

The impact of industrial sponsorship on the final year undergraduate engineering students

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***Abstract:** There has been an increasing emphasis in recent years on the development of employability skills in UK graduates and it has been recognised that involving industry in engineering education provides a very good way of developing these skills. Furthermore, accreditation by professional bodies requires industry involvement in engineering degree programmes and government reports have raised employer engagement with higher education as a key element for economic growth. Sponsorship of students during their degree studies is one way of bringing industry closer to education. A model for using a consortium of companies to sponsor students is briefly described and the methodology for a research project being undertaken to determine the impact of sponsorship on students, academic departments and industry partners is presented. The preliminary results of a survey of final year students are presented and conclusions drawn on the impact of sponsorship on student choice of programme and university and its contribution to the attainment of learning outcomes.*

Keywords: employability, engineering education, industrial placements, industrial sponsorship industry-academic collaboration, pedagogy.

Introduction

Pressures from employers and students for a more ‘professional’ higher education are leading to a stronger focus on key skills and a developing relationship between higher education institutions and industry. Industrial relationships provide the opportunity for sharing ideas in teaching and collaboration in research. This relationship needs to benefit students, academics and industry in order to be successful and sustainable (The Royal academy of Engineering, 2007; Dickens, 2006; Leitch, 2006).

A number of employers have identified skills gaps in specific technical and general skills in the graduates they recruit. University programmes must recognise the changing requirements of industry and provide students with practical skills to work effectively in industry on graduation and employers need to increase their investment in skills. Therefore, more effective collaboration between industry and university engineering departments is essential (The Royal academy of Engineering, 2007 and

Leitch, 2006). This collaboration could ensure that graduates have the required skills and that they are ready to contribute to the organisations that employed them (Dickens, 2006).

The Lambert Review (2003) showed that companies are considerably more successful if they use universities and other higher education institutions as a source of information or as a partner. Also, a government white paper 'The Future of Higher Education' identified closer relationships between employers and academics as a critical factor to prepare new employees and for continuous professional development (DfES, 2003).

Engineering, more than any other scientific discipline, has a long practice of collaboration between academia and industry. Successful collaborations have extensive rewards to both parties, in addition to the benefits generated for economy from technology transfer (The Royal Academy of Engineering, 2007).

The sponsorship of engineering students is considered to be an effective way of enhancing the development of the students' key engineering skills. There is some sponsorship in the pure sciences and in business and commercial subjects; however, sponsorship in engineering is most common (The Royal academy of Engineering, 2003; Gordon, *et al.*, 1985). Through sponsorships industry gains: useful ideas, access to highly trained students, alternative method of recruitment, and enhanced reputation, while the benefits to the university are: improving the quality and relevance of teaching, exposing faculty and students to practical problems and creating employment opportunities for their graduates. Benefits to students include preparing for the world of work, gaining skills, funding, finding a satisfying career (The Royal academy of Engineering, 2007; Lambert, 2003; Santoro and Chakrabarti, 2002; Wood, 1983).

Industry-Academic collaboration in Teaching and Learning

In recent years, there has been considerable development across the United Kingdom in the relationship between higher education and industry. Research collaboration, consultancy services, and industry's growing involvement as an interactive user of all types of teaching and training are parts of these linkages (Howell, *et al.*, 1998).

The Engineering Centre for Excellence in Teaching and Learning (engCETL) at Loughborough University was set up in March 2005 as one of the 74 CETLs created by the largest ever funded programme for teaching by the Higher Education Council for England (HEFCE). The centre focuses on industry and education collaboration and links with seven departments including Civil and Building Engineering (Dickens, 2006). The CETL aims to provide models of practice that can maximise the benefit of collaboration for all parties and ensure sustainable engagement.

The extent of industrial input into taught programmes and the extent of sponsorship at undergraduate level are key distinctive features of the engineering degree programmes at Loughborough University. These sponsored programmes enable the companies to enter into a partnership with an academic institution to design and run new undergraduate degree programmes, which would train future engineers of their projects and companies. In this regard, the department of Civil and Building Engineering is very successful with 24 industrial partners forming consortia to sponsor students on Civil Engineering, Construction Engineering Management (CEM), and Commercial management and Quantity Surveying programmes (CMQS). The CEM and CMQS programmes were created in 1991 as a partnership between Loughborough University and fifteen large construction organisations who have input into curriculum design and student admissions.

Methodology

This paper reports the first results of a long-term study which is investigating the impact of sponsorship on students, academic departments and industry in order to develop sustainable models of effective practice for further dissemination. The research will capture existing practice across sponsored and non-sponsored programmes within the Engineering Faculty, evaluate the benefits to the three stakeholders, assess the barriers that inhibit further sponsorship, and propose strategies for future developments.

The sponsors provide students with a bursary, maintain contact with them during their studies, provide

vacation work and sandwich placements. Throughout this paper the sponsorship scheme refers to the Civil and Building Engineering department's sponsorship scheme unless otherwise stated.

At the first stage of this project, the following groups of undergraduate Civil Engineering students have been surveyed:

- Final year students at Loughborough University, Southampton University and students sponsored through the Institution of Civil Engineering (ICE), to find out their experiences, achievements and views on the sponsorship scheme.
- First year students at Loughborough University to find out their reasons for applying (or not applying) for sponsorship, expectations and views on the sponsorship scheme. Follow up surveys will monitor the changes in their views during different years of their study.

Sponsor companies, engineering departments, recent graduates, and professional bodies will be surveyed as the research progresses.

The preliminary results of a set of questionnaires designed to collect data from final year undergraduate civil engineering students (sponsored / non-sponsored) at Loughborough University are presented in the following sections. The areas investigated included the

- impact of industry sponsorship on students' choice of university and programme,
- impact of industry sponsorship on the undergraduate programme and student employability,
- benefits to students and sponsor company,
- main factors for not applying for sponsorship,
- relation of students and company contacts.

A six-point rating scale was used in measuring and analysing responses. In addition to the quantitative data respondents were able to add qualitative statements in response to open ended questions such as, 'How could the sponsorship scheme be improved?', 'What have you gained most from the sponsorship scheme?', and 'What benefits do you think your sponsor company has gained from the sponsorship scheme?'

Results and discussion

This section considers the results for the final year MEng students in Civil Engineering, a group of 24 students. Twenty three questionnaires were completed, 19 of students were male, 3 female and 1 did not indicate his /her gender. Fifteen students applied for sponsorship during the first year. The survey has been extended to another university and ICE to bring the sample up to 61. Initial analysis of this extended group shows that the results discussed below are representative.

While all female students applied only 58% of male students applied for the scheme. This result suggests that female students were more likely applying for sponsorship; although the numbers are small. This supports the previous study by Gordon, Hutt, and Pearson (1985) which shows across all engineering subjects, a higher ratio of female students applied for sponsorship.

Forty eight percent of the students in the group received an offer from the sponsoring consortium. Of those who are not in the scheme, 50% have sponsorship, either through direct application to a company or by receiving sponsorship offer after industrial placement. Overall, 75% of the group have sponsorship.

The impact of different factors on choice of university

Students were asked to indicate the importance of the following factors on their choice of university: academic quality of university, degree programme reputation, facilities, financial aid availability, social life, location, opinion of current students, sandwich training availability. The aim of this question was to compare the impact of availability of financial aid with the other factors on students' choice of university.

Figure1 presents the percentage of importance of above factors, as it shows the most important factors are: academic quality of university, degree programme reputation, and facilities. Financial aid availability has the least effect on students' choice. Whilst 82% ranked academic quality of university

as important which shows the importance of university reputation, only 4% ranked financial aid availability as important.

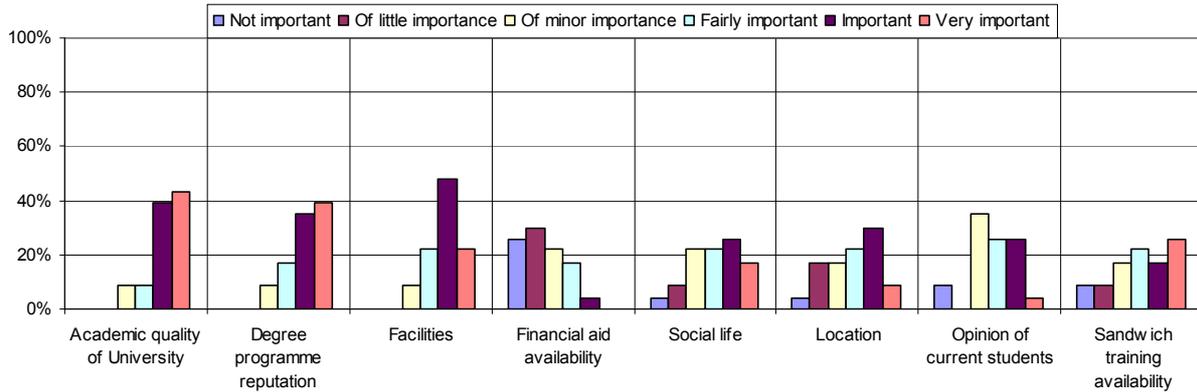


Figure 1: The importance of different factors affecting on students' choice of university

Now, UK students pay £3000 (6900AU\$) top up fees and usually take loans for their support during studies so it was thought that the availability of funding would be rated highly. Surprisingly the results show that the availability of financial aid was ranked low. Further work would be needed on the students' background to determine whether this is specific to the type students in specific universities, like Loughborough University. The Robert's Review (2002) found little evidence that increased student debt had impact on their choice of course which would confirm the findings of the current research.

The department offers the opportunity to all of its students to take a sandwich year in industry after two years of academic study. This traditional 'thick sandwich' is offered on virtually all programmes at Loughborough which makes the university one of the largest providers of sandwich placements in the UK. Figure 1 shows that sandwich training availability had an important influence on the students' choice to study at Loughborough but this would be expected as only a minority of universities in the UK offer sandwich placements and so Loughborough would attract a high proportion of students who rate sandwich placements as a high priority.

The impact of sponsorship on students' choice of programme

Students were asked to rank the impact of availability of sponsorship on their decision when choosing their programme. Results show only 26% considered that sponsorship influenced on their decision.

Reasons to apply for sponsorship

Students were then asked to rank the importance of the following factors on their decision to apply for sponsorship once they had chosen their programme: extra funding, industrial experience, practical skills, guaranteed job, improved job chances elsewhere, and extra training. Figure2 shows the percentage of importance of above factors.

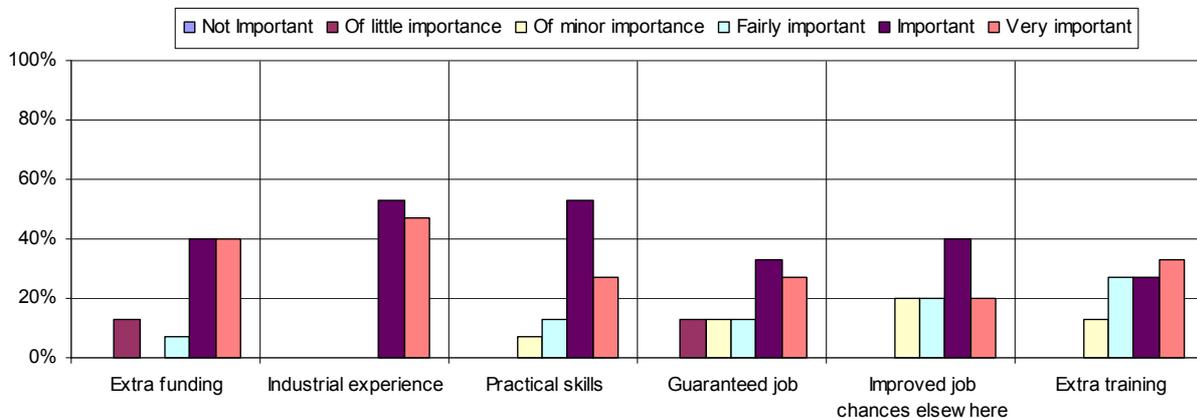


Figure 2: The importance of different factors in applying for sponsorship

Industrial experience was identified by 100% of students as the main advantage of sponsorship, followed by practical skills and extra funding. This result has been supported by the following open ended question “*What have you gained most from the sponsorship scheme?*”, in which industrial experience was identified as the most important benefit of sponsorship by majority of students.

Benefits to sponsor company (open ended question)

Students were asked to identify the main advantages of sponsorship for sponsor company by answering to this open ended question: “*What benefits do you think your sponsor company has gained from the sponsorship scheme?*” Recruitment of good quality and well trained employees and increased company reputation have been mentioned as the main benefits to the sponsor companies from the sponsorship scheme by most of students. The students also perceived that they were a source of ‘cheap’ labour to the company. It is thought the students do not take into account the cost to the company of their sponsorship and placement training.

Understanding of sponsorship

Results show 81% of total students did not have a clear understanding of the sponsorship scheme before coming to university. This response suggests that the publicity material for the scheme should be reviewed, although it already has a high profile in departmental marketing material.

Sponsorship support of selected programme learning outcomes

Figure 3 shows the students perception of how sponsorship has contributed to their attainment of selected learning outcomes of their degree programme. The response demonstrates that the students have a high awareness that their links to a sponsor have a significant impact on the development of the learning outcomes linked to employability skills. The majority of students agreed that sponsorship supports these learning outcomes in some way to considerably.

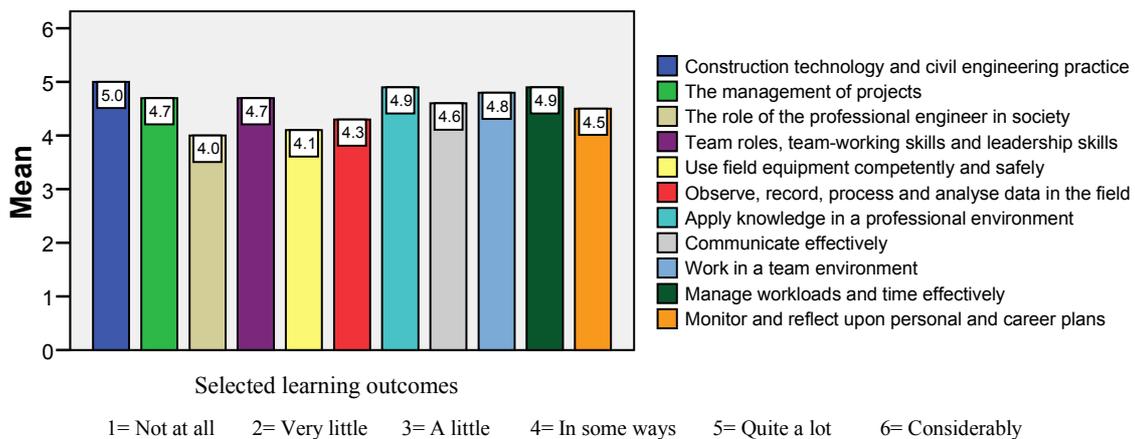


Figure 3: Sponsorship support of some selected learning outcomes of degree programme

The benefit of sponsorship to students in general

In general, 95% of total students agreed that they (could) have benefited in some way from the sponsorship element of their programme. 100% of sponsored students and 67% of non-sponsored students expressed that if they knew what they know now they would apply for the sponsorship scheme today. 96% of students would recommend the sponsorship scheme to other students, which has an important influence on the future students’ choice.

Industry contacts

Students were asked to rank their agreement with the following aspects about their contact, supervisor, and line manager in industry: is easy to approach and talk with, motivates them to perform at their highest level, treats them with dignity and respect, supports exceptional academic performance, answers their questions clearly, offers practical help and support. While 82% are agree that they have been treated with dignity and respect and received practical help and support, only 36% stated that industry supports exceptional academic performance.

The results appear to show that employers do not seek exceptionally high academic performance which reinforces the finding of other surveys of employers that rate employability skills above academic performance (Dickens, 1996).

Scheme improvement (open ended question)

Most of students expressed that a larger choice of companies and clear information before applying will improve the sponsorship scheme. Whilst the students would like a larger number of sponsoring companies, the companies, themselves are reluctant to increase the size of the consortium as this impacts on their chances of recruiting the best students.

The reasons for not applying for sponsorship

Students were asked to rank the impact of the following factors on their decision to not apply for the sponsorship scheme run by their department: complicated application procedure, university rules and conditions, sponsor company rules and conditions, lack of information about the scheme, lack of interest, busy schedules, and lack of confidence. The result shows sponsor company rules and conditions and lack of information about the scheme influenced 76% of students in some way to not apply for the sponsorship scheme run by their department.

The correlation of sponsorship and students' employability

The majority of sponsored students have received a permanent job offer from their sponsor (or another) company. The employability of sponsored students could have a considerable impact on the attractiveness of future students to apply for sponsorship and sponsored programme.

Conclusions

The data shows the financial aid availability has the least and academic quality of university has the most effect on the students' choice of university. Also, sponsorship is not a major factor in the students' choice of programme, just 39% of students considered that sponsorship influenced on their choice. However, more than 80% of total students did not have a clear understanding of the sponsorship scheme before coming to university. It suggests that clearer information about sponsorship will increase the number of potential students applying for the scheme.

Students ranked industrial experience, sandwich training, extra funding, and guaranteed job on graduation as important advantages of sponsorship. Students perceived that employing qualified engineers and increasing company reputation are benefits to the sponsor companies from the sponsorship scheme. They also perceive that they are a source of 'cheap' labour to their sponsor company.

Sponsored students agreed that they have received good treatment and practical support from their industrial contacts. The data also shows that the students have a high awareness that their links to a sponsor have a significant impact on the development of their learning outcomes linked to employability skills.

The majority of sponsored students have received a permanent job offer. Increasing employability of sponsored students could have a considerable impact on the future students' decision to apply for sponsorship and sponsored programme.

In general, 95% of total students (sponsored and non-sponsored) agreed that they (could) have benefited in some way from the sponsorship element of their programme and they would recommend sponsorship to the other students.

Future work

The work will be continued by contacting all involved parties, i.e. students, university, and industry to assess benefits to the three stakeholders.

The next phase is assessment of barriers that limit further collaboration. We intend to identify what barriers exist and how to overcome them. The following factors have been criticised by many industrialists and academics: management and organizational issues, mutual mistrust between the

partners, misunderstanding of each other's needs, aligning of the expectations and objectives of the collaborating university and company, lack of time, lack of follow up, concerning over reputation science and engineering as unattractive and unrewarding careers, poor communication (The Royal academy of Engineering, 2007; Lambert, 2003; Santoro and Chakrabarti, 2002; Wood, 1983).

The final phase is proposing strategies for future collaboration. The criteria to evaluate successful industry collaboration needs to be defined by considering industrial parameters, academic expectations, student factors and reviewing different mechanism for the effective industrial and academic collaboration. Then strategies to support sustained industrial collaboration and future developments will be formulated and implemented.

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Acknowledgements

Authors would like to acknowledge the support of engCETL for funding this project.

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