

Royal Academy of Engineering VP Workshop

‘Pedagogic Issues in facilitating learning of
Sustainable Development’

University of Ulster Sustainable
Development Group

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- **Context**
- **Case Study Construction**
- **Case Study Delivery**
- **Case Study Assessment**
- **Pedagogic Issues**

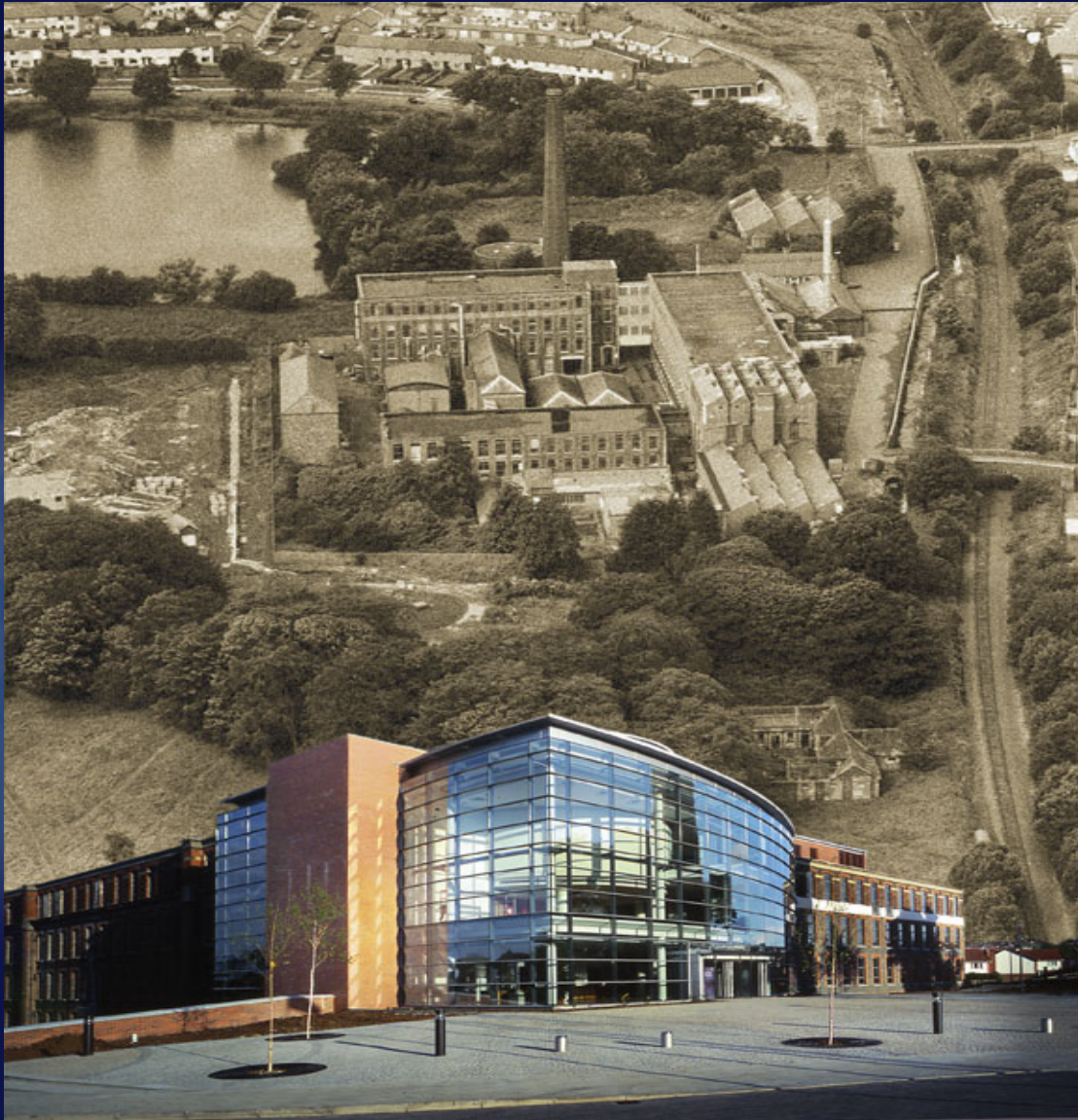
- **School of the Built Environment**

- 9 Disciplines - 11 Undergrad. & 5 Masters

Awareness
Teaching
(Broadening)

Case Studies
(Broadening
&
Deepening)

Design &
Dissertation
(Deepening)



Mossley Mill -
Regenerated to
last?

Official Launch of Summary Report



Newtownabbey Borough Council - a Dilemma

- Need for centralised Headquarters
- Investigation of approx. 40 sites
- Determination of Members to find 'best site'
- Mossley Mill > Hazelbank by rigorous process
- Mill Development completed in 3 hectic years
- Regenerated Mill opened in 2000 as new Civic
Headquarters



Old Mill to Civic Headquarters!



STAGE 1: ROAMEF Statement for each Case Study

- **Rationale** - Triple Bottom Line, LA21, Pedagogy, multi-use
- **Objectives** - Account of: Before & After, SD appraisal, pedagogy, future development
- **Appraisal** - Data capture, synthesis & analysis leading to delivery of each Objective (?)
- **Monitoring** - Engage Staff, SPAT + Stakeholders
- **Evaluation** - Stakeholders + SVP
- **Feedback** - Inform future CS work; see below

STAGE 2: Audit Built Environment Modules

- Explicit & Implicit reference to SD in Learning Outcomes
 - $(8\% + 14\%) = 22\%$ SD reference (from 192 modules, in 2001)
 - Highlight - Environmental Engineering - 45%
 - Lowlight - Quantity Surveying - 5%
 - Identify possible modules for Case Studies
 - Review Course Learning Outcomes re SD & influence change

STAGE 3: Selecting key modules for CS

- Apply Module SD Evaluation
- Use Staff Champions + SPAT
- Match disciplines & themes in CS with Module Learning Outcomes

STAGE 4: Negotiate CS Stakeholder support/ownership

- Stakeholders: Client, Architect, Engineer, Experts
- Staff: Academic [flyer, info. Drip-feed]
- Students: awareness, interest, action
- Community: local, workshops, relationships!

Stage 6: Fact Sheet Development

- Category [Transport, Biodiversity, Waste etc]
- Capital [Natural, Human, etc]
- Legislation/Policy [National, EC, International]
- Relevant Indicators and/or Benchmarks
- Data Sets
- Support documents
- Further Reading
- Comments

Stage 7: Select Auditing Tools

- Options:
 - Triple Bottom Line
 - Indicators - Headline, National, LA21, KPI's, EPI's
 - Life Cycle Analysis + Mass Balance/Ecological Footprint
 - Balance Score Cards; SPEAR
 - 5 Capitals (Forum for the Future):

**** Natural**

**** Human**

**** Social**

**** Manufactured**

**** Financial**

STAGE 8: 5 Capitals/12 Features Scoring System:

- ⌚ represents SD 'actual performance' achieved
- 📄 represents a realistic SD goal, expressed as 'As Sustainable as Reasonably Practicable' (ASARP)
- ASARP describes 'sustainable enough'
- ASARP should be regularly assessed in light of political, economic & social constraints & changes
- Gap between Actual & ASARP becomes 'realistic target' for improvement - 'DEFERRED OUTCOME'

DELIVERY MECHANISMS:

- Liaise with Staff & SD Champions
- Facilitate 'Teaching the Teachers' Workshops
 - Staff Groups, Lunchtime Seminars, Engage Staff
- Construct 'Introduction to Case Study' (ppt)
- Prepare Overview of Case study for Marketing: Flyer, Brochure
- Deliver underpinning knowledge [Auditing tools, policies & protocols, etc]

- Assessment Mechanisms
- Summative, Formative & Diagnostic balance
- Range of tools & delivery mechanisms:
 - Workshops : ‘What if scenarios’
 - Tutorials: ‘Discipline specific assignments’
 - Class Test: ‘Open Book assessment & analysis of data’
 - Exam Questions: ‘Awareness + analysis’ issues
 - Site visits - discussions, observations, reporting, role play
- Assignments & Assessments to be primarily open-ended, challenging, seeking correlations, relationships, context

- **Reference ROAMEF Statement**
- **Feedback Mechanisms:**
 - Student Questionnaire [Meets QAA requirements]
 - Module Evaluation [QAA + T & L Issues]
 - Performance Assessment [Module Summative Scores]
 - Performance Assessment [Specific measurable responses]
 - Staff Feedback [Case study content, need for further teaching]
 - Internal Feedback [by SPAT]
 - External Feedback [CS Client, to SVP]

- Range of Issues - positive and deferred outcomes!
- ⌚ SD not fully embedded in University systems - procurement, biodiversity, policy, Course Learning Outcomes
- 📄 SD has place in University systems - Energy Management, Waste recycling, Staff awareness, CPD courses
- ⌚ Staff buy-in & ownership limited
- 📄 Student response- positive & open-minded
- 📄 Strong network of external support

- Case Studies are time-consuming AND valuable
- SD is complex and needs multi-discipline approach
- SD must be introduced bottom-up
- Holistic approach is rewarding, but need champions
- SD is excellent vehicle for:
 - Meeting need of Professional Bodies in providing conceptual framework
 - Addressing broad & deep areas of study & understanding
 - Developing strong repertoire of pedagogic activities

