

The background of the slide is a photograph of a university campus. In the upper right, a modern, multi-story building with a dark facade and large windows is visible, featuring the 'AAU' logo. The foreground and middle ground show a lush green lawn where several students are engaged in various activities: some are sitting on the grass, one is lying down near a tree on the left, and another is walking on the right. A soccer goal is visible in the distance on the left. The sky is clear and blue.

CSU Engineering: A New Chapter in Engineering Education

Euan Lindsay

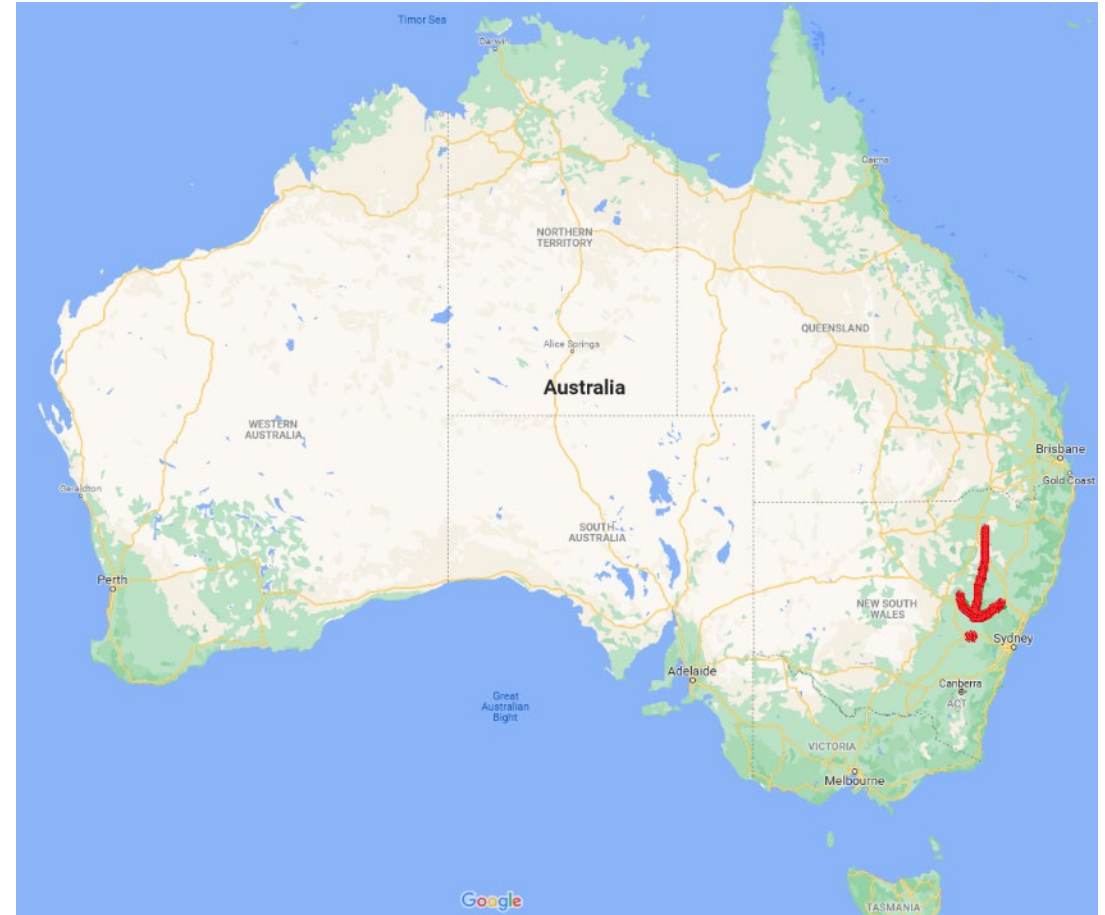
*Professor of PBL and Digitalisation
in Engineering Education*

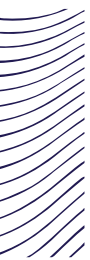
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CSU Engineering

- ▶ Charles Sturt University in Bathurst, Australia
- ▶ Regional University, majority of students are online and part-time
- ▶ Strong links to local industry and community





What would you do if you had a blank page?





Key trends in Engineering Education

- ▶ Digitalisation and personalisation
- ▶ Asynchronous learning
- ▶ PBL / Workplace learning
- ▶ Identity (trans)formation
- ▶ Lifelong learning
- ▶ Employability (not employment)
- ▶ Diversity
- ▶ Macro-credentials vs micro-credentials



The shipping containers of higher education



- ▶ Lectures, laboratories, exams
- ▶ Defined by the subject
- ▶ Comes in standard sizes and shapes (ECTS)
- ▶ Shipping containers work for physical goods
- ▶ Higher ed is becoming a digital good

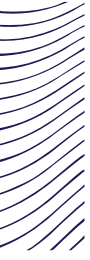


The CSU Engineering model

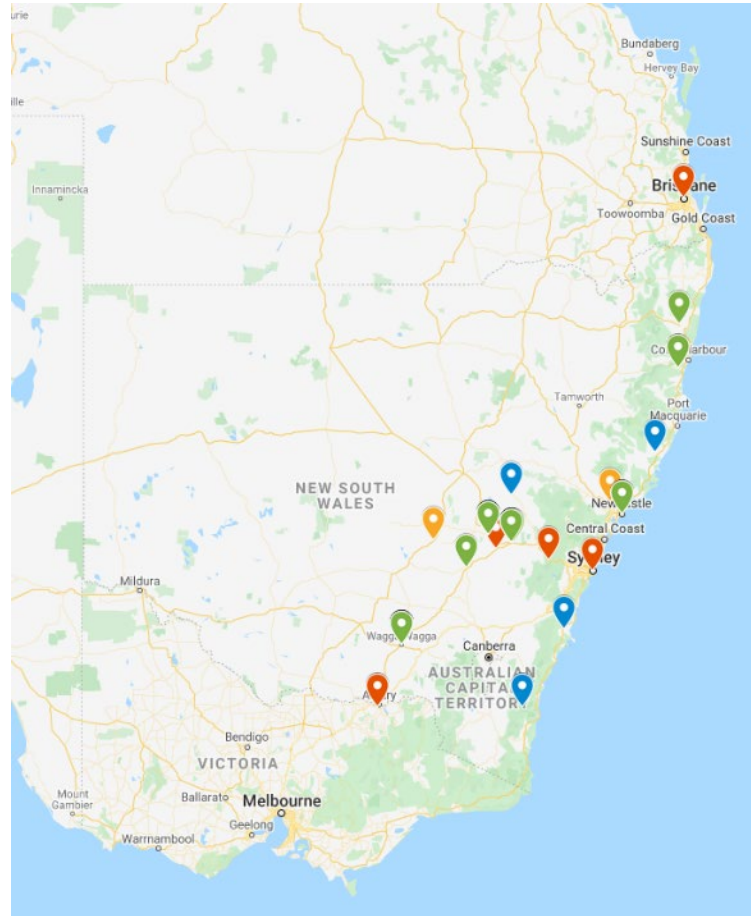
	Challenge/Portfolio /Thesis pillar	Performance Planning and Review pillar	Civil Engineering Topic Tree pillar
Phase 3	4th Placement – Professional Cadet Engineering Capstone Thesis (ENG599) 32pt	Engineering Portfolio – Professional (ENG592) 2 pt Performance Planning and Review – Professional Engineer (ENG580) 4pt	Advanced Topics in Civil Engineering (ENG571) 16pt
	3rd Placement – Senior Cadet Engineering Portfolio – Senior Cadet (ENG490) 28pt	Performance Planning and Review – Senior Cadet (ENG480) 6pt	Topic Tree – Senior Cadet Engineer (ENG473) 24pt
Phase 2	2nd Placement – Intermediate Cadet Engineering Cornerstone Thesis (ENG399) 24pt	Performance Planning and Review – Intermediate Cadet (ENG380) 6pt	Topic Tree – Intermediate Cadet Engineer (ENG373) 24pt
	1st Placement – Junior Cadet Engineering Portfolio – Junior Cadet (ENG290) 28pt	Performance Planning and Review – Junior Cadet (ENG280) 6pt	Topic Tree – Junior Cadet Engineer (ENG273) 24pt
Phase 1	Face to Face – Student Engineer Engineering Challenge 3 (ENG281) 14pt Engineering Challenge 2 (ENG162) 14 pt	Performance Planning and Review – Student Engineer (ENG180) 4pt	Topic Tree – Student Engineer (ENG173) 36pt
	Engineering Challenge 1 (ENG161) 14pt Engineering Challenge 0 (ENG160) 2pt		Topic Tree – Introductory (ENG171) 12pt



- ▶ PBL then Workplace learning – stepping up the jeopardy each year
- ▶ Supported by an online, on demand technical curriculum



Making a huge difference on a small scale



- ▶ 50+ Cadet Engineers on placements in regional Australia
- ▶ Around a third would be otherwise empty chairs
- ▶ Our Cadets feel like other people's Graduates

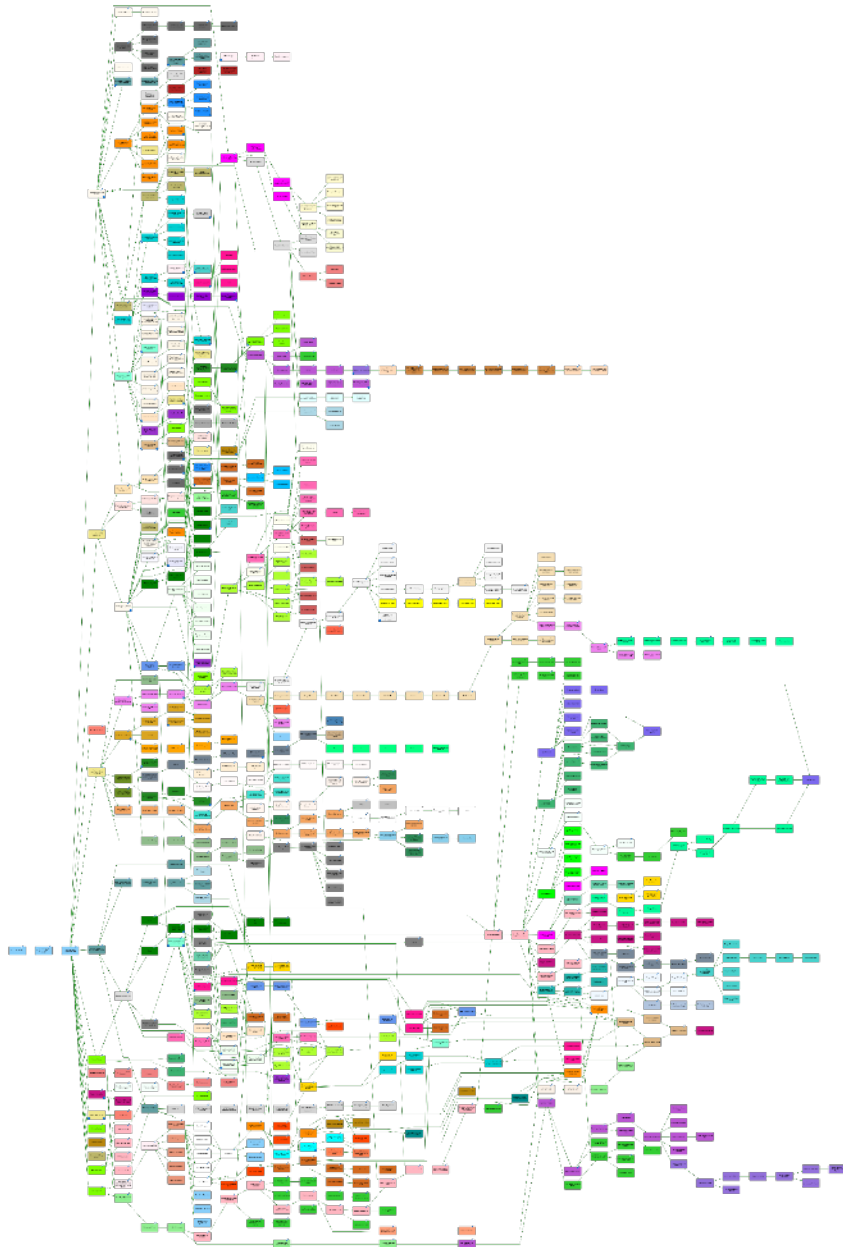


The Topic Tree

Underpinning technical content
delivered online and on-demand

Each topic scaled to take around 3
hours to complete

Mostly “soft” prerequisites –
recommended pathways rather than
required pathways



Compulsory Schedules

	Challenge/Portfolio /Thesis pillar	Performance Planning and Review pillar	Civil Engineering Topic Tree pillar
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G: For all Geotechnical Engineers

S: For all Structural Engineers

W: For all Water Engineers

C: For all Civil Engineers

A: For all Cadet Engineers on placement



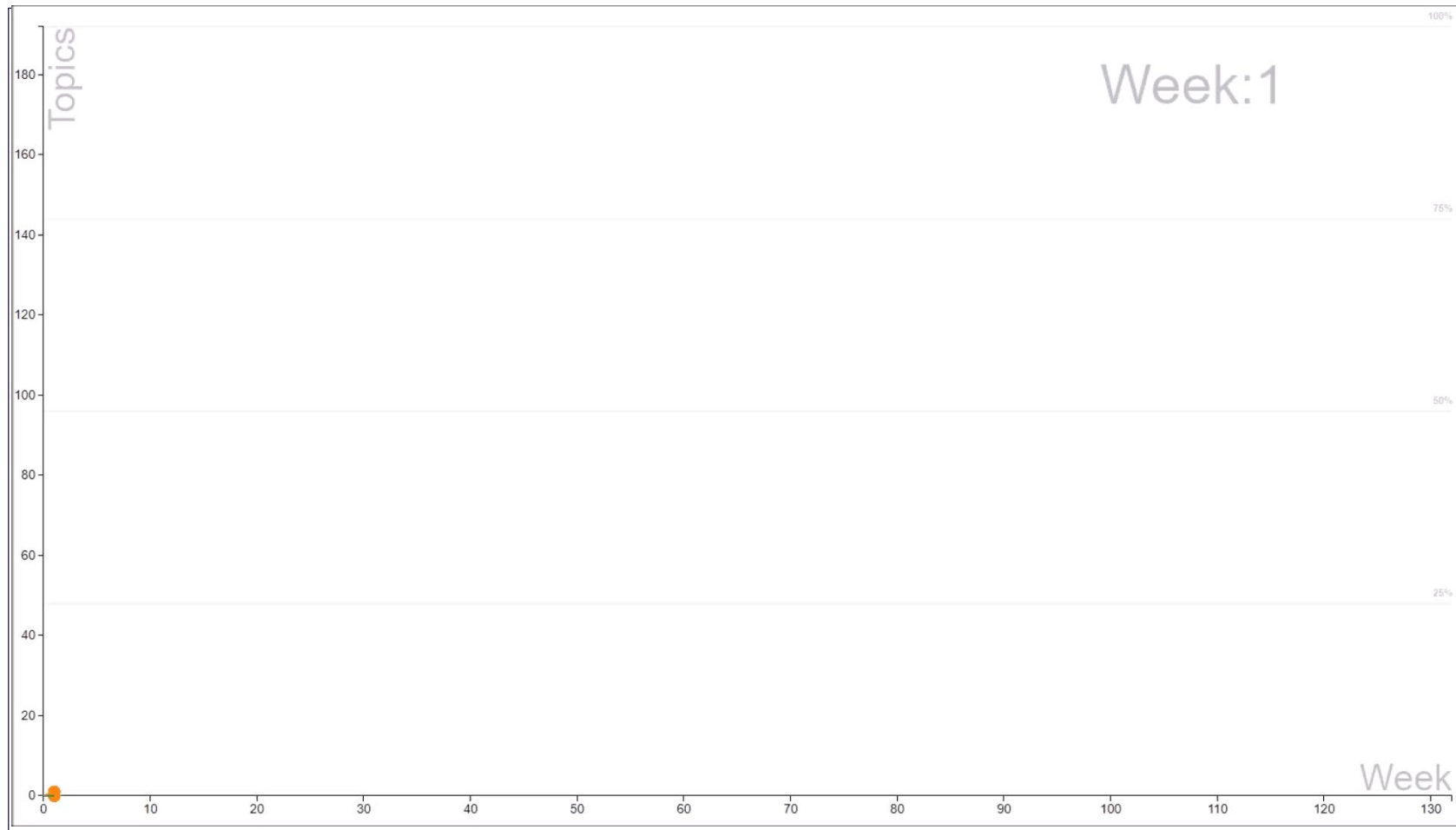


The Key Topic Tree Question

- ▶ “How do students move through the topic tree in terms of actual behaviour and time spent in the system?”

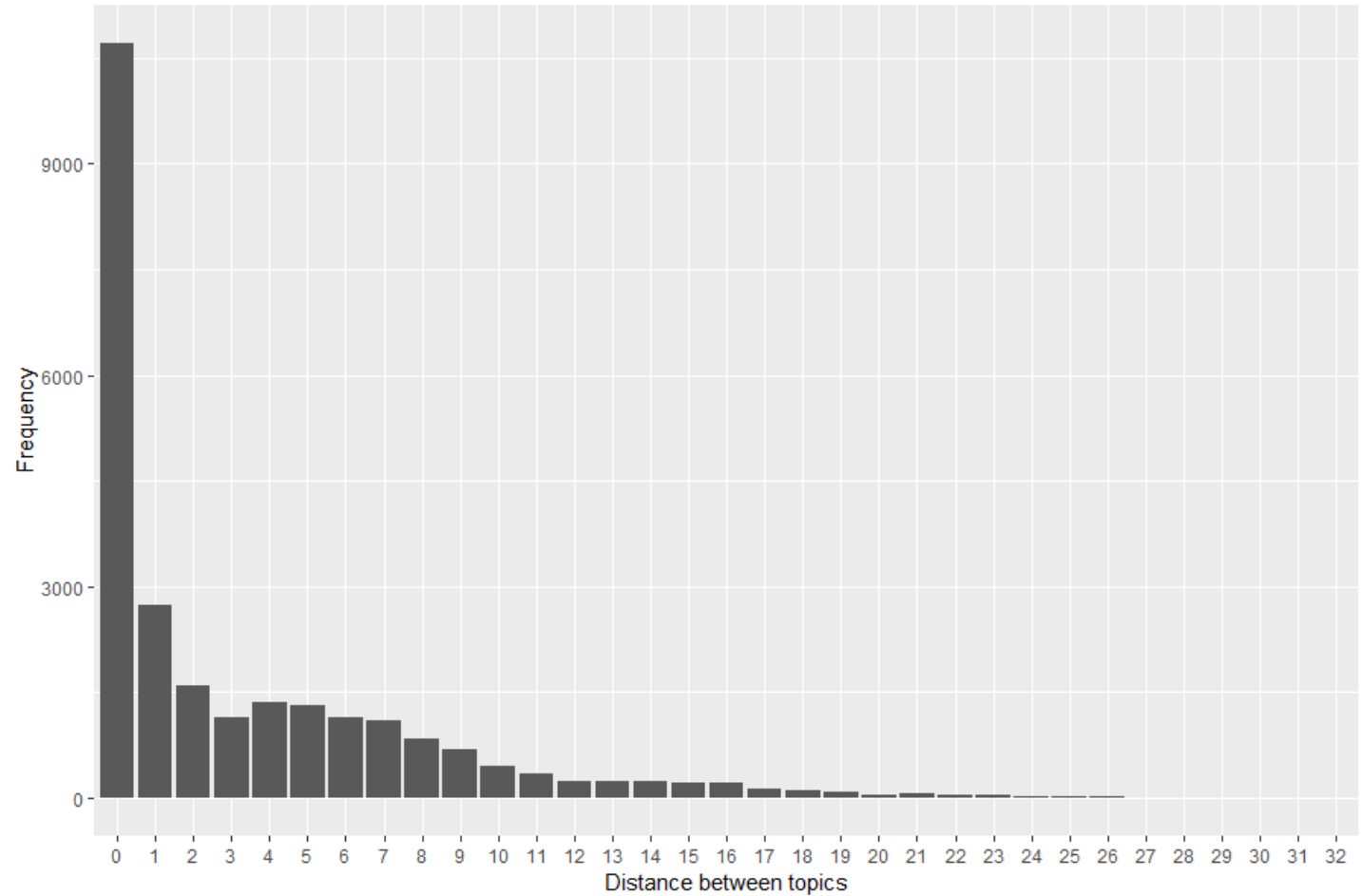


Not linear learning



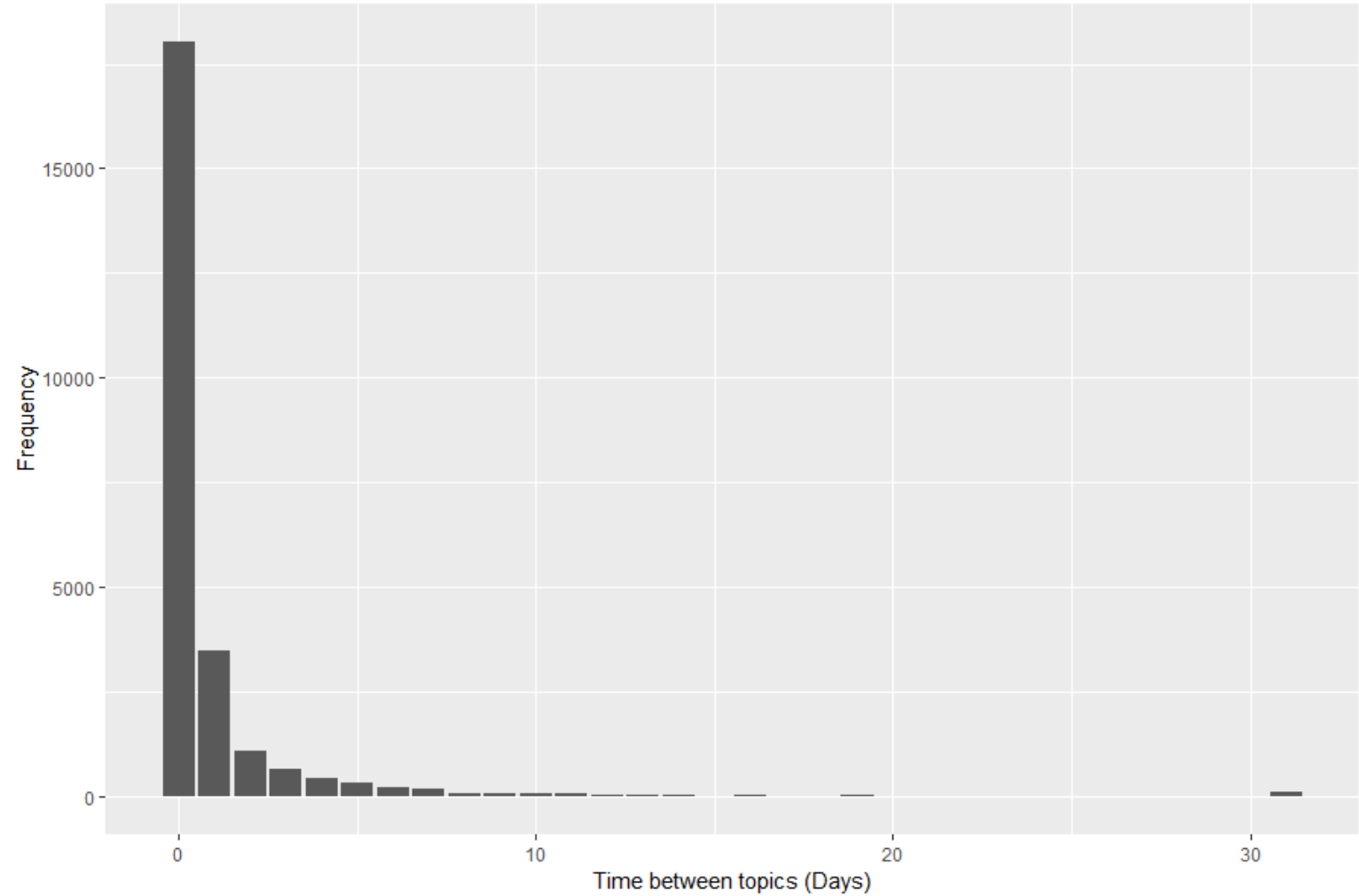
Distance Between topics

- ▶ Most commonly zero – continuing, revising
- ▶ Some jumps of 2 or 3 – skipping
- ▶ Long tail of jumps between branches

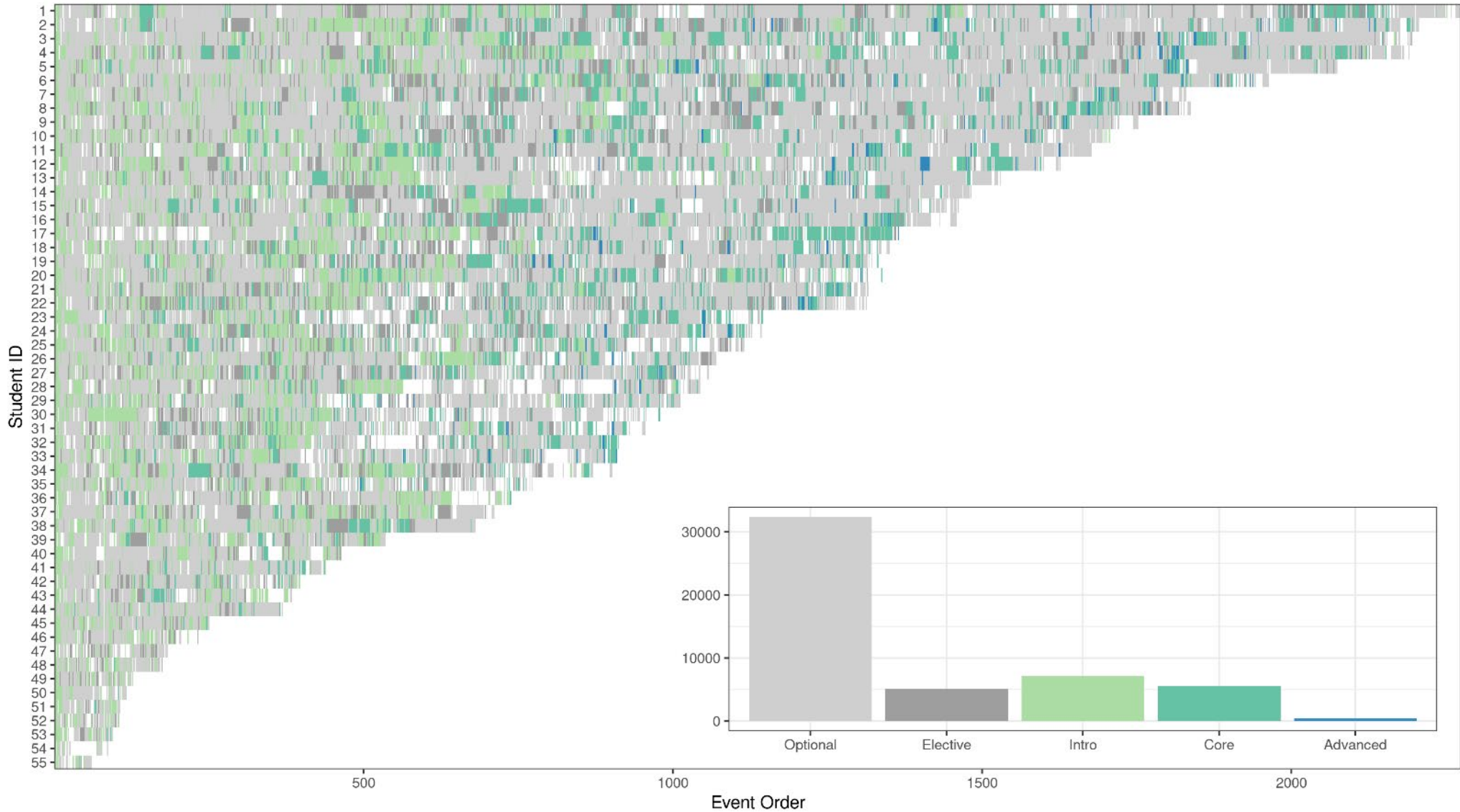


Time between topics

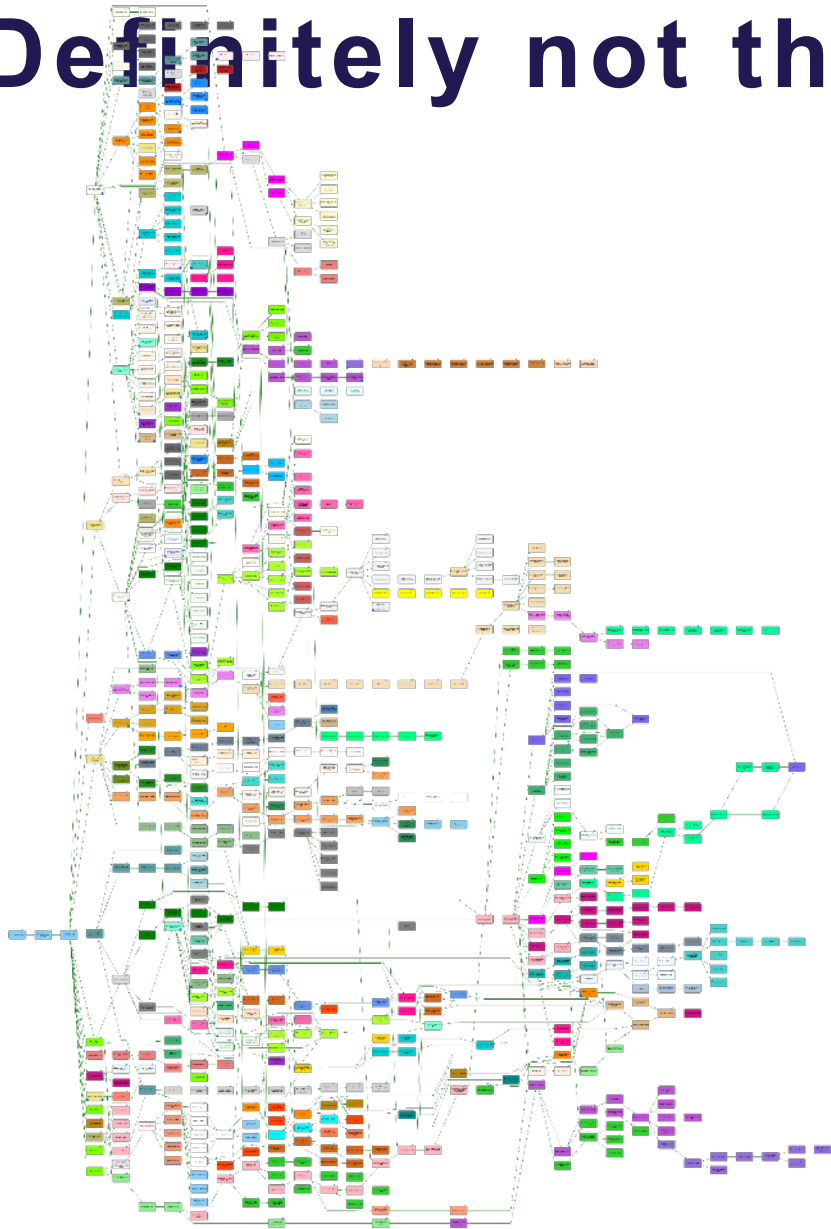
- ▶ The next topic is today
- ▶ The Netflix-style “binge”



Activity by student

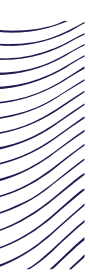


Definitely not the traditional pattern



≠





“What happens if you have a Netflix curriculum?”

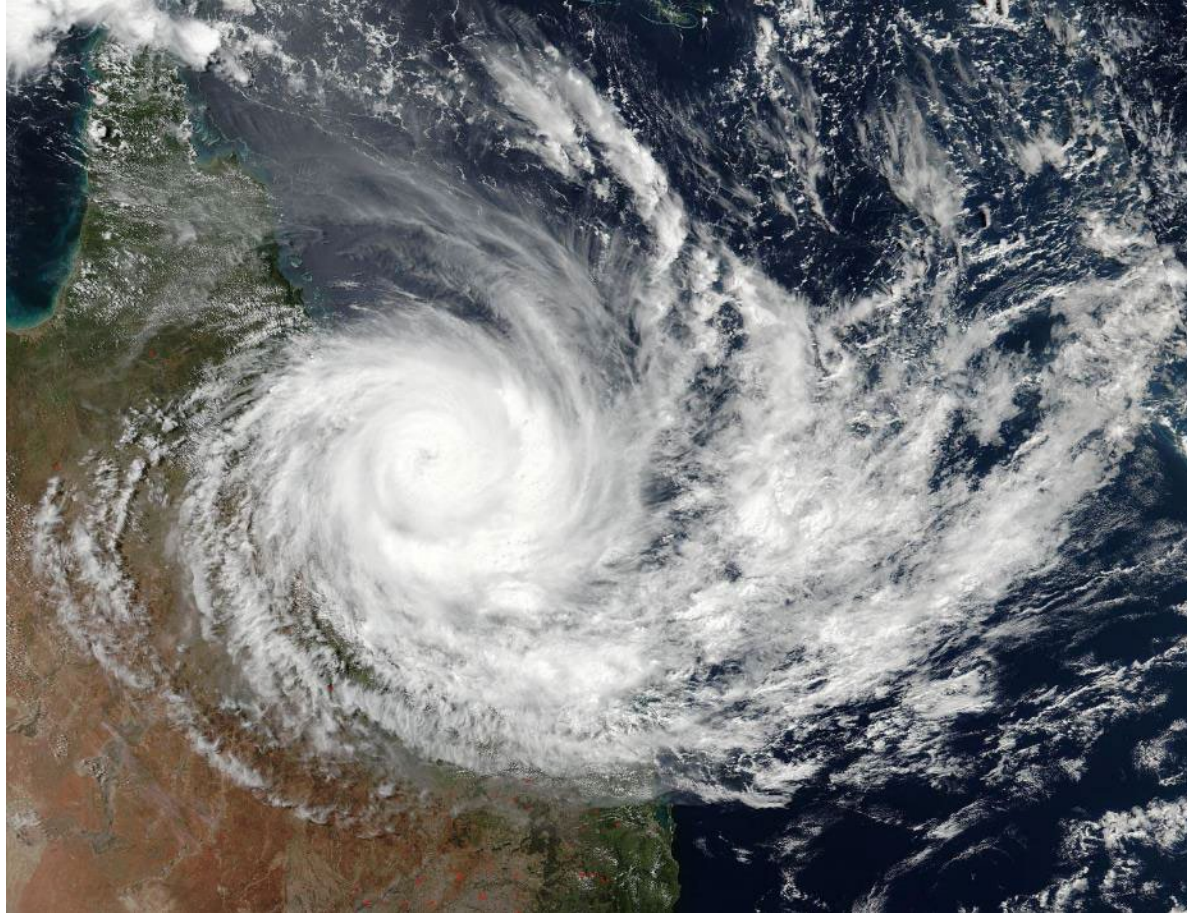
- ▶ Students treat it like Netflix
- ▶ They binge on content
- ▶ They complain there is nothing to “watch”
- ▶ They don’t expect you to make all your own content:



Netflix doesn’t



PBL is in the eye of the storm



- ▶ PBL is comprised of the quintessential parts of education process that can't be replaced by computers
- ▶ Which are the parts of the university value proposition you can't unbundle





So what does this mean for Engineering Education?

- Digital Microcredentials are a way to achieve the delivery of technical content
 - Students want to come back to campus
 - But only for the “good” bits, not the “bad” bits
- Automation of Assessment and Feedback
- Implementing learning analytics
 - Learn more about how and when our students learn
 - Target interventions based on how they are learning
- Workplace learning as an extension of PBL
 - Actual rather than authentic





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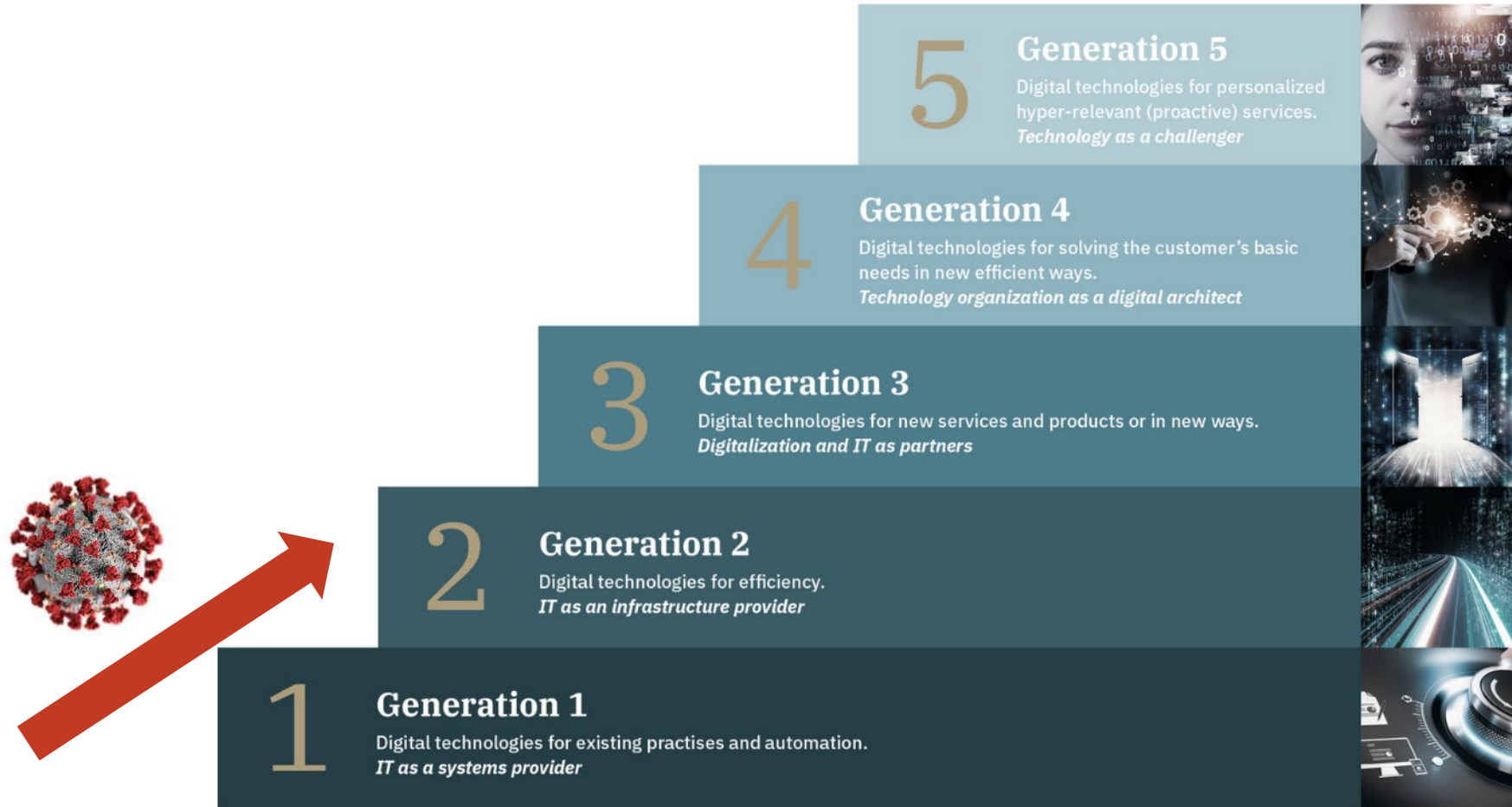
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Emergency Remote Instruction





SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY 	2 ZERO HUNGER 	3 GOOD HEALTH AND WELL-BEING 	4 QUALITY EDUCATION 	5 GENDER EQUALITY 	6 CLEAN WATER AND SANITATION 
7 AFFORDABLE AND CLEAN ENERGY 	8 DECENT WORK AND ECONOMIC GROWTH 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	10 REDUCED INEQUALITIES 	11 SUSTAINABLE CITIES AND COMMUNITIES 	12 RESPONSIBLE CONSUMPTION AND PRODUCTION 
13 CLIMATE ACTION 	14 LIFE BELOW WATER 	15 LIFE ON LAND 	16 PEACE, JUSTICE AND STRONG INSTITUTIONS 	17 PARTNERSHIPS FOR THE GOALS 	 SUSTAINABLE DEVELOPMENT GOALS

