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## Changing to a Student-Centred Paradigm: The Why, What and How

Mike Murphy

Technological University Dublin, [mike.murphy@tudublin.ie](mailto:mike.murphy@tudublin.ie)

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**INSTITIÚID TEICNEOLAÍOCHTA ATHA CLIATH**

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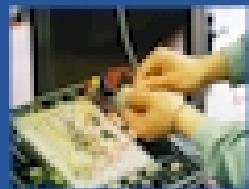
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# Changing to a Student-Centred Paradigm:

## The Why, What and How

**Mike Murphy**

**10 May, 2005**



**Faculty of  
Engineering**





# Outline

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- Welcome
- Why the need for Change?
- What has to Change?
- How should we Change?

Time	Theme	Speaker	Format	Details
9.30	<b>Opening</b> DIT Strategic Plan & Theme 1 Faculty Policy	Mike Murphy Director		Modularisation Semesterisation Widening Access Retention
10.00	<b>Why do we need to change?</b> The Changing External Environment, The Learning Society, Lifelong Learning. <b>What do we do ?</b> Student Centred Learning	Kevin Kelly Head of Learning Development	Power Point Presentation accompanied by Paper.	Globalisation Knowledge economy Industry's needs Changing graduate needs Changing demographics
11.00	<b>Coffee</b>			
11.30	<b>What exactly has to change?</b> Programme and Module <b>Learning outcomes</b> written in compliance with DIT QA and IEI requirements.	Brian Bowe & LTC Team	Short presentation followed by Workshops in various rooms of Bolton St building	Lecturers will be facilitated to write learning outcomes for their module descriptors.
13.15	<b>Lunch</b>			
14.30	<b>Assessment</b> for learning outcomes and the new paradigm	Brian Bowe & LTC Team	Short presentation followed by Workshops in various rooms of Bolton St building	Programme teams will be facilitated to align assessment methods to learning outcomes.
16.15	<b>Plenary session</b>	Chaired by Director	Questions/comments from floor	Are we over assessing? Are the views of all stakeholders taken on board? Can we draw conclusions? Suggestions for next seminar in Sept?
17.00	<b>Close</b>			



# Wake-up Issue

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Ireland must change from an investment-driven economy to a knowledge-based economy

## Implications:

- Continuous learning and re-learning
  - 40-year engineer, not a 4-year engineer
  - distinction between part-time and full-time students
- Blurred boundaries between technical disciplines
  - e.g., product vs. service vs. packaged solution
- The need for the *Entrepreneurial Engineer*

New challenges for engineering educators



# Faculty of Engineering

## Mission Statement

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- *The Faculty of Engineering is committed to excellence in the provision of accessible, multi-level education and training [business] so as to benefit our students and staff, enterprise and society [purpose]. The Faculty achieves this through a student-centered ethos within a culture of lifelong learning supported by the highest standards in teaching, scholarship & research. [values]*



*Engineering @ DIT: Challenging, Fun & Rewarding*

# DIT Strategic Plan 2000-2015 \*

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- ▶ Multi-level, learner-centred environment.
- ▶ Allied with and responsive to industry.
- ▶ Strong Postgraduate/Research.
- ▶ Reputation for excellence.
- ▶ Flexible leading-edge electronic capabilities.
- ▶ Supportive and caring ethos.
- ▶ Entrepreneurial institution.

\* Adopted by Governing Body, 14 March 2001





# Strategic Plan – Theme 1

## Strategic Plan

Theme 1

Theme 2

Theme 3

Theme 4

Theme 5

Theme 6

Theme 7

## *Multi-Level, Learner Centred Environment*

*... enhance ... DIT as a multi-level, technological institution offering programmes ... in a learner-centred environment and which includes ... responsiveness to society's lifelong learning needs. An underlying theme is the promotion of the capacity to learn and to reason ...*

- ▶ **Respond flexibly to the needs of students**
- ▶ **Evolve and adapt the nature of programmes, embracing a changing environment**
- ▶ **Promote new learning experiences, including project elements, etc.**
- ▶ **Develop new learning paradigm with a focus on problem-based and student group self-learning**
- ▶ **Develop new interdisciplinary courses**





# Strategic Plan – Theme 2

## Strategic Plan

Theme 1

Theme 2

Theme 3

Theme 4

Theme 5

Theme 6

Theme 7

## *Strong Postgraduate and Research Arms*

*... expand the capacity of DIT in response to a knowledge-based environment, and foster a culture of scholarship and research ...*

- Enhance postgraduate numbers with focus on research students
- Develop multi-disciplinary niche research areas
- **Establish international links for all schools**



# Strategic Plan – Theme 3

## Strategic Plan

*Theme 1*

*Theme 2*

*Theme 3*

*Theme 4*

*Theme 5*

*Theme 6*

*Theme 7*

*Closely Allied with and Responsive to Industry*

*... enhance collaboration with industry with a view to the employability of DIT graduates ...*

- ▶ Deliver programmes geared to industry's needs
- ▶ Attract industry funding



# Strategic Plan – Theme 4

## Strategic Plan

Theme 1

Theme 2

Theme 3

Theme 4

Theme 5

Theme 6

Theme 7

## *Reputation for Excellence*

*... strengthen feedback in support of improvements to programme development and delivery, to enhance the quality of staff and to promote a culture of excellence*

- Periodically review the performance and operation of faculties/schools
- Attract and retain high quality staff to the Institute
- Continue to improve staff development
- Enhance and strengthen quality assurance



# Strategic Plan – Theme 5

## Strategic Plan

Theme 1

Theme 2

Theme 3

Theme 4

Theme 5

Theme 6

Theme 7

## *Flexible Leading-Edge Electronic Capabilities*

*... position DIT as a state-of-the-art institution with the capacity to deliver programmes flexibly, effectively and to the highest standards ...*

- **Implement course modularisation, credit transfer**
- **Develop modularised e-learning programmes as a feature of a rapid, flexible and cost-effective response capability**
- **Develop flexible web-based course delivery mechanisms for rapid response to changing needs**



# Strategic Plan – Theme 6

## Strategic Plan

*Theme 1*

*Theme 2*

*Theme 3*

*Theme 4*

*Theme 5*

*Theme 6*

*Theme 7*

## *Supportive and Caring Ethos*

... ensure that DIT operates as a supportive, welcoming institution, internally for staff and students and in its external face with the community.

- Foster a caring and supportive environment
- Provide a learning environment of the highest quality
- Provide retention support for students at risk of drop-out
- Develop an effective mentor system



# Strategic Plan – Theme 7

## Strategic Plan

*Theme 1*

*Theme 2*

*Theme 3*

*Theme 4*

*Theme 5*

*Theme 6*

*Theme 7*

## *Entrepreneurial Culture*

... creation of an environment and operational structures and practices which facilitate and enhance dynamic and participatory management, **while fostering a culture of creativity, innovation, adaptability and autonomy.**

- *Dynamic, facilitative leadership, pursuing the Institute's vision and strategic objectives*
- *Devolve decision-making to the maximum extent*
- *Train staff generally in change management and entrepreneurial culture*





# Reasons to Study Engineering \*

	Number	2004 %	2003 %
I was always interested in how things work	190	43%	52%
Engineering is a good career	158	35%	29%
I am interested in designing things	142	32%	28%
I want to build things	110	25%	30%
Engineers are well paid	68	15%	15%

\* 2005 survey of 446 DIT 1<sup>st</sup> year engineering students



# DIT Retention Rates \*

	2002-2003	2003-2004	Δ
Applied Arts	73%	78%	+ 5%
Business	77%	78%	+ 1%
Built Env.	73%	78%	+ 5%
<b>Engineering</b>	<b>57%</b>	<b>70%</b>	<b>+ 13%</b>
Science	71%	73%	+ 2%
Trsm & Food	65%	64%	- 1%
DIT	69%	74%	+ 5%

\* Rates for 1<sup>st</sup> year students eligible for 2<sup>nd</sup> year



# Some Data for Faculty

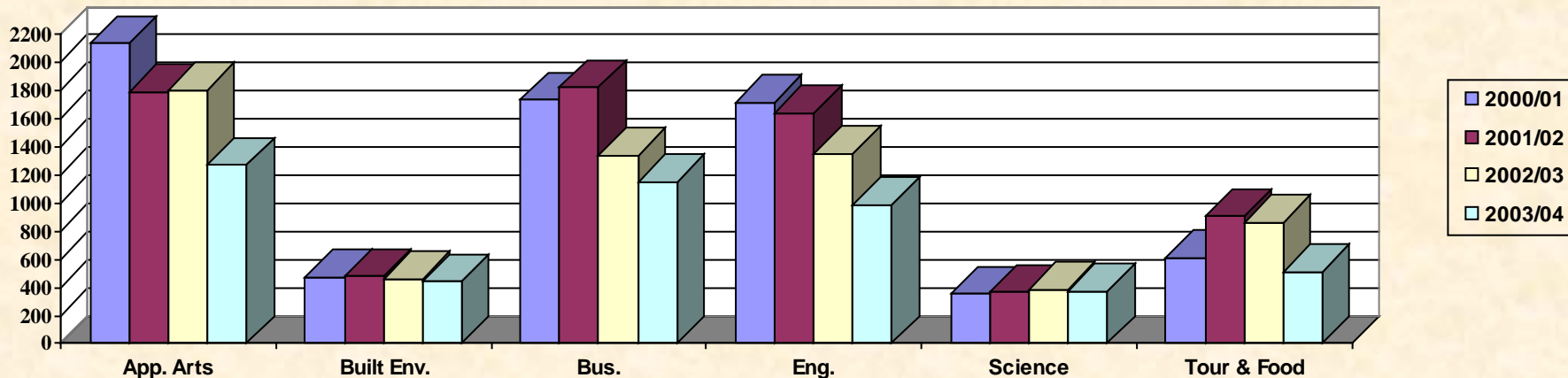
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<b>Student Measures</b>	<b>Number</b>	<b>% of WT Students</b>
Access (LEAP)	43	2%
Women	141	7%
Non-EU	141	7%
Mature (enrolled in WT programmes)	109	5%



# Part-Time Number Trends

Analysis of DIT part-Time Enrolments 2000-2003 - By Faculty



	2000/01	2001/02	2002/03	2003/04	% Change since 2000
App. Arts	2133	1794	1806	1275	-40%
Built Env.	474	481	463	443	-6%
Business	1735	1822	1335	1151	-34%
Engineering	1711	1638	1353	988	-42%
Science	352	364	386	369	+5%
Tourism & Food	608	906	862	507	-17%
<b>Totals</b>	<b>7013</b>	<b>7005</b>	<b>6205</b>	<b>4733</b>	<b>-32</b>



# Specification of IEI Programme Outcomes to satisfy the standard for CEng

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## Programmes must enable graduates to demonstrate:

- a) The ability to derive and apply solutions from a knowledge of sciences, engineering sciences, technology and mathematics;
- b) The ability to identify, formulate, analyse and solve engineering problems;
- c) The ability to design a system, component or process to meet specified needs, to design and conduct experiments and to analyse and interpret data;
- d) An understanding of the need for high ethical standards in the practice of engineering, including the responsibilities of the engineering profession towards people and the environment;
- e) The ability to work effectively as an individual, in teams and in multi-disciplinary settings together with the capacity to undertake lifelong learning;
- f) The ability to communicate effectively with the engineering community and with society at large.





A wide range of skills must be measured – virtually impossible via an exam-only assessment method.



# GRID OF LEVEL INDICATORS

LEVEL 6	LEVEL 7	LEVEL 8	LEVEL 9	LEVEL 10	
Specialised knowledge of a broad area.	Specialised knowledge across a variety of areas.	An understanding of the theory, concepts and methods pertaining to a field (or fields) of learning.	A systematic understanding of knowledge, at, or informed by, the forefront of a field of learning.	A systematic acquisition and understanding of a substantial body of knowledge which is at the forefront of a field of learning.	<b>Knowledge Breadth</b>
Some theoretical concepts and abstract thinking, with significant underpinning theory.	Recognition of limitations of current knowledge and familiarity with sources of new knowledge; integration of concepts across a variety of areas.	Detailed knowledge and understanding in one or more specialised areas, some of it at the current boundaries of the field(s).	A critical awareness of current problems and/or new insights, generally informed by the forefront of a field of learning.	The creation and interpretation of new knowledge, through original research, or other advanced scholarship, of a quality to satisfy review by peers.	<b>Knowledge Kind</b>
Demonstrate comprehensive range of specialised skills and tools.	Demonstrate specialised technical, creative or conceptual skills and tools across an area of study.	Demonstrate mastery of a complex and specialised area of skills and tools; use and modify advanced skills and tools to conduct closely guided research, professional or advanced technical activity.	Demonstrate a range of standard and specialised research or equivalent tools and techniques of enquiry.	Demonstrate a significant range of the principal skills, techniques, tools, practices and/or materials which are associated with a field of learning; develop new skills, techniques, tools, practices and/or materials.	<b>Know-How &amp; Skill Range</b>
Formulate responses to well-defined abstract problems.	Exercise appropriate judgement in planning, design, technical and/or supervisory functions related to products, services, operations or processes.	Exercise appropriate judgement in a number of complex planning, design, technical and/or management functions related to products, services, operations or processes, including resourcing.	Select from complex and advanced skills across a field of learning; develop new skills to a high level, including novel and emerging techniques.	Respond to abstract problems that expand and redefine existing procedural knowledge.	<b>Know-How &amp; Skill Selectivity</b>
Act in a range of varied and specific contexts involving creative and non-routine activities; transfer and apply theoretical concepts and/or technical or creative skills to a range of contexts.	Utilise diagnostic and creative skills in a range of functions in a wide variety of contexts.	Use advanced skills to conduct research, or advanced technical or professional activity, accepting accountability for all related decision making; transfer and apply diagnostic and creative skills in a range of contexts.	Act in a wide and often unpredictable variety of professional levels and ill-defined contexts.	Exercise personal responsibility and largely autonomous initiative in complex and unpredictable situations, in professional or equivalent contexts.	<b>Competence Context</b>
Exercise substantial personal autonomy and often take responsibility for the work of others and/or for allocation of resources; form, and function within, multiple complex and heterogeneous groups.	Accept accountability for determining and achieving personal and/or group outcomes; take significant or supervisory responsibility for the work of others in defined areas of work.	Act effectively under guidance in a peer relationship with qualified practitioners; lead multiple, complex and heterogeneous groups.	Take significant responsibility for the work of individuals and groups; lead and initiate activity.	Communicate results of research and innovation to peers; engage in critical dialogue; lead and originate complex social processes.	<b>Competence Role</b>
Learn to evaluate own learning and identify needs within a structured learning environment; assist others in identifying learning needs.	Take initiative to identify and address learning needs and interact effectively in a learning group.	Learn to act in variable and unfamiliar learning contexts; learn to manage learning tasks independently, professionally and ethically.	Learn to self-evaluate and take responsibility for continuing academic/professional development.	Learn to critique the broader implications of applying knowledge to particular contexts.	<b>Competence Learning to Learn</b>
Express an internalised, personal world view, reflecting engagement with others.	Express an internalised, personal world view, manifesting solidarity with others.	Express a comprehensive, internalised, personal world view, manifesting solidarity with others.	Scrutinise and reflect on social norms and relationships and act to change them.	Scrutinise and reflect on social norms and relationships and lead action to change them.	<b>Competence Insight</b>





# Why Modularisation?

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- **Unlock synergies first and foremost**
  - E.g., 13 Electrical/Electronic courses in 1<sup>st</sup> Year of our BEngTech programmes
  - Rapidly design and implement new programmes, particularly inter and multi-disciplinary programmes
  - Need for a standard Module
- **What about putting 300 in a classroom?**
  - Assessment (e.g., should 1<sup>st</sup> year be all formative assessment?)
  - Learning approach
- **What about cost cutting?**



# Staff Development

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The Faculty will continue to support and facilitate staff to:

- Improve their academic qualifications
- Advance their research interests
- Progress their teaching and assessment skills
- Develop their knowledge of best practice work related skills



# How should we design 21<sup>st</sup> Century Engineering Education?



- ▶ Learner-centred: students learn *how to learn*
- ▶ Modular, *to allow synergies* in use of resources
- ▶ Programmes enriched with *hands-on and team-based learning*
- ▶ Blurring of part-time and full-time students
- ▶ *Flexible delivery and assessment*
- ▶ **Accredited!**



# Vision for the Faculty

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*DIT is recognised as the best multi-level engineering institution in Ireland.*

***It will take all of us to make this vision real.***