The SAFFIRE Project at the University of Canberra
Transforming ICT learning and teaching (@ UC)

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About the presenter

- Telecommunication Engineer + Electronic Engineer
- MSc in Computer Vision
- PhD in Electronic Engineering (visiting researcher @ U. Oxford)
- Head of research group in Multimodal Signal Processing (HCI) and Technology Transfer Center
- Program director, Head of discipline @ University Ramon Llull
- Visiting Senior Research Fellow @ National University of Singapore (sabbatical in 2011)
- ADE @ Faculty of ESTeM in University of Canberra
BACKGROUND

• The University of Canberra was awarded a Structural Adjustment Fund (SAF) grant from the Australian Government so that students could access a higher quality and modern learning experience.

• A major part of the grant is known as SAFFIRE which promotes Flexibility, Innovation, Retention and Engagement across UC.
SAFFIRE supports the UC Strategic Plan’s objective to increase the number of FTE students
• The overall goal of the SAFFIRE project is to create a curriculum that will support flexible and innovative learning approaches which fit the requirements of students
  – course redesign to achieve teaching excellence; and
  – ensure appropriate learning technologies and supporting administration systems are in place.
SAFFIRE

The project focuses on five elements to achieve this goal:

• Curriculum design
• Support and engagement
• Technologies and learning environments
• Cultural change
• Policy and process review
TIMELINE

SAFFIRE festival explored **flexible learning** and saw expert speakers discussing the **future of education, innovative teaching, learning methods and educational technology**.
IT&E TASKFORCE

• Principles:
  – **Learning experience**: best T&L practices and relevant learning technologies
  – **Employability**: industry demand, ACS CBOK, SFIA skills, EA guidelines
  – **Coherent curriculum**: constructive alignment and benchmarking. Design the students’ learning journey and have a layout consistent with it
  – **Research-led education**: direct link with research capacity
ULTIMATE GOALS

• Increase attraction
• Increase retention
• Improved progression
• Efficiency by design
STAGES FOR CURRICULA REVIEW/REDESIGN

• Curricula review at the light of external accreditation guidelines, input from Industry Advisory Panel and consistency in the IT&E portfolio
• Review of external curricula
• Development of recommendations
• Discussion with staff, refinement, and implementation
• Ongoing discussion with industry, next panel in June
• Marketing and Enrolment: July-November
Approach to curriculum design

• ICT roles of graduates: Career outcomes as driver to design the ICT curriculum
• Skills required in such roles: Skills for the Information Age (SFIA) as tool to identify graduate skills
• Mapping of unit learning outcomes against SFIA
• Integration of relevant competitions in the program (EwB, MS Imagine Cup)
ICT Career Wheel and mapping with IT&E portfolio at UC

ICT Career Wheel from ACS 2013
http://www.ichoosetechnology.com.au: “As tomorrow’s ICT professional you are likely to be working with technologies that don’t exist yet.”

ACS: The ICT Career Wheel and Career Map: “developing skills in science, technology, engineering or mathematics can be a helpful foundation.”

Yet, the mathematical background of our students is diverse and has been identified as a potential difficulty.
METHODOLOGICAL CHANGE

• Constant: One of the distinctive elements of the University of Canberra identity is the level of support and the quality of engagement afforded to its students.
• Change:
  – Mathematics Mastery Module
  – Flipped learning
The Mastery Process
• Focus is on the learner, less the teacher.
• Clear cognitive development plan.
• Discrete achievable objectives.
• Integrative tutorial/lab sessions
• Defined mastering points (Assessment Points).
• Students to attain a defined achievement level (e.g. 80%) before they can progress to next set of learning experiences.

Main Advantages
• Highly effective for establishing basic knowledge and skills.
• Significant improvements in student learning outcomes and attitudes.

SAFFIRE
Mastery Learning Project

Implications
• Required changes to UC processes and policy.
• Student progression can be very fast or slower than normal. Self-paced approach.
• The need to heavily modularise unit content
• Need for well-developed rubrics to establish Mastery points and overall Mastery

Our Experience to date
• Mastery applied to maths units: Mathematical Methods, Engineering Mathematics 1 & 2 (also other units in Science)
• Module is basic entry level Mathematics
• 90% of current students have achieved the 80% Mastery level in the module
• Average performance increase of 44%
• Particularly effective with weaker students
Mathematics Pathways
Process – Online via Pearson MyMathLab

- Diagnostic Evaluation
- Quizzes and Help
- Mastery Completion Test
- Verification Test
“Flipped Learning is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter.” - Flipped Learning Network (2014)
FLIPPED LEARNING. Implementation

• Reinforcement of tutorials and labs over traditional lectures.
• Flipping basic content and using tutes/labs for hands-on practice, where the students test their understanding and see the applicability/use of the concepts.
Restructure and rationalize PG courses  
Ensure AQF compliance

Restructure according to course design, unit viability, ACS Accred, EA, industry, APN
Revisit Course Learning Outcomes

Revisit Course Learning Outcomes associated with SFIA and ITP BOK.

Run Prof Dev sessions, map existing stage with regard implementing online facilities. 
Assist staff with Video development

Implement mastery module in Mathematical Methods, Engineering Mathematics 1 & 2

Restructure according to Course structure, unit viability. 
Focus the range of Units according to Themes/ specialisations.

Develop Unit learning Outcomes, in line with Course structure, CBOK, SFIA. Focus APN and core units

Develop Unit learning Outcomes, in line with Course structure, CBOK, SFIA.

Unit redevelopment with flipped/online approach

Establish Flipped Teaching/Flexible online modes for Units. 
Ensure compatibility for APN Partners

Mastery Approach in Maths units

IT&E REVIEW SUMMARY
CONCLUSION: OUTCOMES

• Curriculum ready to support flexible and innovative learning approaches
• Increased flexibility with mastery modules and flipped learning
• Courses ready to be delivered at distant locations (Australian Polytechnic Network)
• Efficient course design with rationalization of units
  – More time for staff to do research
  – Significant reduction in unit/course administration
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