see them all here (this is a draft site that I will complete in time for the course):  
  
http://drvinceknight.github.com/MAT013/  
  
(In particular I haven't finished screencasting the videos for the R portion of the course and there are a couple of other things that have not been done).  
  
I look forward to hearing any comments!  
Vince
```

Figure 6: My Module 2 lesson plan on the PCUTL discussion board

One of my early posts on the discussion board was some links to a free book available online discussing various pedagogic models as see in Figure 7.

A screenshot of a forum post on the PCUTL discussion board. The post is from a user named Vince and is titled 'Free Book on Educational Psychology'. The content of the post includes a greeting 'Hi all,', a statement 'I stumbled upon this book when looking for stuff on Behavioural Learning:', a URL 'http://peoplelearn.homestead.com/BEduc/Chapter_4.pdf', a note 'You can get all ten chapters by just changing the above url:', a list of URLs for chapters 1, 2, and 10, and a closing statement 'Not too sure what it's worth but there's a lot in there...'. The post has 0 replies and 0 likes.

Free Book on Educational Psychology

Hi all,

I stumbled upon this book when looking for stuff on Behavioural Learning:

http://peoplelearn.homestead.com/BEduc/Chapter_4.pdf

You can get all ten chapters by just changing the above url:

http://peoplelearn.homestead.com/BEduc/Chapter_1.pdf
http://peoplelearn.homestead.com/BEduc/Chapter_2.pdf
...
http://peoplelearn.homestead.com/BEduc/Chapter_10.pdf

Not too sure what it's worth but there's a lot in there...

Vince

Figure 7: Sharing a book on the PCUTL discussion board

I also entered in to various conversations with my peers including a discussion on the subject of discussion boards itself. Figure 8 shows some of the discussion.

I also gave some feedback with regards to some of my peers lesson plans as shown in Figures 9 and 10.

Due to my interests in flipped classrooms I also shared some resources on flipped classrooms on the PCUTL discussion board as shown in Figure 11.

This led to a further communication with a PCUTL peer on the discussion board as shown in Figure 12.

Whilst I found this process quite rewarding and the exchange of concerns and resources with my peers interesting I think that the technical platform used (as I discussed on the discussion board itself) is quite outdated and does not facilitate an easy transfer of communication. Before starting PCUTL I already made quite a big use of social media. In the next section I will give certain examples of some of the great interactions I have had with fellow teachers.

4.2 Use of Social Media

My social network of choice is Google Plus. There are various reasons for my choice of social platform but do not feel that it is worth explaining them here (I have written a blog post describing my experiences of using Google Plus as an academic: <http://goo.gl/fvSMV>).

I have found certain resources for this very portfolio on Google Plus as shown in Figure 13.

Dear all,

Is it just me, or is this discussion board software very cumbersome to use, and not at all user friendly? Is anyone else managing to print posts out within the Boards, for example, or are they – like me – having to find excruciatingly complex work-arounds? How do you edit your posts if you discover – to your horror – that they contain embarrassing mistakes?

Setting aside any moral standpoint one might have about using Facebook, I do think that their user experience is excellent, and I keep looking on this Discussion Board for the 'like' button!

I am not sure that I will be recommending this space to my students at this rate ...

Richard

I agree completely.

There are a few posts I don't seem able to comment on (some lesson plans) and as I haven't had any comments on my lesson plan I also wonder if that's because of people not being capable of commenting...

I don't use learning central with my students at all (I prefer to use my own website as I know it'll crash a lot less and is more fit for purpose as I've designed it myself) and certainly wouldn't consider using a LC discussion board with my students. I'm not on facebook anymore myself. When G+ came out I completely migrated to that (as issues relating to students seeing stuff about me that I don't want them to doesn't exist – you have total control) and have used that to chat with students last term.

There was a good paper discussing the use of social networks (facebook, twitter and G+ are discussed) with teaching:

– Here are some slides: <http://www.slideshare.net/gannodg/asee2012>
– Here is a preprint of the paper: https://www.google.co.uk/url?sa=t&ct=j&q=&esrc=s&source=web&cd=2&ved=0CCMqFjAB&url=http%3A%2F%2Fwww.asee.org%2Fpublic%2Fconferences%2F8%2Fpapers%2F5365%2Fdownload&ei=1r77ULLDwOsa-0QWPwIDwDA&usq=AFQjCNEpUjwzPUBUu_4TCXRPWZBE_NFA&sig2=mVLSuqVvREHUSQ5FAcag8bvm=br.41248874_d.d2k

Vince

Trying to more or less reply to everyone here.

With regards to finding people who use G+ I have to admit that I have the opposite problem. I've learnt so much from G+ and struggle to keep up with the interesting people on there. If you do want to give it a try, tag me in a post (you can find me here: <http://goo.gl/ibYqK>) on there (otherwise I won't notice you, again it's a very busy place) and I can point you towards communities of people (educators, scientists, you name it there are literally too many people to circle on there). I wrote a blog post about using it a while back (if it's of interest): <http://goo.gl/fv5MV>

I literally have to filter people I circle as I just can't keep up...

With regards to putting all your eggs in to one basket, that's not a bad argument at all but obviously it is the case for any commercial product for which we're not the customer but the product (facebook, google, any other free site etc...): the plug can just be pulled... (I actually use google sites for my own website and plan on migrating to my own server soon, migration shouldn't be too big a problem as you can just pull down the html but perhaps this was different with their previous incarnation...)

With regards to how I communicated with students on there, it was a mixture of public and private posts (that's one of the great things about G+, it's all very easy to control, I've been told that's easier on fb now but again I don't use it so wouldn't know). I'm a huge open-science and open-education advocate/fan so try and post most of my education and research stuff publicly and so have had some conversations with students in public (for example something as simple as students pointing out typos in my notes) but have also had a more private discussions (when the students wanted it) on there as well. G+ have recently brought out a community feature which I plan to use on an upcoming course, not sure how that will work :) I put up my previous portfolio on my website and will put up module 2's one as well in which I'll probably talk about all this in more detail in case anyone's interested (I'm not saying it's worth much and I'm sure that the various solutions depend on each of our own personalities...)

I forget if that was everything that people had discussed (again this discussion board is pretty terrible)

Just remembered someone saying something about Cardiff should provide something like this. I guess the answer is that they do (this discussion board) but like with so much else there's a lot better out there (I pretty much use nothing that is provided by insrv, there are better solutions on all dimensions for my needs in my humble opinion).

Cheers,

Vince

Figure 8: Discussing discussion boards on the PCUTL discussion board

Parent Post

Fascinating lesson Richard!

I think you've given a very impressive set of comments with regards to inclusivity. My main reflection throughout was indeed what happens if/when a student got distressed due to the nature of the images.

Due to the nature of the course it brings with itself a question as to whether or not any modification are "reasonable". I think you address this given that you explain to students:

"The students are advised that, should they become distressed, the session will be suspended, so that the appropriate steps can be taken."

One potential worry that remains (but again I'm unsure whether or not there is a "reasonable adjustment" that could be made) is whether or not certain religious or cultural barriers would stop a student from wanting to touch the materials. Is this something that you have considered?

Parent Post

Dear Vincent,

Thankyou for your valuable comments.

I have given some thought to how I prepare the students for the emotional impact of the material that they will see whilst doing their Student Selected Component (SSC) in forensic pathology in our department.

During their induction session with me, I discuss the range of emotions and physical feelings that might be experienced during their SSC, mainly when observing autopsies, but also when looking at photographs. I ask them about their experience thus far about observing dead bodies, and they have all been learning anatomy via dissection of cadavers, so have some relevant experience. They do not usually have any previous experience of seeing traumatic injury in A&E, for example, and this is a potential problem of having the SSC with us in the very early stages of the medical curriculum.

I have become more 'up front' about the possibility of being distressed by the subject matter, and am also spending some time with the students at the end of the SSC to explore how they felt during their time in our department. I have already had some very useful discussions with them about this, and have found that a common feeling is that seeing a recently dead body is a 'surreal' experience, which can initially make students feel very uncomfortable. I discuss with them how one copes with such experiences in medicine, and in forensic pathology, and I have found that some of the students have developed their thoughts about this aspect of medicine in their reflective diaries that I ask them to complete following their SSC.

With regard to the cultural aspects of touching the weapons/ implements, I had not thought about their use/ usefulness in this context. However, there does seem to be a general reluctance on the part of some students (not from any specific cultural background, ethnicity, or sex) to pick the weapons up. After some encouragement, and some specific questions which prompt the student to pick up a particular weapon (an axe, for example), this reluctance seems to be overcome, but I am keeping the use of the weapons under observation, to see whether they can be used in alternative ways, whilst still retaining the usefulness of their physical presence/ availability.

Is there a way, do you think, that I could utilise these weapons differently?

Thanks again Vincent!

Many regards,
Richard

Parent Post

Hi Richard,

Apologies for the late reply.

As I had said in my original query I'm not sure if my comment/concern was in fact reasonable. Having said that thanks for your reply, it certainly seems like you have considered most of the aspects I could think of.

I'm afraid that I can't think of any better uses myself.

Good luck with the rest of the portfolio!
Vince

Figure 9: Discussing inclusivity in a forensic medicine lesson plan

Hi Jeremy,

Your lesson plan description certainly caught my eye. Congratulations for finding an excellent topic with regards to PCUTL, I realise that's obviously not the motivation but I thought it was great how this lesson plan addressed issues of inclusivity as well as TEE (as well as technology itself with something as "new" as Graph Search, wasn't it just announced a couple of weeks ago? Cool).

With regards to the actual lesson plan, my first comment would be with regards to inclusivity. Not as much with the content and/or delivery but with the lesson plan itself. The automatic translator has got a few bugs in it (more or less minor although once or twice I wasn't sure what was going on and had to ask my fiancée to translate the original). I understand that this is the lesson plan itself and not actually targeted towards the students but it got me wondering about other resources for your class that you might do the same with. I realise of course that this might not be a reasonable concern: this is a Welsh course. Students are expected to speak/read Welsh, so perhaps ignore this comment, maybe it's just me thinking out loud...

My other main concern would be with regards to the subject area (homosexuality in Tehran). Scenarios like those we discussed during the PCUTL workshop might well occur. I'm not on facebook so I apologise if I'm being ignorant but if your students searched for "men who are romantically interested in men" would a bunch of profiles appear of people who are essentially acting "illegally" in their own country? I would be a bit worried if I had a student in my class who was perhaps homophobic and would somehow use that information. I'm perhaps being a bit over cautious here but I wonder if this is something you have considered?

Fair play to you to be willing to risk these issues though as I feel that this class is extremely well designed. I agree with all your concluding points and appreciate your constructivist methodology. The use of technology is also ever present and strengthens the students overall skills. I suppose in future years, if other students had indeed videoed their presentations you could use them as resources for the current students...

Best wishes and good luck with the rest of PCUTL,
Vince

Figure 10: Discussing certain issues of inclusivity in a Welsh lesson plan

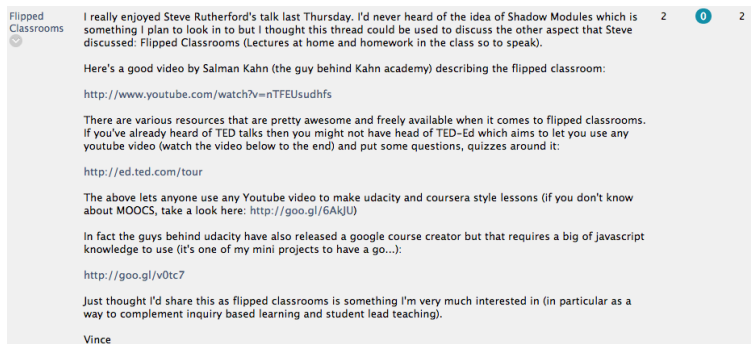


Figure 11: Sharing flipped classroom resources on the PCUTL discussion board

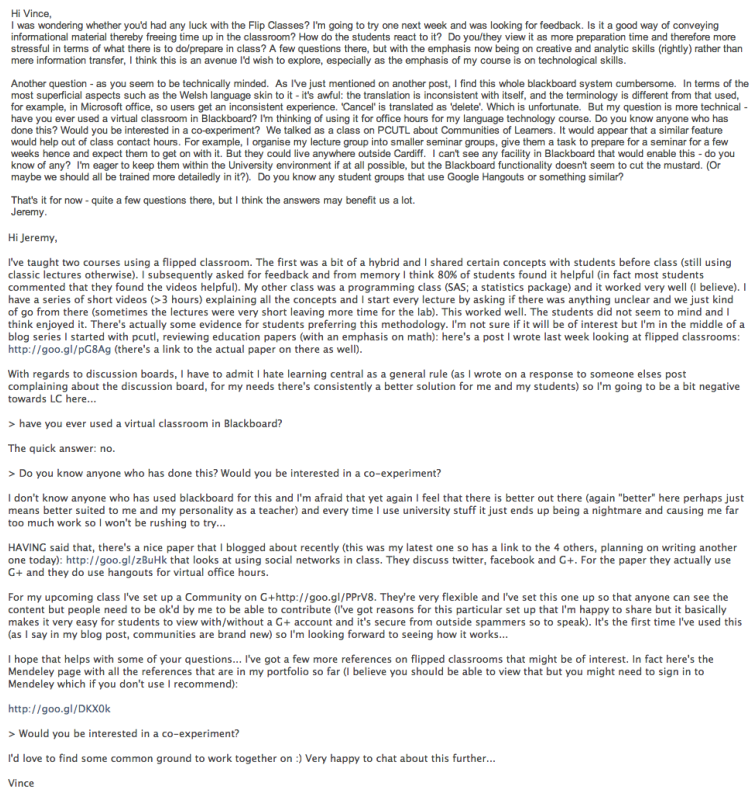


Figure 12: Chatting with Jeremy Ewas on the PCUTL discussion board

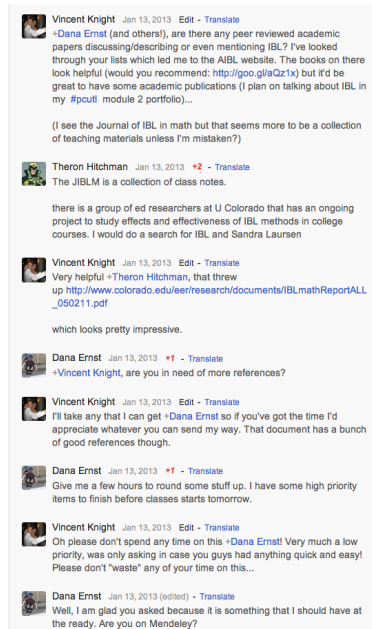


Figure 13: Finding educational resources on Google Plus

I've had discussions discussing teaching approaches as shown in Figure 14.

I've also had some very useful pointers and discussions of my own teaching resources as shown in Figure 15.

I've shared 'circles' of educators as shown in Figure 16.

Finally, as discussed previously, I have used and continue to use Google Plus with my students encouraging them to not online interact amongst each other but also to engage with various teachers and practitioners in the field of Mathematics in general and Operational Research in particular.

4.3 Educational Literature Review

As well as using Social media I also have a blog that I use to post about my teaching and research (for example here is the blog post related to the class I taught for my peer reviewing module 1: <http://goo.gl/oHoz0>).

Patrick Honner Jan 25, 2013 · Public

It may be a misunderstanding, but this article suggests you can potentially get a degree from UW entirely by passing exams, without ever actually taking a course there. If that's true, why do we need the university at all?

College Degree, No Class Time Required

University of Wisconsin will grant bachelor's degrees based on a person's knowledge as demonstrated in online tests, not on class time or credits, the first such offering from a public university syst...

Theron Hitchman Jan 25, 2013 · +1 · Translate

I wonder what accrediting agencies will say about this.

Vincent Knight Jan 25, 2013 · Edit · +1 · Translate

In my undergraduate class there was a guy who never went to any classes. He would come in to the university and sit in the cafe with books. He managed to pass and get a degree... He was a smart guy and barely scrapped through the exams but whenever I'd suggest he go to class he was adamant that there was no point... He was never well prepared for the exams which is why he only scrapped through...

Lori "Mathhead" Johnson Jan 25, 2013 · +Patrick Honner You misunderstand a little:

In Wisconsin, officials say that about 20% of adult residents have some college credits but lack a degree.

Expand this comment

Patrick Honner Jan 25, 2013 · +2 · Translate

The idea of university merely as accreditor is precisely what I find strange here. As far as I can tell, the university isn't playing any meaningful part in this process: typically its role would be to educate students, but it isn't doing that here. Here, the students have educated themselves. So why is this university involved at all?

Vincent Knight Jan 25, 2013 (edited) · Edit · +1 ·

Here's a quote about the role of teachers in the "future" from a book I'm reading through at the moment (<http://goo.gl/0k8A3>):

"If knowledge can be accessed in a multiplicity of ways, then learners will choose teachers for their ability to engage, both with the knowledge and the learning. It will require a different set of aptitudes from the teacher, require artistry rather than a set of technical skills. Teachers will have a role in motivating learners through personal coaching, and in scaffolding support learners in their personal projects. Teachers will be freed from knowledge transmission or duplication, to act as critical friends and guides for learners."

I guess this move is saying that for some (as you point out -Lori "Mathhead" Johnson) "friends" and "guides" are not needed... ?

Theron Hitchman Jan 25, 2013 · +2 ·

As I reflect on this a bit more, I no longer think that accrediting agencies will give UW any trouble.

In my heart, I am way out on a traditionalist end of answers to "what is college for?" I want reflective self-improvement of academic skills: Deep.

Expand this comment

Patrick Honner Jan 25, 2013 · +2 · Translate · Reply

I think that quote summarizes many of my thoughts about teaching, +Vincent Knight, and it's as true of the past and present as of the future, as far as I'm concerned.

It's especially true in high school, where teachers are generally not authentic content experts in their subject. Teachers who see their primary (and in some cases, only) role as disseminators of information can, and probably should, be replaced by videos and computer programs.

Figure 14: Discussing good teaching

Vincent Knight Dec 6, 2012 · Public

How to share a taxi fare

I've been working on some collaborative game theory stuff over the past few days with an aim to explain the Shapley value to the Cardiff Maths MSc ORStats students next Tuesday. I've written up a Sage Mathematical Software System interact that can be used to calculate the Shapley value and also just done a quick screencast that explains it briefly using the example of sharing a taxi fare amongst 3 people.

(The interact is available to play with here: <http://interact.sagemath.org/node80>)

#gametheory #mat2012

Shapley Value

Given a characteristic function $G = (N, v)$ the Shapley value of a player $i \in N$ is given by:

$$\phi_i(G) = \frac{1}{|N|!} \sum_{\pi \in \Pi(N)} \sum_{j \in N: j \text{ precedes } i \text{ in } \pi} (v(S \cup \{i\}) - v(S))$$

Calculating a Taxi Fare using the Shapley Value

In this video I describe an important idea of cooperative game theory: T...

Brandon Hurr Dec 6, 2012 · +1 · Translate

+Vincent Knight, I really liked this demo. It was easy to follow and you avoided getting tied up in the equation. One thing. On the first line when you are doing the permutations you had 6, 6, and 36 and said that added up to 42. I believe you meant 6, 6, and 30, but perhaps I misunderstood.

Vincent Knight Dec 6, 2012 · Edit · Translate

Thanks +Brandon Hurr, you're completely correct! I'll add something to the description to point out the error!

Figure 15: Sharing a video on the Shapley value



Figure 16: Sharing a community of educators

For this module of PCUTL as I made it a point to read a lot of education literature I decided to blog short reviews of as many pieces of literature as I found time to do. A list of these posts with links to each one is available at www.vincent-knight.com/teaching/pcutl.

The blogs posts were quite well received:

- Currently more than 700 views
- Most viewed post was my first one (currently 136 views and one short interesting conversation) which reviewed [19].
- Least viewed post (currently only 48 views) which reviewed [22].

I received some warm comments on social media. Here is a quote from a teaching in the USA who I was thanking for sharing one of my posts on Twitter to his 2049 followers.

“My pleasure—I’m enjoying recent focus on math ed issues. I think a lot about learning and teaching, but I wouldn’t say I’m extremely well-read on the topics. It’s nice to following along with what you’re reading, as well as have another voice in the conversation!”

4.4 HEA Meeting on programming

In the next academic year I will be teaching a new first year module aiming to teach computer programming for Mathematics. With this in mind on the 4th of February 2013 I went to a one day HEA workshop entitled: ‘HEA STEM (Maths, Stats and OR): Experiences of learning programming within a Mathematics course’.

There were 20 delegates present from universities all of the UK. It was a great networking opportunity and I was able to learn quite a few things from the experiences of other teachers which I will take forward in the preparation on of a module I’m teaching next academic year.

5 Further development

There are various dimensions in which I can expand my professional development as a teacher:

- Further understanding of pedagogic models;
- Further understanding of methodologies;
- Further building and participating in learning communities.

On a very tangible note however, an immediate issue that I aim to evaluate is the marking of group projects. There is a growing body of literature aiming to inform best practice when it comes to recognizing individual performance in group work [13].

As I plan to use a lot of group work in my teaching I feel that this is something I need to look at closely. An initial investigation of the literature [13, 12] shows that most approaches make use of feedback from students to evaluate the individual contribution of all group members. I do not see any alternative to this approach but do believe that a more sophisticated and fair approach could be used to map perceived contributions to marks.

Following discussions with my mentor Professor Paul Harper, the approach we propose would place group work within a cooperative game theoretic framework and would use the Shapley value to fairly recognise individual contributions. The Shapley value can be calculated using the following

equation (I realise that this is given in this document without sufficient explanation):

$$\phi_i(G) = \frac{1}{|N|!} \sum_{\pi \in \Pi_N} \Delta_{\pi}^G(i) \quad (1)$$

There are issues of transparency that must be overcome when using such an approach but in a Mathematics department these should not be insurmountable. The idea revolves around the potential contributions of all subgroups within a group. Consider the following feedback obtained from a group of three students ascertaining what potential of the total mark would have been obtained by each subgroup of the group:

S	$v(S)$
A	40
B	40
C	20
$\{A, B\}$	70
$\{A, C\}$	60
$\{B, C\}$	40
$\{A, B, C\}$	100

Using equation (1) the Shapley value can be calculated for each member of the group:

Student	Φ
A	45
B	35
C	20

If we assume that the marking criteria states that group work would be marked with 70% of the mark being dependant on output and 30% being dependent on group work a fair mark could be given using the following formula:

$$m(i) = M \times \left(.7 + .3 \times \frac{\Phi(i)}{\max_j \Phi(j)} \right) \quad (2)$$

Where M is the total mark given to the project. In our above example, if we assume that the project was worth 85 the marks given to each individual would be:

Student	Mark
<i>A</i>	85
<i>B</i>	78
<i>C</i>	71

As discussed this approach still needs to be carefully considered. One of the immediate disadvantages of this approach is its transparency. Various resources would need to be put in place to ensure that students *understood* the approach. As described previously I feel that in a Mathematics department this is not unsurmountable. Furthermore, there are various advantages to this approach. First of all, it is theoretically sound and is in fact the only ‘fair’ approach of distributing marks. Various other aspects are advantages to this approach such as the fact that the only way for students to maximise their marks is for them all to contribute equally.

Further investigation of this approach is an exciting prospect as I feel it would be of publishable quality in a reputable education journal.

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VK - **Annotated** Game Theory

Annotated Lesson Plan

1 Description

This is a lesson plan for the afternoon “teaching period” which aims to cover the Game Theory part of the syllabus of the MAT001: OR Methods MSc module.

Annotated to take in to account inclusivity from workshop: In blue: the essential academic competences; In red: potential barriers; In blue: example of good practice; In orange: potential improvements.

The technical content of the module aims to cover the following topics:

- Normal Form Games
- Pure Nash Equilibrium
- Mixed Nash Equilibrium

The intended learning outcomes for this module.

On completion of the module a student should be able to:

A Describe a general appreciation of the ideas of game theory.

Basic academic skills required: reading

B Interpret the normal form of a game.

Basic academic skills required: comprehension

C Use ideas such as common knowledge of rationality and dominance to identify dominated strategies.

Basic academic skills required: comprehension and basic computation

D Identify best responses to certain strategies in games.

Basic academic skills required: comprehension and basic computation

E Use the two above skills to identify pure Nash equilibria in games.

Basic academic skills required: comprehension and basic computation

F Describe the basic ideas of mixed strategies.

Basic academic skills required: comprehension and basic computation

G Compute mixed strategy equilibria using the equality of payoffs theorem.

Basic academic skills required: comprehension and basic computation

H Describe an appreciation of the relationship of state of the art research and the topics they have learnt.

Basic academic skills required: comprehension

2 Lesson plan

Time	ILO	Teacher Activity	Learner Activity	Resources
Before the class	A,H	Invite student to look at videos: <ul style="list-style-type: none"> • EU-EMS Interface • Introduction to mixed strategies 	View videos Potential issues with comprehension and/or access to internet	Videos
0-20mins	A,C, D,E	Explain 2/3rds of average game	Play 2/3rds of average game Language or other reading disability	Slides + Handouts
20-40mins	B,C, D,E	Lecture on Normal Form Games and Pure Strategies	Listen Language or other reading disability	Slides + Videos
40-50mins	NA	Break	Break	NA
50-80mins	A,D, E	Run PD tournament	Active participation in PD tournament: <ul style="list-style-type: none"> • Group discussion of strategies • Inter group discussion of strategies • Duel Language or other reading disability	Playing Cards
80-100mins	F,G	Lecture on Mixed Strategies	Listen Language or other reading disability	Slides + Sage Interact
100-130mins	F,G	Help if needed	In groups of 2 work on Sage lab sheet A part from issue with language barriers within a group I don't foresee any potential barriers.	Sage lab sheet and interact

Main potential barriers: comprehension due to language and reading of lecture material.

3 Assessment

The above ILO would be assessed as part of the wider assessment for MAT001: part of the exam. This type of assessment is well suited to the subject area as it will allow for evaluation of each ILO.

The standard barriers are to be expected when it comes to a written exam.

4 Comments

This lesson plan is designed in such a way as to ensure that most learning styles will be catered for. Indeed students are initially introduced to Game Theory through a game itself. This should allow students to be put in the place of a decision maker and thus allow for the more complex concepts to be easier to understand. Furthermore, it is hoped that this will relax students and make way for better students participation throughout the course.

To complement the two participation activities there are two breaks scheduled which are put in place to ensure that students won't be tired and their concentration will not falter. Apart from these activities information will also be delivered through two short lectures and there is also a group exercise scheduled which will hopefully invite peer learning. This exercise is intentionally different to all other learning exercises presented in this period. It makes use of programming and relates to a video that students will hopefully watch before the lecture.

Finally there is a tutorial session scheduled that will allow for students to carry out classical pen and paper exercises which should help them prepare for the exam. This tutorial will be taken by 2 postgraduate students to hopefully offer a different perspective however I will still be present in case I am needed.

Examples of good practice: The main potential barriers for this lesson plan are with respect to communication. The prior viewing of videos and sharing of course material should help with this issue. They allow the students to see the content prior the class and of course “listen, read” at their pace so that if a student did not understand a particular point they have the time to “re-listen, re-read”. I give as much content to my students as possible prior to the lecture, I do this to ensure that they have as much time as possible to familiarise themselves with the content. I also feel that I endeavour to speak clearly and the rooms are equipped with audio feedback loops so students can use them if they choose.

Potential improvements: All of my notes are delivered to the students in pdf format. This is by design. I want my students to have access to the content anywhere without the need for proprietary software (all my teaching is done with open source software). The pdf’s allow students to view the notes where they want them and also to zoom as necessary. The source code for all my notes are also available online so that if need be the students could change the notes to make them easier to read. Having said that one potential improvement would be to give students notes in multiple formats so that they could read them as they wished: html, pdf, md, docx etc... This is easily done using pandoc.

MAT013: Module plan

(This sheet was last updated on February 1, 2013)

1 Description

This plan is a description of the teaching methodologies for the entire MAT013 module. This module aims to teach students how to use two statistical packages: SAS and R and is taught over 4 morning long periods over 4 weeks as shown in Figures 1 and 2.

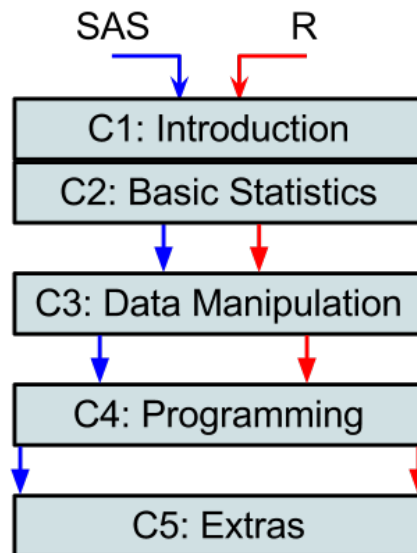


Figure 1: Outline of the course

The course will be taught in a non traditional way use various forms of pre-class (non-contact time) instruction as well as a peer lead inquiry based learning approach. This methodology is justified in my PCUTL covering claim and based on a thorough investigation of the literature.

Figure 3 summarises the proposed approach.

2 Discussion

I will here discuss in detail how the above approach relates to issues of:

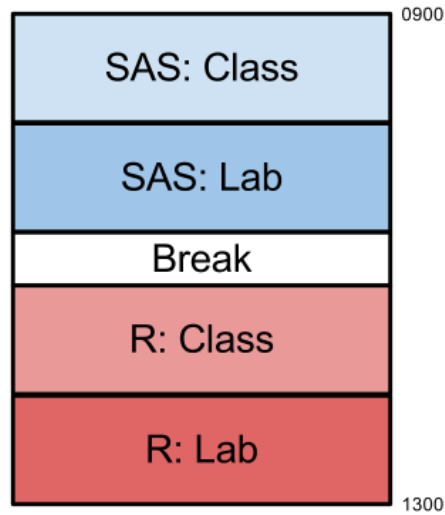


Figure 2: Day schedule

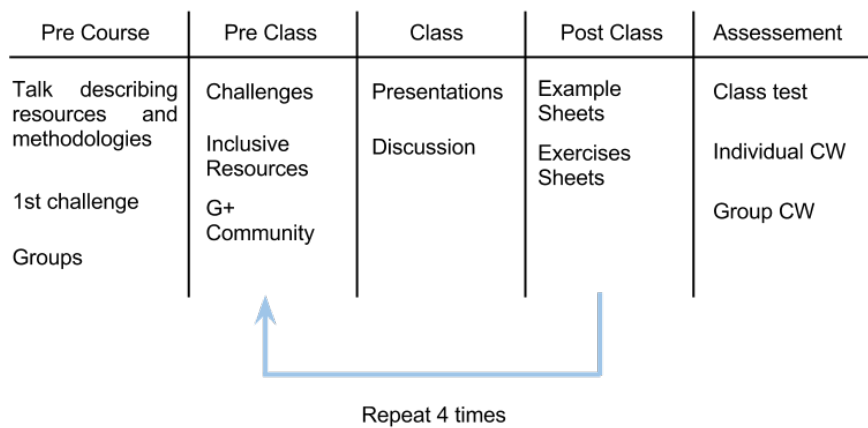


Figure 3: Summary of module approach.

- Inclusivity;
- Contact and non-contact time teaching;
- Technology enhanced education.

2.1 Inclusivity

Various issues of inclusivity have been taken in to account:

- All data sets have been carefully considered to avoid issues of heteronormality, gender bias and/or religion;
- All teaching rooms used are fitted with inductive audio loops;
- There are no issues related to access to the various teaching rooms required;

The student groups (already assigned) have taken in to account various aspects of the literature (again these are detailed in my covering claim), ensuring a mix of age, gender and cultural heritage. Importantly, the MSc does quite a lot of group activity and so these groups are purposefully aiming to build on strong relationships but also encourage new ones.

The use of videos in a flipped classroom approach also enters in to the realm of inclusivity as the videos can be viewed easily on most platforms. Furthermore, the videos cover the entirety of the course contents (approximately 4 hours of videos) and should enable students to overcome issues of communication by viewing the videos at their own pace.

Finally all teaching materials have been written in markdown and translated via pandoc in to various formats:

- .pdf
- .md
- .html
- .docx

The first 3 formats of the documents ensure that students will be able to read the content on any operating system and/or platform without loss of formatting etc. The last 3 formats ensure that students can if need be change the font and/format of the notes as desired. This holds for all teaching materials involved (example sheets etc...).

Furthermore, at the first discussion with the students (“pre class”) I will remind them to let me know if there are any other issues relating to inclusivity.

Finally, all materials will be distributed to students using my personal website, ensuring once again ease of access.

2.2 Contact and non contact-time teaching

The course is designed to involve a large amount of non-contact time teaching. This is scaffolded using various technological solutions including:

- Challenges;
- Videos;
- Full set of notes;
- An online community.

The challenge sheet is the main focus of the non-contact time teaching. In groups, students will be expected to work on a particular challenge in their own time. In class (i.e. during contact time) students will present their solutions to their peers and a further discussion will arise. The challenges are designed in such a way as to guide students towards their ILOs but if these are missed I will be able to step in a discuss any particular subject as necessary.

The various resources available to the students are meant to be helpful (and indeed contain all the necessary content) but students will be encouraged to find other resources and also communicate as necessary. To aid with this, a community on Google plus has been setup.

Finally a copy of the notes will be made available to the students on Google Docs to encourage the students to make amendments, and/or include other examples.

2.3 Technology enhanced education

Technology is used throughout this teaching plan to enhance the learning of students. Most of the aspects have been touched on above but here is a summary:

- Multiple short videos (approximately 5 minutes in length) have been designed covering all aspects of the course;
- Notes are translated in to most available formats using pandoc;
- A copy of the notes is being made available in google docs for online collaboration of students;
- A google plus community has been setup to encourage students to take ownership of the course content.

It is firmly felt that the use of technology is justified in this course.

MAT013: C1+C2 - Lesson plan

(This sheet was last updated on February 1, 2013)

1 Description

This is a lesson plan for morning long class delivering content relevant to chapters 1 and 2 of MAT013. Which will cover:

- The environment (SAS + R)
- Libraries (SAS)
- Objects (R)
- Importing and Exporting Data (SAS + R)
- Basis statistical procedures (SAS + R)

The intended learning outcomes for this day.

On completion of the class a student should be able to:

- A Run basic code in SAS and R.
- B Describe the library structure in SAS.
- C Give a basic description of objects in R.
- D Write code that imports and exports csv files in SAS and R.
- E Carry out a variety of statistical procedures in SAS and R.

2 Lesson plan

Time	ILO	Teacher Activity	Learner Activity	Resources
Before the class	A,B,C,D,E	Invite student to look at videos and distribute challenges	View videos and as a group carry out challenges.	Videos, Challenges and Notes.
0-20mins	A,B,C,D,E	Listen	Listen and deliver group SAS activity	Student presentations
20-40mins	A,B,C,D,E	Discuss	Discuss	Lecturer slides + Student presentation
40-100mins	A,B,C,D	Assist	Carry out Lab sheet, Exercise sheet or work on challenge (student choice)	SAS Lab Sheets
100-120mins	NA	NA	Break	Coffee
120-140mins	A,B,C,D,E	Listen	Listen and deliver group R activity	Student presentations
140-180mins	A,B,C,D,E	Discuss	Discuss	Lecturer slides + Student presentation
180-240mins	A,B,C,D	Assist	Carry out Lab sheet, Exercise sheet or work on challenge (student choice)	R Lab Sheets

3 Assessment

The above ILOs will be assessed through the various assessments at the end of the module. ILOs A, B and C will be evaluated as a consequence of the students being able to use SAS and R.

MAT013: C3 - Lesson plan

(This sheet was last updated on February 1, 2013)

1 Description

This is a lesson plan for a morning long class delivering content relevant to chapters 3 of MAT013. Which will cover:

- The program data vector in SAS
- Data structures in R
- Merging and concatenating data sets (SAS + R)
- Creating new variables (SAS + R)
- Handling dates (SAS + R)

The intended learning outcomes for this day.

On completion of the class a student should be able to:

- A Give a basic description of the programme data vector in SAS.
- B Give a basic description of the vector structure as well as notions such as Indexing and Recycling in R.
- C Merge and concatenate data sets in SAS and R.
- D Creating new variables in SAS and R.
- E Format dates in SAS and R.

2 Lesson plan

Time	ILO	Teacher Activity	Learner Activity	Resources
Before the class	A,B,C,D,E	Invite student to look at videos and distribute challenges	View videos and as a group carry out challenges.	Videos, Challenges and Notes.
0-20mins	A,B,C,D,E	Listen	Listen and deliver group SAS activity	Student presentations
20-40mins	A,B,C,D,E	Discuss	Discuss	Lecturer slides + Student presentation
40-100mins	A,B,C,D	Assist	Carry out Lab sheet, Exercise sheet or work on challenge (student choice)	SAS Lab Sheets
100-120mins	NA	NA	Break	Coffee
120-140mins	A,B,C,D,E	Listen	Listen and deliver group R activity	Student presentations
140-180mins	A,B,C,D,E	Discuss	Discuss	Lecturer slides + Student presentation
180-240mins	A,B,C,D	Assist	Carry out Lab sheet, Exercise sheet or work on challenge (student choice)	R Lab Sheets

3 Assessment

The above ILOs will be assessed through the various assessments at the end of the module. ILOs A, B and C will be evaluated as a consequence of the students being able to use SAS and R.

MAT013: C4 - Lesson plan

(This sheet was last updated on February 1, 2013)

1 Description

This is a lesson plan for morning long class delivering content relevant to chapter 4 of MAT013. Which will cover:

- Flow control (SAS + R)
- The Macro Compiler (SAS)
- Macro Variables, Programming Statements and Functions (SAS)
- Functions (R)
- String manipulation (R)
- Memory and scripts (R)

The intended learning outcomes for this day.

On completion of the class a student should be able to:

- A Carry out basic programming statements using flow control in SAS and R.
- B Construct functions in R.
- C Describe how the SAS macro compiler works.
- D Describe the library structure in SAS.
- E Write SAS macro code.
- F Write efficient R code using vector forms.
- G Manipulate strings in R.
- H Describe how R workspace images can be saved.

2 Lesson plan

Time	ILO	Teacher Activity	Learner Activity	Resources
Before the class	A,B,C,D,E	Invite student to look at videos and distribute challenges	View videos and as a group carry out challenges.	Videos, Challenges and Notes.
0-20mins	A,B,C,D,E	Listen	Listen and deliver group SAS activity	Student presentations
20-40mins	A,B,C,D,E	Discuss	Discuss	Lecturer slides + Student presentation
40-100mins	A,B,C,D	Assist	Carry out Lab sheet, Exercise sheet or work on challenge (student choice)	SAS Lab Sheets
100-120mins	NA	NA	Break	Coffee
120-140mins	A,B,C,D,E	Listen	Listen and deliver group R activity	Student presentations
140-180mins	A,B,C,D,E	Discuss	Discuss	Lecturer slides + Student presentation
180-240mins	A,B,C,D	Assist	Carry out Lab sheet, Exercise sheet or work on challenge (student choice)	R Lab Sheets

3 Assessment

The above ILOs will be assessed through the various assessments at the end of the module. ILOs A, B and C will be evaluated as a consequence of the students being able to use SAS and R.

MAT013: C5 - Lesson plan

(This sheet was last updated on February 1, 2013)

1 Description

This is a lesson plan for morning long class delivering content relevant to chapter 5 of MAT013. Which will cover:

- Three SAS tools: sql, functions and optimisation.
- Three R packages: sqldf, ggplot2 and twitterR.

The intended learning outcomes for this day.

On completion of the class a student should be able to:

- A Use sql within SAS and R.
- B Build functions in SAS.
- C Solve various optimisation problems in SAS.
- D Construct publication quality graphics in R.
- E Data mine twitter with R.

2 Lesson plan

Time	ILO	Teacher Activity	Learner Activity	Resources
Before the class	A,B,C,D,E	Invite student to look at videos and distribute challenges	View videos and as a group carry out challenges.	Videos, Challenges and Notes.
0-20mins	A,B,C,D,E	Listen	Listen and deliver group SAS activity	Student presentations
20-40mins	A,B,C,D,E	Discuss	Discuss	Lecturer slides + Student presentation
40-100mins	A,B,C,D	Assist	Carry out Lab sheet, Exercise sheet or work on challenge (student choice)	SAS Lab Sheets
100-120mins	NA	NA	Break	Coffee
120-140mins	A,B,C,D,E	Listen	Listen and deliver group R activity	Student presentations
140-180mins	A,B,C,D,E	Discuss	Discuss	Lecturer slides + Student presentation
180-240mins	A,B,C,D	Assist	Carry out Lab sheet, Exercise sheet or work on challenge (student choice)	R Lab Sheets

3 Assessment

The above ILOs will be assessed through the various assessments at the end of the module. ILOs A, B and C will be evaluated as a consequence of the students being able to use SAS and R.

VK - Module 2 lesson plan resource list

Give the large quantity of resources made for this module they can all be found at the following url:

<http://drvinceknight.github.com/MAT013/>

PCUTL - Module 2: Response to NS Peer Review

Vincent Knight

February 10, 2013

In this document I'll respond to the peer review undertaken with Nikos Savva.

1 Inclusivity

“Vince placed a lot of emphasis in making sure that both his teaching methods and materials are largely inclusive (for further comments related to the available resources see comments below).

An important aspect in his teaching is the formation of student groups to work together both during contact-time and non-contact-time activities. In his lesson plan Vince commented on the formation of groups in such a way to ensure a mix of age, gender and cultural heritage. It is not clear to me how this task can be achieved and whether aspects of student characteristics such as academic performance and computer literacy are also taken into account which can also play some role in group dynamics.”

Nikos makes an excellent point as to the methodology used when choosing groups. This should have been better explained in my lesson plan. Our MSc course benefits from the presence of a Knowledge Transfer Office who builds a great relationship with the students throughout the year and for all group activities is tasked with creating inclusive groups. The KTO takes in to account all of the characteristics mentioned by Nikos and I'm confident that groups are inclusive.

2 Resources and technology use

“An abundance of resources will be made available to students mostly in the form of lecture notes and youtube videos.

More specifically, detailed sets of lecture notes are provided for both packages in a variety of formats. The notes include screenshots and code snippets, are engaging and are prepared in a conversational style, which can help students master the material more easily.

The work that went into preparing the online videos is truly remarkable. The videos, which are offered at different resolutions, are very informative and Vince explains clearly and slowly every step required to utilise various features of the software packages that would benefit students with no prior exposure to SAS and R. Most importantly, making such videos available gives students the opportunity to go over the material at a pace that is most comfortable to them.

I also liked the idea to make the lecture notes available on Google Docs, so that students can make amendments. However, will the content be moderated by Vince to ensure the accuracy of the amended information, or will it be entirely left at the students' discretion? Given also the tendency of students to learn what the instructor gives them as lecture material, I could foresee some reluctance in actually stepping in and making their own contributions. Another possibility worth considering is perhaps posting the best solutions from the group assignments instead of posting his own solutions, which might also be complemented with slides from their presentations (if available). This might give additional incentives to students to invest more time in their group activities in order to polish their work further.”

Nikos's kind words regarding my resources are greatly appreciated. I have indeed spent a lot of time on them! I had not given much thought to moderating the use of Google Docs. This is mainly due to the fact that having used Google Docs previously students did not engage at all and did not use it. As such I'm still making it available to students and on some level would be 'glad' if they wrote anything at all: even if it is incorrect! Having said that, after chatting to Nikos about this I'll be sure to keep an eye on the Google Document. In fact if a student does write something that isn't completely accurate, it would give me a good opportunity to address the issue in class.

3 Non-contact-time activities

“Students are provided with ample opportunities to engage and practice outside the classroom, which are likely to appeal to a variety of learning styles. Student collaboration features rather strongly in non-contact time teaching, by having students work on challenges and by setting up an online community where students can participate in discussions.

A minor comment I would like to make is that since contact sessions are designed around non-contact time activities, it might be good if students are informed how much time they are roughly expected to invest in preparation for each session. This can be helpful in a number of ways, especially in scheduling the meetings so that students allocate sufficient time to work as a group.

Lastly, during the contact sessions, students are expected to report their findings to the rest of the class. Again, some information on what is expected of them (e.g., the duration of the presentation, whether software use is required etc.) might help relieve some of the anxiety that is natural for students who do not have much experience with public speaking, or for students with weaker communication skills.”

I again agree with Nikos and in fact plan to clearly explain to the students the amount of work required as well as what I expect from them with regards to presentations. This I will in fact leave up to the students, if they choose to simply demonstrate their code and/or use a complicated piece of software I do not mind.

4 Contact-time activities

“Teaching how to use a software package essentially involves transmission of a lot of procedural knowledge, i.e. students need to learn the sequence of steps or commands required to perform certain functions. Vince, however, tries to ensure that this is not a one-way process, but a process that involves continuous feedback, interaction and practice, which I find rather commendable. It is apparent that the lesson plans are primarily student-centred and are based on teamwork. This type of classroom design shifts the focus from the teacher to the various student groups and the teacher acts more like a moderator than a lecturer. To achieve

this, students need to be more actively involved in their learning, while at the same time they develop their presentation and teamwork skills.

The class consists of MSc students, so it is natural to assume that the audience is sufficiently motivated. However, Vince also gives additional incentives to engage in classroom activities, by making classroom participation count towards the final grade. I also agree with Vince that a holding a debriefing session prior to the first session is essential to inform students what is expected of them, explaining also the different approach he intends to adopt in organising his sessions. Sometimes, however, despite our best intentions, students might be reluctant to participate and engage fully in discussions. I am thus wondering whether Vince had thought of any proactive measures to ensure the smooth running of the contact sessions.

A final comment I would like to make is that a four-hour session can be rather tiring for both the students and the lecturer. While the diversity of activities will perhaps help students stay alert for a longer period of time, it is also natural to expect that student engagement levels/attention span etc. will tend to decline with time. Hence, since the discussions on R are always planned to take place during the second half of each lesson, the material on R might appear to be more difficult. Hence I would suggest that Vince can perhaps consider varying the order at which the sessions are delivered so the lesson is not always about SAS early in the morning and about R just before lunch. Moreover, the design of the various tasks to be performed during each session could also take into account these factors.”

Nikos hits on an excellent aspect of this module design: the need for student engagement and buy in. As described I have designed various incentives to try and take this in to account. Also, the debriefing session will also hopefully be helpful but nevertheless if students do not engage during contact time I will need to adapt.

Ultimately every piece of contact time must be used to reach the described ILOs. I will hopefully act as a passive observer as the students guide themselves towards these ILOs but might well have to intervene. Either because students miss a particular ILO or indeed because engagement is so low that no ILO will be reached. As such I will be prepared to step in and potentially

deliver a classic lecture on some or all of the topics.

Nikos's other comment regarding the length of the day is an important one. I have purposefully included breaks and intend that students might be able to recover slightly during the lab sessions. Nikos makes an excellent suggestion which is to swap SAS and R throughout the course. I had not thought of that and appreciate it being suggested. It will be very helpful.

5 Final thoughts

“ It is quite apparent that Vince put a lot of effort in this bold attempt to teach inclusively in a flipped classroom approach. His hard work and dedication are strong indicators that he will succeed!”

These kind words are appreciated. I very much gained from this peer review as Nikos was able to confirm some of my ideas as well as point out potential weaknesses.

PCUTL - Module 2: Peer Review of Nikos

Vincent Knight

February 6, 2013

1 General comments

I think that this is a well thought out lesson plan with an excellent set of well written notes. I personally feel that it's great if students see notes before a lecture and as such like that Nikos plans to give the notes to the students.

Before going on to explore particular aspects of the lesson plan there is one aspect that I thought was particularly worth highlighting. Nikos will be using a quasi immediate feedback system that he calls the 'muddiest point'. This is a great idea and something I might think of implementing myself.

2 Inclusivity

Nikos has taken care to consider various issues of inclusivity with regards to access to the room and other issues of communication. One minor suggestion that I would have is with regards to the formats of the notes. It is obvious that because of the diagrams and mathematical notation the notes need to be prepared in \LaTeX and distributing them in pdf format is natural. Perhaps to take in to account the fact that some students might have difficulties with reading the notes Nikos could also make the \LaTeX code available so that if need be students could modify the notes to make them easier to read?

3 Contact and non contact time

Some great effort has been put in place to consider contact and non contact time. My only concern is that because Nikos has (very rightfully!) designed the plan so that student who do not look through any of the material will not be excluded from learning, will any students in fact look through the

material?

Perhaps some sort of incentive could be put in place to ensure students take advantage of the efforts made by Nikos to create non contact time learning opportunities. I feel that this would ensure that students are placed in a constructivist learning model. I might be incorrect and Nikos would rather teach allowing for a constructivist model if the student chose to use it whilst ensuring a cognitivist model otherwise.

Another aspect that would be worth considering is the use of an online discussion board? Perhaps one of these could be setup on Learning Central (I'd recommend the campus pack one).

4 Technology enhanced education

Great use of video in and out of contact time. The notes are of high quality and the \LaTeX code is not basic as the Tikz package is used. My only other technologic suggestion would be perhaps setting up a discussion board?

5 Suggestions and conclusions

Good work getting the students to go through the Kolb cycle and learning in various ways.

The course seems to be set in a cognitive setting. Despite asking students to attempt the one example. Perhaps an incentive asking students to do that would be better?

I would also suggest that where possible Nikos should insist that students work in groups to add a social learning dimension to his lesson.

On a whole those comments are minor as I feel that this is a well thought out lesson plan.