



BCMEg: The pedagogy of an asynchronous online course: supporting students' engagement

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The context:

'Digital Technologies for Mathematical Learning' module

- ❑ Masters level optional module in the MA Mathematics Education, UCL Institute of Education, University College London
- ❑ co-designed and co-tutored by Cosette Crisan and Eirini Geraniou; currently in its 4th presentation
- ❑ 10-week course; 30 M-level credits; usually attended by 14 – 25 students

- ❑ *Description of the course*

There are two e-learning aspects

1. its online delivery *and*
2. the focus on digital technology of the course itself, consisting of:
 - familiarisation of the participants (practicing or prospective mathematics teachers) with a wide range of digital tools and resources (graph plotters, dynamic geometry environments, statistical software, fully interactive online packages) and
 - critical reflection on the implications of using such tools in the learning and teaching of mathematics mainly at secondary school level (11-18 years old students).

- ❑ *Asynchronously delivered*

The course is delivered **online**, with learning resources to facilitate information sharing outside the constraints of time and place among the group of participants

Positioning the participants on this course as:

Learners and Users of digital technology themselves;

Designers - participants are encouraged to design activities with different digital tools;

Pedagogues/teachers - participants evaluate the digital resources by trialling them with learners ;

Researchers

Appreciate the rationales and pedagogic strategies associated with using key types of digital technologies for learning mathematics;

Draw from and critically apply intellectual perspectives, research and scholarship to select and/or design tasks in their own teaching/learning contexts;

Analyse and reflect critically upon learning experiences with digital technologies.

Design considerations of an online module:

“Active learning is probably not going to happen in an online environment unless the interaction is deliberately planned and the instructor encourages it” (Moore and Kearsley, 1999), hence tutors’ focus on:

- ***How to facilitate and support students’ engagement, given the constraints & affordances of the asynchronous online module***

A three-part approach for implementation of active learning practices into an asynchronous online environment

A three-part approach: An Architecture of Engagement

- Architectural Element 1: Syllabus Communication and Engagement Policy
- Architectural Element 2: Course Orientation
- Architectural Element 3: Modular Course Structure

Shannon A. Riggs and Kathryn E. Linder (2016). Actively Engaging Students in Asynchronous Online Classes IDEA Paper #64 • December

Architectural Element 3: Modular Course Structure

- A modular course structure assumes dividing the course chronologically with multiple units, with each module containing all of the course materials, learning activities, assignments, and assessments for that unit
 - ❖ it paces the learning experience to prioritize information and activities and to help prevent students from feeling overwhelmed;
 - ❖ it allows students to monitor progress regularly;
 - ❖ it discourages procrastination by providing regular milestones and deliverables;
 - ❖ it visually provides a high-level overview of the course topics, which can increase understanding of how course topics relate to one another;
 - ❖ it provides space to scaffold active learning experiences and to provide sufficient opportunity for guidance and feedback on reflection activities.

MA in Mathematics Education 2017-18

**Digital Technologies for Mathematics Learning
Programme 2017-2018**

Spring Term 2018 (8th Jan – 23rd Mar 2018)

	Week	Date	Theme: Topic	Leading tutor
	1	wb 8 th Jan 2018	Practical Implications of the use of ICT in the classroom	Cosette Crisan Eirini Geraniou
Theme A	2	wb 15 th Jan 2018	Visualising with Digital Technologies (Part 1) <i>Graphware</i>	Cosette Crisan
		Sat, 20 th Jan 2018	Face-to-Face day (optional)	Cosette Crisan Eirini Geraniou
	3	wb 22 nd Jan 2018	Visualising with Digital Technologies (Part 2) <i>Dynamic Geometry Systems (DGS)</i>	Cosette Crisan
	4	wb 29 th Jan 2018	Visualising with Digital Technologies : Activity week	Cosette Crisan Eirini Geraniou
Theme B	5	wb 5 th Feb 2018	Generalising and Expressing (Part 1) <i>Logo and Scratch</i>	Eirini Geraniou
	6	wb 19 th Feb 2018	Generalising and Expressing (Part 2) <i>MiGen, Cornerstone</i>	Eirini Geraniou
	7	wb 26 th Feb 2018	Generalising and Expressing: Activity week	Cosette Crisan Eirini Geraniou
Theme C		Sat 3 rd Mar 2018	Face-to-Face day (optional)	Cosette Crisan Eirini Geraniou
	8	wb 5 th Mar 2018	Modelling (Part 1)	Cosette Crisan
	9	wb 12 th Mar 2018	Modelling (Part 2)	Eirini Geraniou
	10	wb 19 th Mar 2018	Modelling: Activity week and Preparation for Final Assessment	Cosette Crisan Eirini Geraniou

Architectural Element 2: Course Orientation

An orientation for an online asynchronous course should introduce students to the structure of the course and should address the following questions:

- How often do students need to log in to participate?
- How much time should they set aside weekly to spend on coursework?
- Where should students look for updates and breaking news about the course (e.g., announcements, email messages, discussion forums)?
- How is the course structured (e.g., by week or module, by project milestone)?
- What does a typical week's or unit's work entail in the course?
- Where can students find important due dates?
- What does attendance mean?

Architectural Element 2: Course Orientation

An orientation for an online asynchronous course could include information about the structure of the course, the expectations for students, and the resources available to them.

- How often do you expect to meet with the instructor?
- How is the course structured?
- Where can students find important dates?
- How is attendance tracked?
- What does a typical week look like?
- Where can students find important dates?
- What does attendance mean?

At first, I was afraid I wouldn't get the proper guidance, but now I believe that the structure of the course is pretty clear and I know what I have to do every week (ET, 2018).

Short recorded video lectures by the teachers about some of the themes and discussions on the essential readings would help to make learning even more meaningful (TA, 2018)

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Architectural Element 2: Course Orientation

Week 3 at a glance

Reminder: if you have not done so already, please contribute to the Student Forum discussion with

		Mon	Tue	Wed	Thu	Fri	Sat	Sun
	Jan	22-Jan	23-Jan	24-Jan	25-Jan	26-Jan	27-Jan	28-Jan
CC	Week 3 Visualising with Digital Technologies (Part 2) DGS	W3 Tasks 1,2 uploaded on Moodle	tutors' feedback to W1 Tasks uploaded on Moodle		*post questions to tutors in Questions for tutors * use Student Discussion forum (for Week 3 Task 1)	tutors respond to questions		*upload Week3 Tasks 1 and 2 on Moodle
	Jan 2018	29-Jan	30-Jan	31-Jan	01-Feb	02-Feb	03-Feb	04-Feb
		tutors' feedback to W2 Tasks uploaded on Moodle		Tutors' feedback to W3 Tasks emailed to students				

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Architectural Element 2: Course Orientation

I find the module really interesting I really like the fact that we have weekly tasks to complete. I think that these tasks help me improve my writing skills and how to critically reflect on the bibliography. (BN, 2018)

I find the timeframe given to complete the weekly tasks to be appropriate especially for a working student. (TC, 2018)

cc	V V Dig Techno (Part 2) DGS	Jan 2018	tutors' feedback Tasks uploaded on Moodle	Tuto Tasks ema	02-Feb	03-Feb	04-Feb
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*Architectural Element 1:
Syllabus Communication and Engagement Policy*

The asynchronous online course syllabus must do all the foundational things a face-to-face course syllabus does, but it must also:

- set communication policies and expectations for online engagement;
- set a course schedule that outlines the frequent and meaningful engagement.

Expectations of students studying on an online module

For this online module face-to-face elements are replaced with online teaching, activities and discussions, and in addition to these, two days of face to face sessions. There is a balance between learning with others, private study and research.

Hours of study

- When studying online, you should expect to log in for short periods several times each week. It is very important to keep to the timetable of each week or you risk falling behind and missing crucial discussions (which can easily happen!).
- Contribution includes both posting your own messages, responding to/commenting on other students' posts and actively engaging in group activities and group presentations. You will need to keep up with the online discussions, contribute to these and undertake any other activities that have been set for the week.
- As with other modules, you should expect to read papers or chapters each week and contribute to discussions of the issues raised, as well as complete any set activities. Activity completion may be visualised with a ticked box next to the activity to help you record your attendance.
- Given that this is a 30 credit modules, it is expected that you will spend **15 hours per week** studying for this module, and the level of work is designed to reflect this.

Attendance

For the online modules you are expected to complete activities for and contribute to at least 70% of the required online activities. Failure to do so will be considered as non-attendance. Your attendance (tasks completion) will be monitored by the module tutors on a weekly basis.

Inhabiting the Architecture of Engagement

The participants visiting the module website to perform certain tasks several times throughout a week, meeting mini-milestones as they progress and so these structures are not as clear as in a F2F and need to be spelled out with greater clarity in the asynchronous online environment.

- ❖ A time frame for replies to email communications and questions posted on discussion forums
- ❖ A time frame for providing feedback on assignments, tasks, etc
- ❖ Clarify how the tutor plans to participate in online asynchronous discussions (e.g., I do read every post, but will not reply to every post so as not to dominate the conversation; I will post a summary of discussion highlights at the conclusion of each unit.)
- ❖ Clarify other ways the tutor plans to remain actively involved throughout the course and how urgent or timely information will be communicated (e.g., via announcement or email)

Active learning in an asynchronous online environment

Instead of direct teaching, **learning is designed to take place as the result of doing short, manageable tasks.**

❑ Offline tasks include:

- familiarising with a piece of software and example problems using specific software
- designing and trialling maths activities involving the specific software that bridge learners' interactions with digital media and the mathematical concepts
- reflecting on teaching or learning episodes they trialled

❑ Online tasks include:

- engaging with the ideas in the key readings;
for example: read one of the essential reading articles and write a response about the points agreed with and disagreed with from the article;
 - reflecting about the application of the ideas encountered in the key readings in specific learning contexts.
- links to external resources are provided
 - students post to discussion boards
 - students submit tasks, assignments
 - students respond to each others' contributions

on their own schedules within given time frames

Active

Studying for this course online has been enjoyable for me thus far for the following reasons: I have found the class to be appropriately challenging and the pace is suitable for me; I appreciate the exposure I have received to the various tools used so far in the course. Furthermore I find the support that comes with each tool I am introduced to very helpful; I also enjoy the essential readings because they force me to consider ideas that I have never thought about before. (TC, 2018)

Excellent to have dedicated time to explore the tools and applications, nice to be directed to appropriate research in the field.(KT, 2018)

- reflecting

□ Online tasks include

- engaging with the ideas in the key readings;
for example: read one of the essential reading articles and write a response about the points agreed with and disagreed with from the article;
 - reflecting about the application of the ideas encountered in the key readings in specific learning contexts.
- links to external resources are provided
 - students post to discussion boards
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Inst

I also like that we get a feedback on what we write, both as a group and individually. When we get the feedback as a group I can see others opinions and how some of them are connected and also sometimes the module leaders express their opinion so I can understand their thought on the matter too. (BN, 2018)



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y, 2008)

What we observed:

Tutor validation: students keen on receiving feedback from the tutor

It would be good if the tutor could provide more detailed and personalised feedback to the tasks we have handed in each week so that at least each individual of us will be clear if we are on the right track of the task objective. (all student quotes are from end of themes surveys)

What we did that worked:

- ❖ Personalised feedback on tasks at the end of the three themes
- ❖ General comments on all the other tasks, raising common issues, etc
- ❖ Keeping the online course 'alive' through us, the tutor, maintaining a weekly presence, encouraging and prompting discussions.

Cooper

Tutors need
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One of the negative impacts that I am finding is that the majority of my peers do not post anything until the last minute or after midnight on the cut off day which makes it very difficult for any discussion to happen as by the time I see their posts I am working on the next weeks tasks. (PN, 2018)

What we did that worked:

- ❖ re -designed the course, such that one task formed the basis of an online group discussion.
- ❖ (re)designed collaborative tasks for tutor-allocated groups ([example](#))
- ❖ included Pick-a-Paper tasks -choose one paper and its commentary from a participant in your group and post your comparative remarks and reflections.

W10 Task 2 😊

Design an Excel spreadsheet (focus on the software) to simulate the three schemes proposed in *The Rich Aunt* problem. Include questions to support the user in his/her investigation (focus on the maths).

Upload your file on Moodle (YourFirstName.xls) in the designated area for your group, by **Friday** the latest so that you have time to comment on one of your group members' work by Sunday. Don't forget to protect your file!



A Rich Aunt problem

- Review one of your group member's (as per table below) activity by uploading your comments (200-300 words) in the forum: **A Rich Aunt Excel-based activity** on the following aspects:
 - 1. A general comment on engaging with the activity: ease of use, clear instructions, knowing what to do, design facilitating the achievement of the expected learning outcomes, etc
 - 2. How did the Excel model help you with investigation (generating, recording and interpreting the data)?
 - 3. What design features of the Excel activity helped you with the mathematics?

Group 1: Mike, Ginny, Harshini, Stavros

Group 2: Mona, Naoko, Jas, Meeri-Maija, Cheryl

Group 3: Melina, Shaima, Kourosch, Xinjue, Beatrice

Restricted: Available from 8 March 2015.



Group 1 Activity upload



Group 2 Activity upload



Group 3 Activity upload



A Rich Aunt activity - Peer review



Questions for tutors

About online learning

- ❖ While some researchers argue that asynchronous communication affords in-depth and thoughtful discussions, researchers found evidence that when characterizing levels of cognitive presence, that the vast majority of student postings fall in the lowest levels of cognition (**meaningful engagement**).

I feel like I cannot effectively and efficiently discuss with other participant of this course. Although there is a forum to discuss, but I feel like it is better for me to discuss face to face with them. I am not comfortable with discussing online.(IN, 2018)

But, the truth is that the forum is impersonal and writing actually makes you feel anxious because it is formal. (BN, 2018)

Evaluation: Active (?) Online learning

What we would like to research further:

- ❖ While these strategies worked in that the participants contributed online **once** being nominated & directed on doing the task, their contributions were not always very insightful.
- ❖ We also became interested in **why some students were more engaged than others**, why they displayed a higher degree of learner autonomy, evidenced in their inquiring further, seeking assistance and generating new threads of discussion, than others.

Supporting active and meaningful engagement in an asynchronous online course

UCL Grand Challenges grant

Co-PIs: Cosette Crisan & Eirini Geraniou

- The purpose of this 'exploratory' study is to investigate the extent to which and how the asynchronous online experiences enhance our taught postgraduate students (PGTs)' learning in an online course and re-design the course to support our PGTs become active learners and seek active learning strategies in their online learning experiences.

Our Research Question: What are our PGTs' perspectives on the extent to which and how their asynchronous experiences contributed to their **active and meaningful engagement** on this course?

Active learning pedagogies in online environments

- Re-Conceptualizing Active Learning for the Asynchronous Online environment

Face-to-Face	Synchronous	Asynchronous
✓ Think-pair-share activity	✓ Think-pair-share activity	Not possible? ... given that tutors and students participate in learning activities on independent schedules

Dissemination of our work

- international conference presentation:

Crisan, C. (2016). [The use of video cases in an online course: supporting teachers in developing their RiTPACK](#), ICME13 (*International Congress on Mathematical Education*), Hamburg, Germany, 24-31 July 2016.

- chapter in a Springer monograph

Crisan, C. (2017). [The use of video cases in an online course: supporting teachers in developing their RiTPACK](#). In Amaral R.B., Hoyos V., de Geest E., Silverman J., Vogel R. (2017) Topic Study Group No. 44: Distance Learning, e-Learning, and Blended Learning. In: Kaiser G. (eds) Proceedings of the 13th International Congress on Mathematical Education. ICME-13 Monographs. Springer, Cham.

- UCL Teaching and Learning conference:

Crisan, C., Geraniou, E., & Mavrikis, M. (2015). [The emerging pedagogy of an on-line module](#). *UCL Teaching and Learning Conference*, London, UK, 13 April 2015.

- National conference:

Crisan, C., & Geraniou, E. (2017). [Using video cases to encourage participants' engagement with research and theory: Emergent pedagogies from an online course on digital technologies for mathematical learning](#), In: Curtis, F. (ed.) *Proceedings of the British Society for Research into the Learning of Mathematics*, 37 (1), British Society for Research into Learning Mathematics: Cambridge, UK, 4 March 2017.

- At local level

Writing a case-study for the UCL ChangeMakers website: <http://%20https://www.ucl.ac.uk/teaching-learning/case-studies/2017/feb/using-video-online-module-encourage-students-engage-research-and-theory>