'Securing the future Engineering needs of ESB: the selection and education of apprentices to attain professional engineer qualifications'

September 2010
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ESB – Our History

- State owned vertically integrated utility established in 1927 – first Hydroelectric Scheme in Ardnacrusha
- Rural Electrification – 1950s
- International ventures – mid 1970s (oil crisis) > 100 countries
- Network Renewal – big investment
- Ireland has had one of the fastest-growing electricity markets in the world – it grew over 40% in the past 10 years
- In 2004 ESB had a turnover of over €2 billion – it is now over €3 billion
- There are currently 7,500 employees working in ESB (was 13,800)
- Electricity Market fully open to Competition since February 2005
ESB - Financials

- Dividend paid by ESB in 2009 = €279.4 million. Over the past eight years, ESB has paid dividends of €815 million to the Exchequer.

- ESB revenues for 2009 amounted to €3.1 billion with profits of €580 million – an increase of €307 million on the previous year that was attributable to the once-off sale of power generation assets to the Spanish utility, Endesa.

- Capital investment in 2009 was over €900 million.

- ESB net debt increased during 2009 by €143 million to €2,231 million.
How Our Industry Works
Electricity Industry Structure

- **150,000 km Overhead Lines**
- **175,000 Pole Transformers**
- **3,700 staff in Networks business**
- **Peak of 105,000 new customers connected 2006 (35,000 in 2009)**
ESB ‘Strategy 2020’
Strategic Vision to 2020

ESB will be a leading commercially successful, environmentally responsible utility

- World Class Sustainable Networks
- A Renewables Business of Scale
- Best Practice Generation Portfolio
- Customer Focussed Supply Business
- Delivering on the national target of 20% improvement in energy efficiency by 2020
- Significant International Presence

ESB will be leaders in Carbon Management and Energy Efficiency

We will reduce our Carbon Emissions by 30% by 2012; 50% by 2020; Net-Zero by 2035
Corporate and Social Responsibility
Triple Bottom Line – An ESB Which

➤ Growing, efficient, commercially focussed, financially strong delivering shareholder value

➤ Cares for society, impact on community and in partnership with people

➤ Implements a sustainable vision and is a part of Ireland’s effort to meet its environmental challenges
ESB stimulus for Irish Economy
2009 - 2013

April 2009 - Employment Creation
ESB stimulus for Irish Economy
2009 - 2013

1. Create 3,700 new external Irish jobs by 2013 through investment in new activities such as Smart Networks, Electric Vehicles and Smart Metering

2. Continue investments in Networks & Generation (€3.5 billion) which sustain 1,300 jobs in Ireland

3. Provide the infrastructure to support continued job growth and economic progress well beyond 2013 in Smart Economy

4. Support the training of 800 apprentices & 300 professionals/graduates
Apprentice & Graduate Recruitment

- ESB will recruit 300 graduates
  - 250 Engineering Graduates
  - 50 Finance/Accounting Graduates

- During 2009/10, ESB will enable 400 unemployed apprentices to complete their apprenticeship

- ESB will recruit 400 school leavers into its craft apprenticeship programme
Apprentice Engineering Education

➢ Initiative announced on 16th April 2009

“In order to alleviate the current severe shortage of electrical engineers, ESB will finance 50 apprentices each year for the next four years to allow them to achieve a third level engineering degree”


➢ A key element of the ‘Securing Quality Engineering Resources’ strategic framework
‘Securing Quality Engineering Resources’
Influencing the Engineering Supply Pipeline – Key Activities

- Robotics (Infinity Project)
- AG Education Services
- IGC conference
- STEPS
- Under-grad. Presentations
- SQER Technical Group
- Apprentice Selection: Aptitude and Ability
- SQER Group (Resourcing)
- Primary Level Education (to age 12)
- Secondary Level Education (to Age 17/18)
- Third Level Education
- ESB
- CareersPortal.ie
- Careers Fairs
- Power Academy
- Strategic Alliances - Academic Community
- CIT Scholarship Scheme
- Apprentice Engineering Education

Influencing the Engineering Supply Pipeline – Key Activities
Electrical Engineering Graduates Trend

Figures are cumulative from UCD, UCC and DIT
Apprentice Engineering Education Programme

Overview

➤ The education model

➤ Memorandum of Understanding with Education Partners

➤ National Framework of Qualifications (NFQ)

➤ Apprentice-Engineer recruitment process 2009

➤ Selection of apprentices for engineering education

➤ How does the ESB Group compare to a Graduate Group
**Selection and Education Model - Overview**

### Pre Engineering College Phase

- **Formal Application process**
- **Pre-bridging assessment process**

### Part-time & Full-time Bridging Education during 2nd year apprenticeship

- **Maths Tutorials**
- **CalMast**

### Full-time Bridging Modules

- **CIT / DIT**

### Engineering College Phase

- **College Education Full-time Student**
- **ESB Apprenticeship ceased**

- **Commence 2nd year Level 7 Engineering Programme**
  - 2 Years
- **Commence advanced entry to Level 8 Engineering Programme**
  - 1 - 2 Years

### Concurrent Apprenticeship Training

- Students paid a Stipend while attending college

**Bridging Module Details**

- Computer Applications
- CAD
- Maths X 2
- Electrical Science X 2

**Dates**

- Feb 2011
- Mar 2011
- Sept 2012

*CalMast = Waterford Institute of Technology*
Education Partners

➤ CIT and DIT

➤ Memorandum of Understanding is being finalised for signature

➤ Bridging Modules will be scheduled to align with National Craft Apprentice Phase 4 (March 2011). ESB to cover costs for provision of Bridging Modules by CIT & DIT.

➤ ESB is guaranteed 50 advanced entry places to 2\textsuperscript{nd} Year of a Level 7 Engineering Degree programmes

➤ Competitive selection process based on performance in Bridging Modules and a Merit Grade in National Craft Apprentice Phase 4 examinations

➤ Full-time education will commence September 2011
The National Framework of Qualifications

Apprentices to make transition from Level 5 to Level 8
**Apprentice-Engineer Recruitment 2009**

- Number of applicants = 4139

- Recruited 100 apprentices, of which 50 were selected as having a reasonable fit for Apprentice-Engineer programme in the medium term. Positions offered **before** Leaving Cert results available.

- ‘Expressions of Interest’ in engineering are filtered based on a threshold of Grade C1 Ordinary Level or Grade D3 Higher Level in Leaving Cert (final Second Level examination’) in both Maths and English

- Cut-e Psychometric Tests using comparable benchmarks with European Aeronautic Defence and Space Company (EADS) and Siemens

- Cut-e Learning Style assessment and feedback report
How do the ESB Group compare to a Graduate Group

- ESB group N = 76

- Graduate Group N = varied from 5000 – 6500 candidates who would typically have been in final year or very early career in technical / science / engineering discipline depending on the ability test in question.

- Graduate Group Norm data collected mainly in BASF, Airbus, Siemens, RWE, BP, Statoil as well as from applicants for and graduates from technically oriented universities. Countries of origin were mostly German-speaking countries, UK and Nordics, but also other European countries.
ESB Group vs. Graduate Norm Group

Mean

ESB group  Norm group

Concentration
Maths (Basic)
Maths (adv)
Verbal (admin)
Verbal (instruct)
Logical (basic)
Logical (adv)
• Blue Columns: ESB and norm group performed equally
• Green Columns: ESB group performed better than the norm group by 10% or more
• Red Columns: Norm group performs better than ESB group by 10% or more
Cut Offs Applied for Selection

- **2009 Intake**
  - > 31st percentile (or 45T) in Adv Maths & => 45T for total score in 3 psychometrics tests (verbal, maths and logical).

- **2010 Intake**
  - > 31st percentile (or 45T) in each of the respective psychometric tests.

- Same approach will apply for 2011 & 2012 intake.
Performance in the Leaving Certificate vs. Performance in Ability Tests

Participants scores on the following ability tests:
- Concentration
- Mathematical Reasoning (basic)
- Mathematical Reasoning (advanced)
- Verbal Reasoning (admin)
- Verbal Reasoning (Instruct)
- Logical Reasoning (basic)
- Logical Reasoning (advanced)

were compared against scores on the LC maths exam, LC English exam and overall LC score.

Number of participants = 55
Results

One relationship emerged as statistically significant:
  • As scores on logical reasoning (basic) increased, scores on LC maths also increased \( (p = .05) \)

Some relationships that were approaching significance:
  • as scores on concentration increased, scores on LC Maths also increased \( (p = .08) \)
  • as scores on logical reasoning (basic) increased, scores on LC English also increased \( (p = .08) \)
Results

- Sample size quite small – more interesting results may arise from the inclusion of more data
- Results show that there is evidence to believe that the ability tests are measuring some of the same aptitudes assessed in the Leaving Certificate.
- Logical Reasoning difference – how big a factor this is will emerge in time
Summary points

• Problem of shortage of Electrical Engineering graduates had been identified
• Significant and practical initiative to address national and ESB problem into the future
• Excellent collaboration between ESB, Education Partners and Cut-e
• Gives young people an opportunity to acquire Level 8 qualification
Thank You!

Questions
## Comparisons – Mean (Std. Dev.)

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<thead>
<tr>
<th></th>
<th>ESB Group</th>
<th>Graduate Group</th>
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<tbody>
<tr>
<td>Maths (Adv)</td>
<td>38.43 (7.72)</td>
<td>35.78 (8.81)</td>
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<tr>
<td>Verbal (Adv)</td>
<td>16.31 (5.73)</td>
<td>16.23 (7.80)</td>
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<tr>
<td>Logical (Adv)</td>
<td>63.34 (37.68)</td>
<td>91.0 (26.46)</td>
</tr>
<tr>
<td>Maths (Basic)</td>
<td>12.77 (3.66)</td>
<td>12.1 (2.50)</td>
</tr>
<tr>
<td>Verbal (Basic)</td>
<td>14.95 (3.97)</td>
<td>16.76 (2.38)</td>
</tr>
<tr>
<td>Logical (Basic)</td>
<td>38.67 (26.28)</td>
<td>55.24 (23.17)</td>
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<tr>
<td>Mechanical-Technical Understanding</td>
<td>31.71 (7.09)</td>
<td>27.0 (6.51)</td>
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<tr>
<td>Concentration</td>
<td>46.57 (7.09)</td>
<td>46.90 (9.0)</td>
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ESB Group vs. Graduate Norm Group

- Concentration
- Maths (Basic)
- Maths (adv)
- Verbal (admin)
- Verbal (instruct)
- Logical (basic)
- Logical (adv)
- Mech-Tech
Relationship Between Concentration and LC Maths

The diagram illustrates a scatter plot with a trend line, showing the relationship between concentration and Maths Points. The R² value for the linear fit is 0.058.
Relationship Between Logical Reasoning (Basic) and LC Maths