from z to a

Alan Kwan
CARDIFF UNIVERSITY
AECEF

Looking round the corner in Engineering education

15-17 June 2005 Dept of Civil and Env Engineering, Helsinki University of Tech (TKK), Espoo, Finland

The 5th AECEF International Symposium on Civil Engineering Education in the Next Decade

Session on Education in Civil Engineering

Constructivism in Construction: Postmodern Civil Engineering

by

Dr. Alan S.K. Kwan
Cardiff University, Cardiff, U.K.

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... The disti[illegible] plurality or p[illegible] systems col[illegible], which dated distant in time and space and discovered [illegible]. They are periods when there is a tende[illegible]ncy [illegible] to imitate, [illegible] to simplify, [illegible] to state with authority or integrate. New meaning [illegible] from the e[illegible] or th[illegible]n of many different elements.

Today, this state of mind o[illegible]e h[illegible] [illegible] derni[illegible]-or me[illegible]n [illegible]at state is a Bedouin mounted [illegible] cle[illegible]ar[illegible] [illegible]bes u[illegible] [illegible] with a transistor radio in his hands and an ad for Coca-Cola on the camel's back.

postmodern

Civil Engineering

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postmodern

Civil Engineering

Le Corbusier

Frank Lloyd Wright

VS

Robert Venturi

Frank Gehry

Terry Farrell

	born	age today	came to university
Boomer	1946 - 64	61 to 79	before 1983
X	1965 - 79	46 to 60	1983 - 1997
Y	1980 - 96	29 to 45	1998 - 2014
Z	1997- 2011	14 to 28	2015 - 2029

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alpha	2012 onwards	under 14	from 2029

Aspect	Gen Y / Millennials (~1980–1996)	Gen Z (~1997–2011)	Generation Alpha (~2012–)
Tech exposure	Grew up with internet Adapted to mobile & smartphones Facebook, MySpace	Digital adapters/natives Grew up with smartphones & social media Internet gaming >6hrs/day online Tech-centred lifestyle Instagram, Snapchat, YouTube, TikTok	AI natives Born into smart devices, voice assistants, immersive tech, touch screen, streaming, connected devices Able to use tablets from aged 2 Tech shapes social, emotional & cognitive development Roblox, TikTok, Amazon, Disney+
Learning Style	Collaborative but	Independent, self-directed learning Values collaboration OK with traditional formats	Expects immersive & AI-driven personalised learning
Attention Span	Moderate, Benefit from structured sessions	Short, prefer quick, visual, high-impact content Can focus when there is variety and stimulus Gets bored with long lectures	Very short Needs continuous, dynamic, multimodal input Want high interactivity & instant feedback
Expectations of education	Personal development Clear rules, structured evaluation, meaningful feedback qualifications leading to employment	Flexible scheduling, hybrid learning, career-focused content Practical and outcome-based Self-directed learning pathways Hands-on & applied learning	*On-demand everything*, real-time feedback, VR labs, AI tutors — learning has to feel like Netflix, Minecraft, Roblox, and YouTube Global & socially resp education
Pedagogic preference	"Traditional" Project-based learning	Flipped classrooms Elective heavy Micro-learning, interactive simulations	Personalized AI tutors Gamified/AR-based learning

Implement → Integration → Immersion

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Experiential → Interactive → Autonomous

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Firm → Fragmented → Fleeting Fluidal

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Structured → Blended → On demand immersive

duolingo

Expectations of educ

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Traditional → **Flipped** → **AI-driven Gamified**

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I think there are good reasons for suggesting that the modern age has ended. Today, many things indicate that we are going thorough a transitional period, when it seems that something is on the way out and something else is painfully being born. It is as if something were crumbling, decaying, and exhausting itself, while something else, still indistinct, were arising from the rubble.

... The distinguishing features of such transitional periods are a mixing and blending of cultures and a plurality or parallelism of intellectual and spiritual worlds. These are periods when all consistent value systems collapse, when cultures distant in time and space are discovered or rediscovered. They are periods when there is a tendency to quote, to imitate, and to amplify, rather than to state with authority or integrate. New meaning is gradually born from the encounter, or the intersection, of many different elements.

Today, this state of mind or of the human world is called postmodernism. For me, a symbol of that state is a Bedouin mounted on a camel and clad in traditional robes under which he is wearing jeans, with a transistor radio in his hands and an ad for Coca-Cola on the camel's back."

2005

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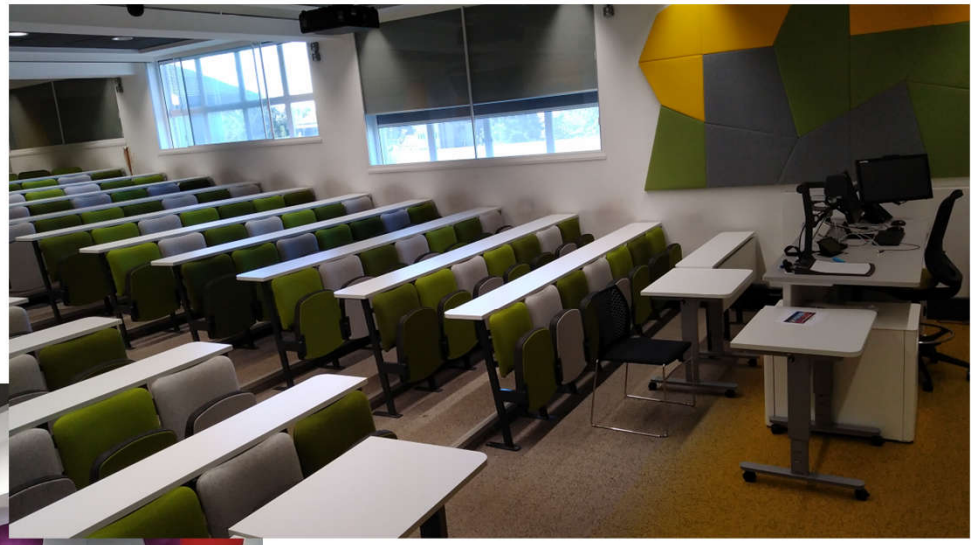

2010-2015


Engineering
prifirst

overwhelmed
bewildered
too much

more material
online

make contact time
higher value

poor lecture
engagement

low lecture
attendance

de-risk year-end exams
more regular assessments

too theoretical
more applications

want inspirational
not just routine

students just
memorise

survival & not
deep learning

thinking in
compartments,
not holistic

coursework
deadline hijack
classes

mark
chasing

low pass rate
from Year 1

Engineering pri first

teaching	⇨	learning
fragmented timetable	⇨	day–long “baseroom”
small modules	⇨	integrated
compartmentalised	⇨	interdisciplinary
lectures	⇨	exercises
“old” labs	⇨	open labs, play&learn, maker hub
exams	⇨	competency testing
end of year exams	⇨	tests spread out
mark chasing	⇨	blocks of weeks
fragmented knowledge	⇨	year–long project

Engineering pri first

from z to a

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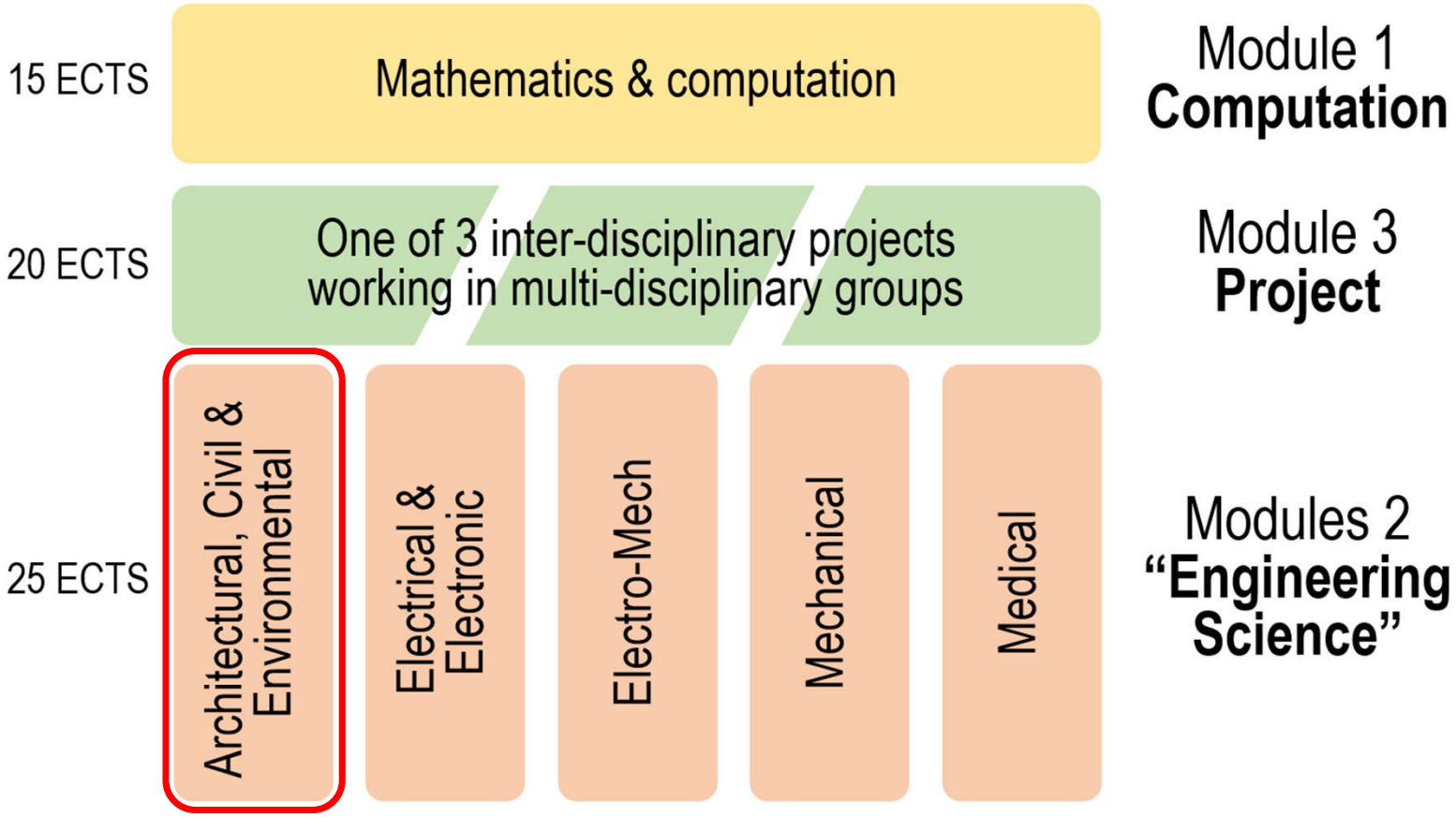
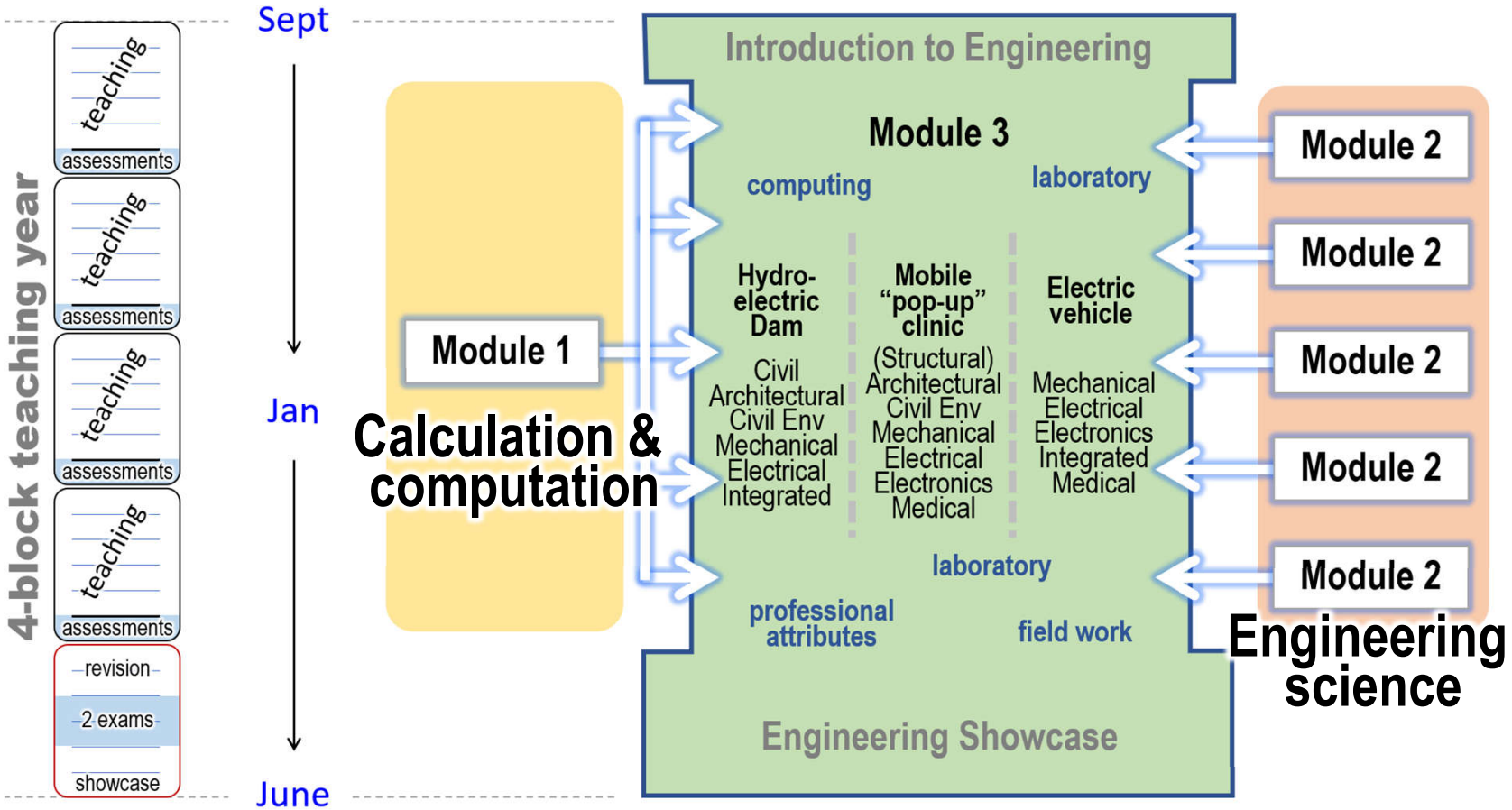
3-module Year 1

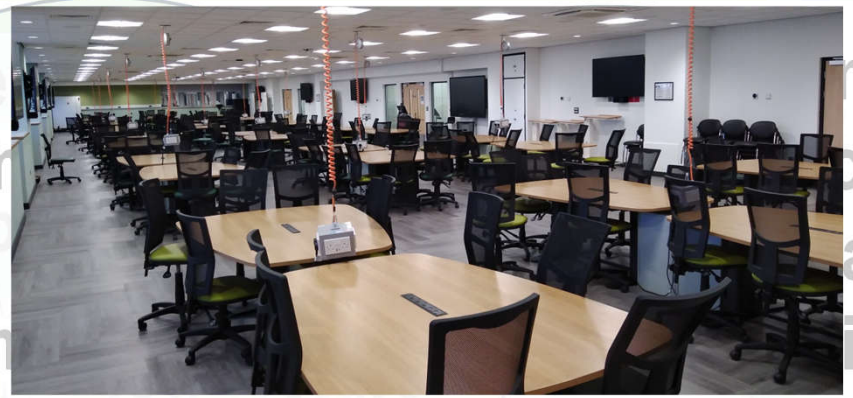


Engineering pri first

3-module Year 1



Engineering first



traditional lectures	⇨	flipped lecture, exercises
“old” labs	⇨	open labs, play&learn, maker hub
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Engineering first

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Engineering first

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Engineering pri first

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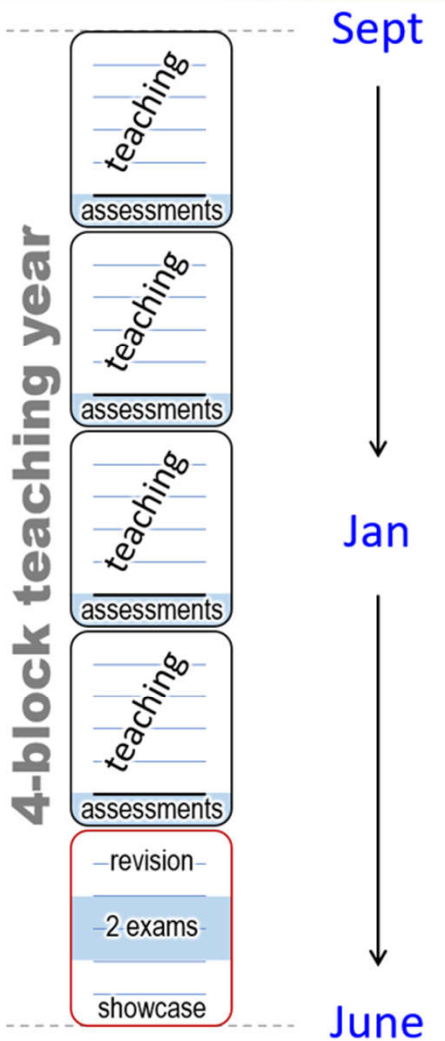


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deadline hijack
classes

The landscape of engineering education is evolving and responding to the changing characteristics of student cohorts. The significant differences in Generation Z have consequently caused changes in processes, pedagogy, provisions, and particularly the philosophy of Engineering educators. This lecture will briefly sketch out those changes, but will then project forward to adaptations that might be needed for the next Generation Alpha, arriving at universities from around 2028. There are notable generational

EUCEET 2025 BUDAPEST

for personalised tech-integrated learning, and immersive, adaptive educational experiences. There is need for pedagogical strategies that are student- and learning-centric, with emphasis on experiential learning, collaborative problem-solving, and pervasive digital integration. The lecture will explore ideas such as use of AI-powered personal learning assistant, gamification in the virtual learning environment, physical class rooms which are adaptive flexible learning space, student-led global collaborative projects, and hands-on design-make-test projects from early on.

TEACHING GEN Z CIVIL ENGINEERS