Embedding employability and transferable skills in curriculum: A practical, multidisciplinary approach

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Outline

• Introduction

• **Embedding employability and transferable skills in curriculum**
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    • Skills and Needs - The challenge
    • Rationale from literature/research
  • Part 2- Implementation
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Introduction

• **MSc Electronic Systems Design**
  
  • **New PGT course** at the University of Bath
  
  • Focus on **students’ employability** by giving them the practical design skills to take a lead role in the **electronics industry**
    
    • Learn how to research, design and develop electronic systems, engineering technologies, processes and products

Experience and reflections on embedding employability and transferable (soft) skills in the curriculum for a new PGT programme.
Embedding employability and transferable skills in curriculum: A practical, multidisciplinary approach
Part 1- Background and Rationale
Skills Set and Environment – The Challenge
Rationale from literature/research
# Electronics Engineer’s Skill Set

## Technical Skills
- Understanding of electronic engineering
- Diagnostic skills
- Micro-electronic circuitry
- Understanding of design languages

## Soft/Employability Skills
- Communication
  - Oral
  - Written
- Criticality
- Task oriented

Electronics Engineer’s Professional Environment [1]

- **Specialist knowledge**
- **Hands-on**
  - Ability and experience to apply the academic knowledge acquired in a practical environment
  - Development of new products/technologies
- **Integrative + Multidisciplinary**
  - Need to deal with complex interdependencies
  - Integrate information from several sources and linking theory and practice
  - work on multidisciplinary teams

Developing Electronics Engineers - The Challenge

• Institution of Engineering and Technology (IET) annual ‘Skills and Demand in Industry’ Survey [2]:
  
  • *Despite a rise in demand for engineering staff, UK employers find that many new engineering graduates have significant skills deficiencies*
  
  • Need to refocus the higher education curriculum away from ‘theory’ and lectures to *problem-based, project-based or experiential learning* – focused on creating solutions to real-world challenges

As course/programme developers and/or facilitators, what can we do?

What Literature/Research Says

- “the development of academic skills is most effective when it is integrated into course design” (Huijser et al. 2008, p. A34)

- “developing and improving academic literacy and numeracy skills should be seen as a shared responsibility between teachers and students.” (Huijser et al. 2008, p. A34)

- “learning how to study effectively at university cannot be separated from subject content and the process of learning” and we should consider a “Built-in” vs. “Bolt-on” approach to skill development (Wingate, 2006, p. 458)
Reflections from Literature/Research

- The development of academic skills is most effective when it is integrated into course design (Huijser et al. 2008, p. A34).
- Developing and improving academic literacy and numeracy skills should be seen as a shared responsibility between teachers and students (Huijser et al. 2008, p. A34).
- Learning how to study effectively at university cannot be separated from subject content and the process of learning (Wingate, 2006, p. 458).
- Integration between units: Soft/Employability Skills not as a stand-alone part in the curricula, but effectively embedded in the programme (i.e., links with other units/modules).
- Hands-on: Students as active agents in the learning process, with active involvement as assessors of their own learning (constructivist approach).
- Multidisciplinary: Informed by key data and key players (market, facilitators, students) – Integration, interdependence, and interconnections across departments/centres and initiatives.
Reflections from Literature/Research

Three main pillars to build on

Soft/Employability Skills effectively embedded in the programme (i.e., links with other units/modules)

Informed by key data and key players (market, facilitators, students) + Integration, interdependence, and interconnections across departments/centres and initiatives

Students as active agents in the learning process (constructivist approach)
Part 2- Implementation
From Curriculum to Class
From Curriculum to Class – Case Study

EE50228 – Electronic Systems Design and Manufacture

Content

Professional Skills 50%
PCB design 50%

Sample

Home 28%
Overseas 72%

[Category Name]
[Percentage]

[CATEGORY NAME] [PERCENT]
female 14%
male 86%

Some kind of training - self/inf
From Curriculum to Class

- Products used for other parts/units in the MSc
  - Relevant
- Strengthen links between subjects
  - Integrate information from several units, linking theory and practice
- Integrate and apply principles and methodologies from multiple areas (linguistics, information, etc.) different to students’ technical expertise
  - Careers Service, Academic Skills Centre, Library, Students Services targeting key areas (communication, etc.)

• ‘Skills and Demand in Industry’ Survey
  • Learn by doing
    • Workshops
    • Activities & resources online
  • Students produce own products
Sessions Structure

- Lecture time: Theoretical concepts
- Workshop time: Case studies examples
- Feedback from facilitators
- Feedback from peers
- Assignment linked to other units/modules
- Students’ deliverables
Part 3- Evaluation
Preliminary results
Present and Future
Initial Outcomes

• Students’ view

- **Satisfaction**
  - Satisfied
    - 100%

- **Relevance**
  - Relevant
    - 80%
  - Very relevant
    - 20%

- **Finding a placement**
  - Helpful
    - 40%
  - Very helpful
    - 60%
Initial Outcomes

• **What our Students Say**

  • “The lectures [about] presentation skills and technical reports were really interesting and also very useful. In fact, the variety of people presenting was really good. It was clear a lot of effort had gone into arranging the sessions” – Dan O.

  • “The CPD classes have been very helpful. Since I’m not from the UK, I didn’t know a lot of things. With the help [of the demonstrators] I have understood a lot of do’s and Don’t’s” – Elaine M. A.

  • “It helped me to understand how to approach literature study and filter it down. It was an extremely helpful session. It is a skill to be mastered by all students!” – Allan A.
Initial Outcomes

• How our students are perceived

  Xin was such a wonderful addition to our team. It was an absolute pleasure to have him working with @bristolisopen during his @UniofBath placement. #Engineeringinterns #interns #UniofBath

• Read Xin’s story at

  https://www.bristolisopen.com/summer-interns-at-bristol-is-open/
Present and Future

- **Starting point/inspiration for other initiatives**
  - Supplementary workshops for MSc students at Bath who do not have these as an integral part of their MSc programme
  - Placement support sessions

- **Expansion to other PGT programmes**

- **Ongoing evaluation/revision process**
  - Revision through data, students, peers and reflection

- **Open dialogue with existing and new partners**
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THANKS FOR YOUR ATTENTION