

School of Engineering and Materials Science  
Industrial Advisory Board  
2-30 to 4 pm, 13<sup>th</sup> March 2019

## **Notes from the Mechanical Aerospace Session**

### **Points for Discussion**

From the point of view of a potential employer of our graduates, how important are the following in a degree programme?

1. Management

What general management skills or knowledge should graduates have?

What project management skills?

Are interested in students learning the “theory” of management and management techniques, or simply gaining experience in managing?

### **Specific Question**

**Is there any appetite for Engineering Management degrees? (And would these need to be accredited?)**

#### Notes from the Meeting

*There was a clear distinction between Management in general and project management. The latter was felt to be more important.*

*Management regimes were too dependent on the structure of a particular company, and therefore difficult to teach in general.*

*There was little enthusiasm for “with Management” degrees, with pure engineering (or other subjects) preferred.*

*Students should be given opportunities to demonstrate management skills, and in particular the ability to manage people.*

2. Project Work

What would you like students to learn from individual projects?

What would you like students to learn from group projects?

Are projects with a research (rather than industrial) focus of benefit?

### **Specific Question**

**Are you aware of any innovative models of project work in your graduate training or at other universities that we should consider adopting?**

#### Notes from the Meeting

*It was felt the balance between group and individual projects was about right, but it was important that assessment was individual.*

*Suggested that group work be introduced earlier in Programmes.*

3. Accreditation

Is accreditation necessary?

What proportion of your engineering graduate recruits have non accredited degrees?

### **Specific Question**

**If you accept graduates from non-accredited degrees what other factors influence your choice to recruit them? (Grade:1<sup>st</sup> or 2:1; work experience etc.)**

Notes from the Meeting

*Accreditation was not considered essential from the employer's point of view but was none the less vital for the students themselves.*

*Students with none accredited degrees would be considered, with Programme of Study, work experience and degree classification important (in that order).*

#### 4. Other factors

What transferable (non-engineering) skills would improve a graduate's employability? List in order of priority.

Notes from the Meeting

*In NO order of preference:*

*Writing skills*

*Ability to summarise complex information.*

*There was general agreement that some coding should be embedded in the Programmes, and this should start early enough to be useful for 3<sup>rd</sup>/4<sup>th</sup> year projects.*

*Other skills were also needed (e.g. experimental techniques) for other types of project.*

Do you want generalists or specialists?

Notes from the Meeting

*Not really discussed.*

What are the comparative benefits of MEng and MSc Degrees?

Notes from the Meeting

*Not really discussed, but difficulties arising from lack of recognition of MEng abroad were mentioned.*

## Notes from the Chemical Engineering Session (taken by Stoyan)

Input – types of

Chemical Engineering and management -> There is currently no Chem Eng + Management option.

What do employers want? What above the core courses?

What hobbies -> practical hobbies? Enjoying working with soldering irons?

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Our PBLs – strength – industrially themed projects to do practical problems

We are losing £2000/student per year under the restructuring

How to keep the PBLs?

The FMEA – could be taught as part of design ->

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Are Taguchi-type techniques - > design of experiments taught effectively?

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Not so much Maple –

But graduates should know how to use statistics

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Stage-gate approach -> Prince – or one of the other project management methodologies?

Agile – short-sprints -> regular reviews -> from software -> now with products

Teach the staff how to better project manage – with the undergrad projects.

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What to improve:

Chemistry – teaching

Is there a lack of Chemistry?

Lack of teamwork

All leaders -> students do not want to work in a team if they are not the leaders.

We should force and rotate who leads the teams?

Do something together well.

Documentation and communication

There is a whole optional module dedicated to Intellectual Property – but only 5 people took it.

Fewer options -> but integrate IP into one of the common modules

Philip Kennedy – can send some people he knows from 3M – to teach basics here 2-3 lectures

Should there be a financial management module – Is this appropriate?

Ability to estimate – really separates classes of people. Must be able to venture a guess.

At Imperial – they have a course – how to estimate. Is this a \$million or a \$billion?

Size a market in 2-hrs

Useful practical hands on approaches that were suggested included:

Arduinos,

Soldering

Drawing

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Other universities

Strathclyde – industrial project day – not only poster session ->

+ each team present to their sponsor. + a really good showcase for the department

Bristol – programs

Physics with innovation, Geography with Innovation – and all ideas from industry

QMUL - Materials with design - > but application numbers are consistently about 25.  
We are giving people too many choices. We should do 80/20?

Accreditation – not necessary for graduates entering at Rolls Royce

What about -> CEng. Does it have any status?-> Matching sections?

But both Airbus and Boeing -> thought accreditation was a measure of quality,

If not then both needed extra reference letters.

We have 6 accrediting bodies for the school. -> so we are continuously being accredited.

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Split of our graduating student numbers:

- About 1/3 each in uni, industry and service sectors such as financial

£32,400 – Materials graduate starting salaries in 2018 which was higher than medics, dentists, lawyers

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We choose the 50 best posters for ILF. But 350/400 kids never present their project  
Industry – comfortable to teach students how to give talks.

Harder – to teach – Sketching and drawing. – if they are unwilling to pick up a pencil.

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Students who want to work in industry

- Students need to gain experience during their studies

Learn how to do something WELL!

Time-management

Cross-functional teamwork – very important in industry

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Innovative models of teaching:

CEO – doesn't like people reporting to him.

He wants them to present to people like Warren East (CEO at RollsRoyce)

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Grades –

In Rolls Royce – both Bachelor and Master's -> same weight, and 2.2 degree – not even considered  
Work experience differentiates students –

Internship – easiest way, lowest requirements -> and often can get offered the job at the end.

Our stats -> more than 50% of the students with a year in industry -> go work with that company.

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EECS – year in industry – they don't just mark it pass/fail.

If you get grade -> value of year in industry -> increasing in popularity

Based on reports on the year in industry. (+ support from employer)

## Notes from the Materials Session Emiliano B

Started with a round a table self-introduction

-> Aims of the meeting:

- There is a general desire, at the College level, to streamline our Module offer, to have less modules attended by larger cohorts .
- There is another trend to tackle: More and more students leaving with a 3 years degree (BEng) and not carrying on with the 4th year of MEng. Can we make the 4th year more attractive? How to do? Mini-industrial placements? More industrially important skills to gain?
- Which attributes industry wants?

Suggestions from industrialists:

- “practical people” “with hobbies and interests”. (the offer of PBL to Materials students, somehow already goes into this direction. Does PBL fit the strategy: ‘less modules with more students’).
- Need for teaching more FMEA skills (like ‘stage-gate’, Prince 2, Agile methodology, or others), design of experiments, 6 sigma, multivariant analysis, data analysis, etc. (this could be incorporated in Design Modules, PBL or into research projects. This could be addressed also by guest lecturer from industry/IAB?)
- Some fundamental subjects? Chemistry (already addressed in our current curriculum)
- CAD for materials students
- Lab safety and good lab practice (PBL?, research projects?)
- Team work/team member communication
- IP/securing/NDA, etc. (maybe in the 4th year, but not as a self-standing module that few materials students decide to take?)
- Public talking
- Importance of estimating (also as part of feasibility product development?)
- ‘Triage of ideas’...(part of the design module? To be incorporated in Qconsult?)
- Time management
- Cross-functional team (for the MEng group projects)
- Influencing people

Accreditation. Does it matter?

- For some companies it is important (e.g. Airbus) for others not (e.g. RR)
- Anyway, it still gives a ‘quality insurance’
- It is valued by students
- Overall, It would perhaps be too risky not to accredit programmes.
- Others:
- Add a pitch presentation for students at the ILF?