

BOLOGNA TREATY FROM THE VIEW OF STUDENTS AND GRADUATES

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ABSTRACT

The main aim of the Bologna Process is to create a common and comparable system of academic standards and quality within Europe. Twenty-nine countries agreed to sign the declaration in 1999 and that number has since increased to forty-six [1, 2]. Attempts have been made by Engineers Ireland to help this process come into affect by the decision to raise minimum requirement of new ordinary members to Masters Degree in Engineering accredited by Engineers Ireland after 2013.

In this paper, one of the engineering programmes is covered in detail (Manufacturing Engineering with Business Studies). Also, a survey expressing a number of student's opinions as well as obstacles for the Bologna process based on the survey results are presented.

INTRODUCTION

The School of Mechanical and Manufacturing Engineering undertakes four undergraduate BEng degrees worth 240 ECTS each. The courses are Mechatronic Engineering, Bio-Medical Engineering, Mechanical and Manufacturing Engineering and Manufacturing Engineering with Business Studies. The course Manufacturing Engineering with Business Studies will be presented in detail.

MANUFACTURING ENGINEERING WITH BUSINESS STUDIES

The specific objectives of the program me are [3]:

1. To provide a firm foundation of engineering principles, mathematics and computing.
2. To promote the use of computer based tools and their development for a wide range of engineering applications, including design, manufacturing marketing and plant operation.
3. To allow students to carry out in-depth studies of the core and option subjects, and in-depth investigative studies of projects chosen from relevant areas.
4. To enable students to be familiar with the principles of enterprise management and with basics of entrepreneurship.

5. To familiarize the students with aspects of business, economics, and HRM pertaining of engineering product development and industrial practice.
6. To enable the students to learn effective engineering communication practice.
7. To involve the students in engineering practice through the period of INTRA placement in industry.
8. To enable graduates to attain the status of Chartered Engineer in Ireland and internationally.
9. To enable graduates the opportunity to communicate engineering concepts and ideas and to assimilate, interpret and evaluate information in English and German or French.

Currently, all undergraduate courses in the faculty including Manufacturing Engineering with Business are completed in four years with an optional one-year taught masters. Each year is worth 60 ECTS. The INTRA work experience program is carried out in the second semester of 3rd year (worth 30 ECTS of the 60 ECTS for that year). If the system of education is changed from 4 years undergraduate to three years undergraduate, then the INTRA work experience would be moved to the newly created two-year masters program instead. Before implementing these changes, it is of utmost importance that the opinion of students is consulted. Thus a survey was carried out as explained below.

STUDENT SURVEY

In the survey carried out, 19 students participated. Twelve were postgraduate students, six were masters or PhD graduates and one was a bachelor degree graduate. All students were asked the same questions. Nine participants completed the questions online while the remainder were completed on paper. The questions were selected based on requirements of compliance with the Bologna Treaty to support the engineering industry with excellence [3].

- High quality of technical knowledge
- To be able to learn, develop and improve
- To be flexible in adapting to change
- To be able to manage and motivate employee
- To be able to manage project and event
- High communication quality
- Focus on business
- Team working and multidisciplinary nature
- Proving leadership and vision

- Commitment to ethical and social responsibilities
- Commercial and financial knowledge

The survey that was carried out contained the following questions:

Are you

- An employed Bachelor degree graduate?
A post-graduate Student?
A Masters/PhD graduate?

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Please tick the boxes for the following statements according to highest relevance
(Strongly disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly agree = 5)

| | | 1 | 2 | 3 | 4 | 5 |
|----|--|---|---|---|---|---|
| 1 | A one-year taught masters would be too short and demanding | | | | | |
| 2 | I have acquired sufficient quality of technical knowledge from my university education | | | | | |
| 3 | My increase in personal development is largely due to my work completed in university | | | | | |
| 4 | My university education has provided me with much project and time management skills | | | | | |
| 5 | Sufficient team-work practice have been provided in my university education | | | | | |
| 6 | Sufficient practice to adapt to change has been provided in my university education | | | | | |
| 7 | Ethical and social responsibilities has been sufficiently addressed in my university education | | | | | |
| 8 | Sufficient commercial, business and financial knowledge has been acquired in my university education | | | | | |
| 9 | My modules have given me much advantages in finding employment | | | | | |
| 10 | My modules have been used extensively in my work after graduation | | | | | |

Would you prefer

- 3 year undergrad with 2 year masters postgraduate?
4 years undergrad with 1 year masters postgraduate?

| | |
|--|--|
| | |
| | |

Is there any subjects or modules that you have considered of benefit for your work after graduation? If yes, please suggest them: _____

RESULTS AND DISCUSSION

The survey results as well are outlined below. A very large percentage (55%-60%) of students were neutral on the opinion of the taught Masters course being too short and demanding. This may be due to the fact that many participants have not undertaken the taught Masters programme. However almost double the number students were in agreement than in disagreement or strong disagreement with the length and demand of the taught Masters course.

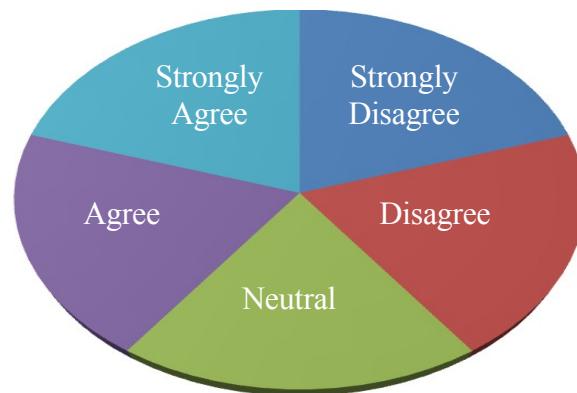


Figure 1: Results from student opinion survey.

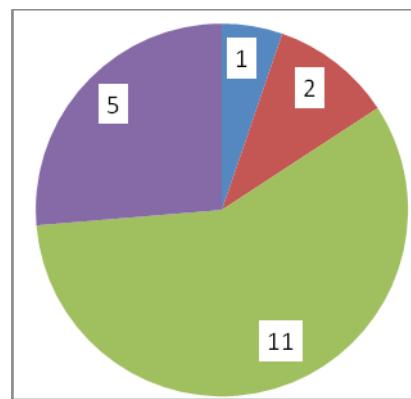


Figure 2: A one-year taught masters would be too short and demanding

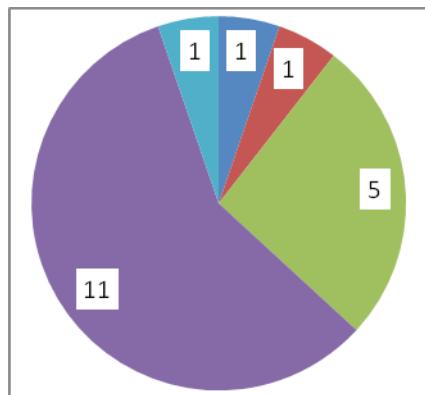


Figure 3: Acquired sufficient quality of technical knowledge from my university education

It has been well established here that students are satisfied with their acquirement of technical knowledge in their undergraduate studies. Only two students were in disagreement with sufficient technical knowledge provision.

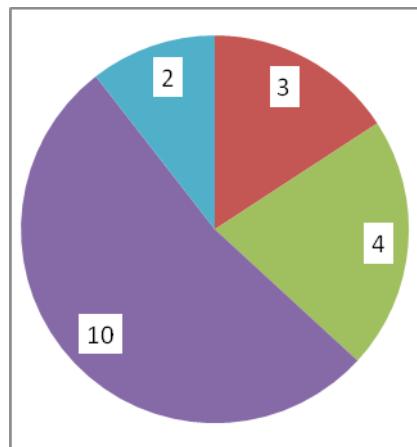


Figure 4: My increase in personal development is largely due to my work completed in university

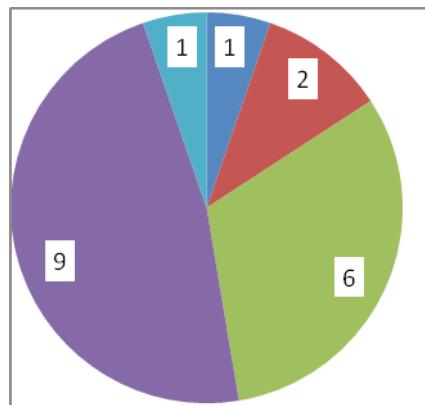


Figure 5: My university education has provided me with much project and time management skills

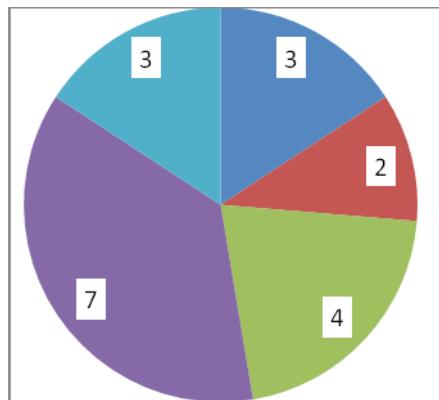


Figure 6: Sufficient team-work practice has been provided in my university education

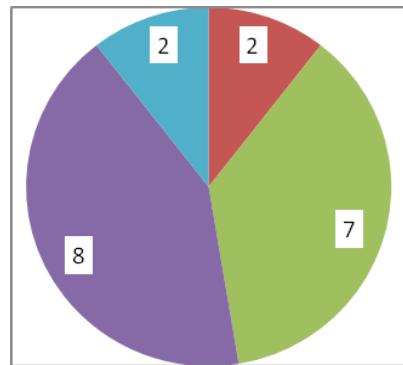


Figure 7: Sufficient practice to adapt to change has been provided in my university education

A similar opinion of agreement was found for the acquirement of personal development, project and time management, team work and adaption to change in the old (4+1) system. As aimed by the department of Mechanical and Manufacturing Engineering and Engineers Ireland in recent years, ethics and social responsibility has been adequately addressed according the students studied

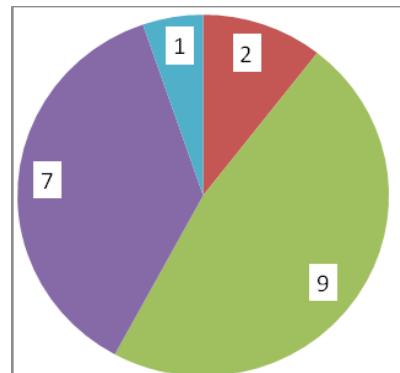


Figure 8: Ethical and social responsibilities have been sufficiently addressed in my university education

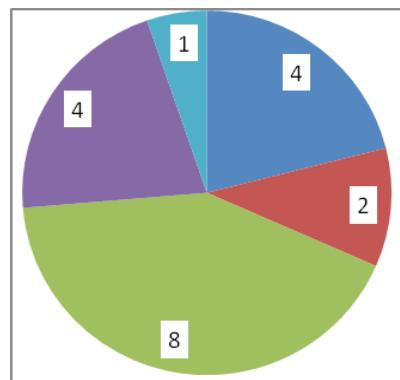


Figure 9: Sufficient commercial, business and financial knowledge has been acquired in my university education

However 74% of students were either neutral or sceptical about the covering of commercial, business and financial knowledge. Manufacturing Engineering with Business Studies clearly satisfies this but other courses appear to not do so. Only 7 students believed that adequate advantage has been provided in the modules covered for finding employment after graduation. Many (63%) participants were unsure whether the modules covered in their studies were used extensively in the workplace as many students who participated have had very limited experience in employment.

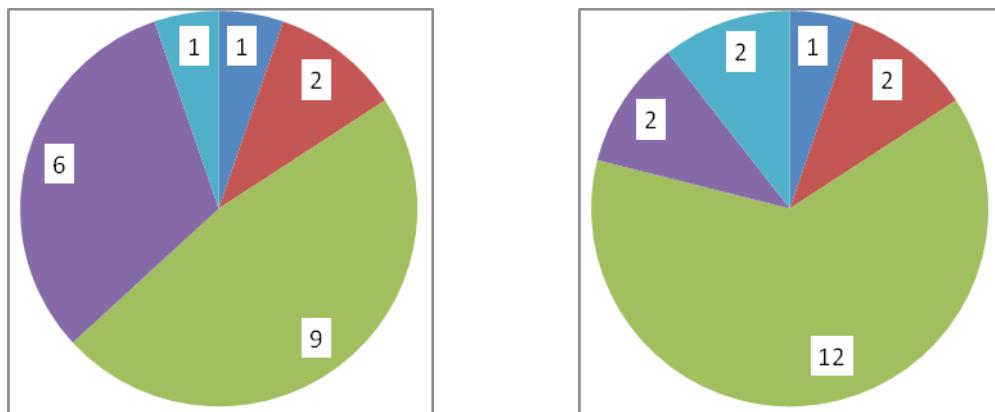


Figure 10: (a) My modules have given me many advantages in finding employment and (b) My modules have been used extensively in my work after graduation

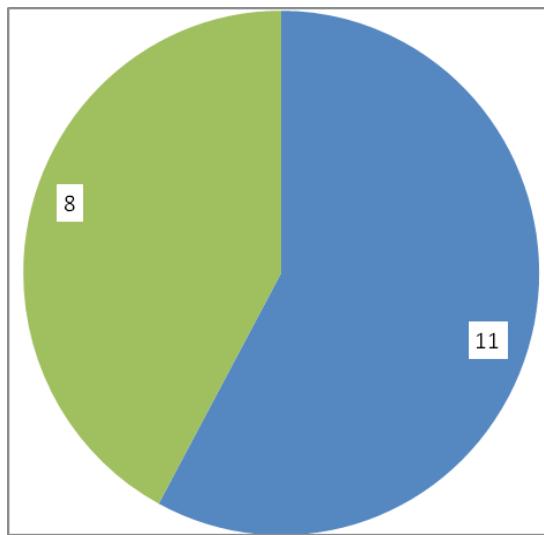


Figure 11: Students in favour of retaining 4+1 degree (11) instead of adopting the newly proposed 3+2 degree.

However, it was found that 11 of the 19 people favoured the traditional system of 4 years undergrad with 1 year optional taught masters. Another optional question in the survey included asking for a most relevant subjects studied. Subjects based on finite element analysis were mentioned three times while mechanical mathematic based subjects and CAD was nominated twice. Other listed subjects included design and production, advanced manufacturing processes, polymers, control systems and communication engineering.

CONCLUSION

It has been established in the survey that there is definitely a need to introduce more business education in the engineering curriculum with exception to the Engineering with Business Studies course. Also, great demand for more computer based design studies such as finite element analysis and CAD in future undergraduate course has been established.

There seems to be overall satisfaction with the current 4+1 format (4 years undergraduate and 1 year optional taught Masters) of engineering education with DCU graduates and post-graduates. It is unsure as whether extending the taught Masters course to two years would be popular with the next generation of undergraduate students.

If the engineering courses are changed to a 3+2 format (3 years undergraduate and 2 years optional taught Masters), it may well be against the wishes of many who only want a Bachelors degree as well as a four year engineering education guaranteed. The main advantage of adopting a 3+2 year system would be apparent if there would subsequently be a common system of qualification measurement for all nations involved.

REFERENCES

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2. Council of Europe, Higher education and Research – Bologna for Pedestrians, [Online, http://www.coe.int/T/DG4/HigherEducation/EHEA2010/BolognaPedestrians_en.asp], Accessed 04 August 2008.
3. Olabi A.G, “Engineering Program Structure Requirements for Bologna Compliance”, International Symposium for Engineering Education, 2007, Dublin City University, Ireland, p35-38.