# To keep up or to fall behind and catch up later?

Study patterns and how we support our students

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## Mech Eng undergraduate learning activities

Lectures

**Tutorials** 

Labs

Workshop

Writing lab reports

Design projects

Independent study



# A module that I teach – first year maths for mechanical engineers

- Lectures and tutorials autumn and spring term
- Revision and exams summer term

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- Lectures and tutorials autumn and spring term
- Revision and exams summer term
- Coursework deadlines from OTHER MODULES get prioritised over maths lectures and tutorials
- Students stop attending maths lectures or stop attending the tutorials
- Students fall behind, they catch up later in the holidays without support of tutors or other students

	1 Synchronous		
Lectures and lecture content	Keeps up		
Tutorials and problem sheets	Keeps up		

	1	2	
	Synchronous	Semi-synchronous	
Lectures and	Keeps up	Keeps up	
lecture content			
Tutorials and	Keeps up	Falls behind,	
problem sheets		catches up later	
		(in the holidays)	

	1	2	3	
	Synchronous	Semi-synchronous	Asynchronous	
Lectures and	Keeps up	Keeps up	Falls behind,	
lecture content			catches up later	
			(in the holidays)	
Tutorials and	Keeps up	Falls behind,	Falls behind,	
problem sheets		catches up later	catches up later	
		(in the holidays)	(in the holidays)	

	1	2	3	4
	Synchronous	Semi-synchronous	Asynchronous	Not engaged
Lectures and	Keeps up	Keeps up	Falls behind,	Falls behind,
lecture content			catches up later	does not catch up
			(in the holidays)	
Tutorials and	Keeps up	Falls behind,	Falls behind,	Falls behind,
problem sheets		catches up later	catches up later	does not catch up
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## MEd research project

Explore what **motivates** first year Mechanical Engineering students at Imperial to keep up or fall behind with their maths at the end of spring term?

I hoped to implement changes to my teaching to motivate more students to study synchronously (keep up)



# Expectancy-value theory (applied to learning activities)

The individual appraises

To what extent they expect the activity will be successful

To what extent they **value** the activity

Determines motivation



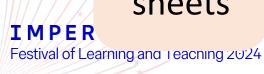
## What my research told me

• Our students value a wide range of aspects of learning maths

Prerequisite for other modules on the course

Solving problem sheets

Passing exams



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• Our students value a wide range of aspects of learning maths

Prerequisite for other modules on the course

Acquiring knowledge, skills and understanding

New and beautiful mathematics

Solving problem sheets

Passing exams

Application to engineering and the real world

Becoming an engineer

Festival of Learning and Teaching 2024

## What my research didn't tell me

- How to motivate students to keep up
- How to stop students falling behind

### What I realised

• Learning well = happy learners, teaching well = happy teachers

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## Short term fix

Teachers need to reframe 'falling behind'

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## Long term fix -20(?) years away

• Al tutor-bots: on-demand bespoke 1-1 support for asynchronous studiers

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## In conclusion

### My problem

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### My solution

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Short term (< 20 years): reframe 'falling behind' as 'asynchronous learning' Long term (20 years +): Al tutor-bots for on-demand bespoke 1-1 support



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#### My suggestions to teachers

Embrace the asynchronous learners equally Survey your students, ask 'what do you value about learning XXX?'

