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PRODUCT DESIGN EDUCATION: DIFFERENT PERSPECTIVES

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ABSTRACT
This paper explores the differing approaches and experiences of two tertiary level courses provided by two UK University providers within the Product Design subject area. Both institutions provide quite different learning experiences for the students on their courses, both deemed valid in their own right. These differences include syllabus content and delivery, learning environment, to assessment methods. Exploration of student experiences, expectations and aspirations are compared and contextualized in the light of both of these different approaches, one rather engineering biased, the other more creative design focused. Graduate quality from both courses is high, valued by industry and validated by published data on graduate employment rates and roles as provided on behalf of the UK government/Higher Education Authorities. High Employment or further study rates support the assertion that both courses are valued and contribute enormously to the employability of the students undertaking these courses.

Keywords: Design education, design culture, graduate employability

1 INTRODUCTION

The academic subject of Product Design is well established and popular amongst students in the UK. Courses in the subject are provided by a huge number of UK Universities and other institutions, and student numbers on such courses are high. There are noticeable differences in the nature of course offered at many of these institutions, and the subject can have significant variation in terms of course content and subject emphasis. This paper relates to two such courses offered at two Universities in the North East of England - both well established but quite different to one another in many respects.

The BSc(Hons) Product Design Technology course at Northumbria University has been running since the early 2000s and was conceived as a joint venture between what was the School of Engineering and the School of Design at the time. Staff identified that an opportunity existed for a new course that sought to fill the void between more traditional Industrial Design courses and Engineering Design courses, by combining elements of both to focus upon educating product designers with an emphasis on the engineering, technology and functional performance elements of products.

The interdisciplinary design course was further validated in its early years by the publication of the Cox Report [1] which emphasized the importance of design to the UK economy, identifying that "Design" spans the gap between "Arts" and "Hard Sciences" and made particular reference to the importance of design education and the impact it can have upon subsequent design employment and economic growth. The multidisciplinary approach to design involving business, creativity and design and engineering and technology in order to enhance business competitiveness and development was identified as crucial.

The development of this course, and issues relating to integration of engineering design and industrial design disciplines into a coherent, engineering and technology focused product design course have been covered previously, highlighting issues in relation to course content and delivery, graduate skills and impact upon future careers [2, 3].

The BA/BSc(Hons) Product Design course at Teesside University is well established and has been evolving from the 1970's. It has seen several changes in this time but remains essentially a creative design focused course that has resided within the Arts/Design Faculty, in its various guises, for its entire duration. It is a course that is popular with students and has developed good links with industry during its operational lifetime.

2 DIFFERING APPROACHES

There are however, marked differences in approach to the subject of Product Design across these two courses, although both offer BSc(Hons) qualifications upon completion. These manifest themselves in a number of ways, from facilities, to teaching and assessment methods, to display of final year project work.

The BSc(Hons) Product Design Technology course at Northumbria University is offered by the Faculty of Engineering and Environment, whilst the BA/BSc(Hons) Product Design course at Teesside University is provided by the School of Arts and Media.

The focus of both courses is quite dissimilar – Northumbria places its emphasis upon educating product designers in the technical and engineering solution of design problems, whilst the Teesside course focuses upon the creative exploration of design solutions. Whilst some importance is placed upon functional, structural and operational user satisfaction it is not to the same extent as the Northumbria course, which thus perhaps loses some of the more artistic and explorative elements.

The Northumbria course makes significant use of engineering modules and content in its syllabus, in an effort to draw upon the expertise of staff and facilities available. In contrast, the Teesside course has higher ratios of staff that are more creative and industrial design educated. The Northumbria course thus includes many elements of materials testing, manufacturing theory and mechanics in the curriculum. The course seeks to educate students in being able to provide technically feasible design solutions, which can be proven to be appropriate in terms of product structure and function. The Teesside course, whilst recognising the importance of such issues, does not cover them to the same extent, instead encompassing more of the traditional industrial design elements such as aesthetics, user expectation, and presentation.

These two approaches manifest themselves in many ways. For example, as a result of incorporating engineering modules into the course, Northumbria students experience formal examinations as part of their assessment process, whilst more usual design assessment methods such as presentations, portfolios and critiques make up the entirety of the Teesside course, with no written examinations. These examinations only make up a small part of the Northumbria assessment model, where a mix of assessments are used across the various modules that form the course, but it is still a noticeable difference between the two in terms of student expectation and their experiences.

The two cultures across both Faculties have marked differences. Teesside strives to foster a feeling of creativity and exploration, whilst Northumbria tends to put more emphasis upon a scientific approach in reaching solutions and resolving design problems. This is evidenced in the facilities afforded - Teesside provides dedicated design studios, where the students can form a home and an attachment to their surroundings and projects, whilst Northumbria provides no such dedicated facilities for its product design students. Instead, a number of open-access, flexible working spaces are made available to all students within the Faculty. Whilst the benefits of design studios and the learning culture they can engender is well documented and debated [4, 5], the Faculty have deemed that the opportunity to mix with students from other courses outweighs the advantages afforded by residence within a dedicated studio space. The ways in which content delivery takes place duffers; Northumbria makes significant use of theoretical engineering content, which is predominantly delivered through a lecture and support seminar model of student-staff contact. Teesside make much more use of open ended design brief content, and consequently more contact is studio located, discussion based and experiential in nature, exploring more immersive design projects simultaneously.

The two courses also have differentiation in the way they present the graduate student output and final year work, principally based upon the different cultures of the two departments that they reside within. The Northumbria course places great emphasis on students being able to demonstrate technical viability of their solution rather than simply appearance. As a result, their major project presentation models are often more technical demonstration pieces than complete finished model presentations. Teesside meanwhile expects more traditional industrial design displays, with well finished models representing the finished product rather than placing importance upon explaining complex internal features or working principles, although some form of technical evaluation is required in a report Both courses make use of similar levels of CAD renderings and exploded component diagrams to supplement any physical artefacts, but at Northumbria more emphasis is put upon proving aspects such as component interactions, kinematics and structural integrity. The course at Teesside puts more value upon aesthetics, product context and use, and issues such as product branding and user esteem and appreciation, and whilst construction and manufacture are important, they are not explored to the same level as at Northumbria.

The ways in which the two courses present these final outcomes to the wider world, be they other staff and students, industry and potential employers or other interested parties also differ significantly. Teesside display final year work in the form of a show that is organised across the entire school, with many courses displaying their project work. This show has a strong tradition, significant presence and is a major event in the academic calendar, for staff and students alike. By comparison, the Northumbria event is less high profile, instead their faculty show not only encompasses design work, but also showcases research and enterprise activity across the faculty. Teesside then follow up their University design show with displays at the New Designers exhibition in London. Northumbria students instead have the opportunity to showcase their work across the globe by participation in a multinational design show hosted by a partner University in another continent, which displays final year student work from a number of countries in the form of both a physical and online exhibition.
Many of these factors and differences can be summarized in Figure 1, which attempts to display some of the spectrum of product design approaches that span the range from BA to BEng type courses.

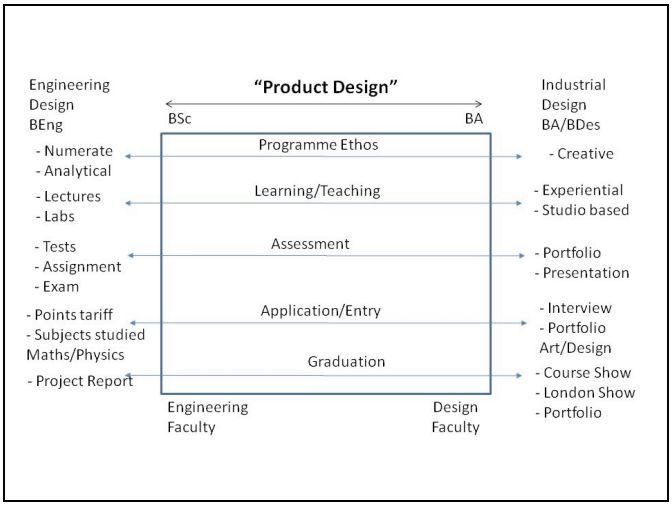

Figure 1. "Product design" course spectrum

Figure 1 also highlights some other significant differences. Entry at Teesside typically involves some form of interview and a portfolio of work, whilst the BSc "engineering" approach is based solely upon prior qualifications. In terms of final year work, the Northumbria model revolves more around a report on the major project which covers the technical details of the project, much as a technical engineering design report would, as opposed to the more portfolio natured output typical of the Teesside course outcomes. Although the Teesside students are required to provide some form of technical analysis, it would be expected to contain manufacture considerations rather than aspects such as stress analysis or kinematic considerations, as would be usual for Northumbria students.
There are of course also many similarities across both courses, essential to the core content of a product design course. These include the embedding of themes such as employability, materials and manufacture, design thinking and methodology, ethics and sustainability within the curriculum and course activity of each course. Such requirements and the importance of them to the core education of product designers are well recognized and acknowledged [6, 7]. Both courses teach the basic design cycle, Teesside through many small experiential projects, Northumbria via theory initially before practice. Investment in the student experience in the Northumbria model has focused upon laboratory equipment, analysis software and engineering hardware such as additive manufacturing facilities, whilst Teesside investment is focused around mostly the provision and enhancement of studio/workshop facilities and design software.
There are many aspects of both courses that prepare graduates for employment, and allow them to develop skills and competencies that make them more employable. These include high employer interaction activities, through the use of employer liaison boards to ensure courses are relevant to the needs of industry, as well as embedding design competitions and industrial projects into the curriculum. The courses both teach a number of transferable skills, but using different vehicles and applications to teach similar skills, so for example experiment design is taught in the context of a

scientific investigation at Northumbria, but in the Teesside course it is applied within a design problem context such as to help evaluate user needs.

3 OUTCOMES/GRADUATES

Graduates from both the Northumbria University and Teesside University courses are considered knowledgeable, skilled, well rounded and valued by industry. Gathering hard evidence on destinations and the future career paths and movements of graduates is difficult, but some important data is available from the UK Government as part of their efforts to provide University applicants with information related to their potential course of study. This "Key Information Set (KIS)" data includes information gathered from the "Destination of Leavers from Higher Education (DLHE)" survey, which surveys students six months after gaining their qualification from University/College, and also that from the longer term "Long DLHE" which surveys a sample of DLHE respondents a period of 40 months after they left University/College. This information is publicly available via the Unistats service [8]. The DLHE survey seeks information from those recent graduates about their current activities and whether they are working, studying, or seeking employment amongst other things. Those graduates that are in employment are then enquired as to the nature of their role and the kind of employment they are in, as well as their salary. The DLHE survey classifies roles according to the Standard Occupational Classification 2010 (SOC2010) system [9], and includes classification ranges; 1 – Managers and Senior Officials, 2 – Professional Occupations, and 3 – Associate professional and technical occupations; within what it terms "professional or managerial jobs" as provided by the Unistats data. The use of such data in evaluating and comparing courses is limited, but it can provide some interesting information that can be used to feed back and help shape course content and delivery.

The KIS data published provides some encouraging data relating to the employability and nature of roles and organizations that graduates progress to. Both courses have good overall rates of employment or further study, at 87% for Northumbria and 77% for Teesside. These values compare well with others in the sector, and exceed those values for many other courses available.

When considering the question as to whether these graduates are employed in "professional or managerial jobs" six months after graduation, figures of 85% for Northumbria and 57% for Teesside are declared. Whilst this may appear at face value to be a significant difference, some of this variation may be explained by the nature of employment stated by those graduates, and different perceptions as to what role qualifies as being in the SOC2010 classification ranges 1 to 3.

With regard to salaries, discrepancies between the courses could again be due to the initial destinations of graduates, with those progressing into engineering roles (typically Northumbria graduates) gaining higher starting salaries as is more usual within this employment sector where skills can be more readily evidenced than the design sector where it may take longer to establish a reputation and demonstrate competence in this field before higher remuneration results. The average salary of the Northumbria graduate is £25000 (typical salary range £20000-£27000 based upon 25 respondents) six months after leaving their course, whilst the average for Teesside graduates is £15000 (typical salary range £12000-£18000 based upon 35 respondents). These compare with stated averages across the sectors of £25000 (typical range £21000-£28000) and £15000 (typical range £13000-£18000) – different sector averages being stated due to the category each course is categorised into – "Engineering and Technology" for Northumbria and "Creative Arts and Design" for the Teesside course. This demonstrates that both courses are in line with expectations in terms of similar courses within their subject area, whether they be considered to be competing with engineering or creative design type courses elsewhere.

In terms of long term salary expectations, there are noticeable differences between expectation in the engineering and design sectors, with averages of £30000 (range £25000-£34000) in the engineering sector and £17000 (range £16000-£23000) in design roles, 40 months following graduation.

These employment destinations and the impact of average salaries between graduates of the two courses can be seen in Table 1 which shows the most common jobs as identified by those graduates in employment from the available KIS data.

Whilst this KIS data is only valid for the recent academic year and relevant 40 month period, staffs at both institutions consider it a fair and valid reflection upon employment rates and trends, with slight but not significant variability in year on year differing student groups and economic situations.

Less quantifiable evidence also exists regarding the demand for graduates from these courses, in the form of alumni and informal contact data such as communication via social media. These sources

provide some destination information regarding graduate destinations and subsequent career movements. Graduates from both courses have very recently progressed to Dyson, in technical engineering design roles, and many other engineering/design companies in the UK and beyond.

Table 1. "Most Common Jobs"

NORTHUMBRIA	%	TEESSIDE	%
Engineering professionals	45	Design occupations	30
Managers, directors and senior officials	15	Sales occupations	16
Business and public service associate professionals	10	Elementary occupations	16
Sales occupations	10	Business and public service associate professionals	7
Elementary occupations	10	Managers, directors and senior officials	5
Business, research and administrative professionals	5	Engineering professionals	5
Science, engineering & technology associate professionals	5	Information technology and telecommunications professionals	4
Design occupations	5	Teaching and educational professionals	4
Administrative occupations	5	Administrative occupations	4
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4 DISCUSSION

There is no doubt that both courses demonstrate good employment rates following graduation, but some of these issues are worth further consideration and investigation.

One such point is the fact that Northumbria graduates appear to be far more likely to be employed in engineering roles than their Teesside counterparts, who are conversely more likely to be employed in design roles. This may not be quite the case though, and the way in which the respondents classify their employment may be a contributing factor in this misalignment. If the role was an "engineering designer", would this role fall within the engineering role classification or the designer? The answer to this subjective question may depend upon the background of the respondent – discussions with existing students at the two establishments suggest noticeable differences - the Northumbria students more likely to classify such a role as within the more familiar to them "engineering" category, whilst Teesside students are more likely to consider it still being within their "design" field. Similar issues exist in terms of the organization employing them – Northumbria students carrying out design roles in an engineering organisation would be more inclined to classify such as engineering, whilst the Teesside students suggested they would still classify it as design role, albeit applying it to an engineering environment.

Discussion with students at both establishments reflect and reinforce these perceptions, with Northumbria students being far more receptive to engineering careers, whilst Teesside students are keener and more intent on trying to find employment in the design sector. These factors would support the results from the data in respect to the different employment destinations reported. Several Teesside students indicated that they would be less likely to consider engineering type roles, and they feel that their strengths lie in researching design problems and producing an innovative initial solution. Northumbria students highlight the engineering development of an outline concept as their strengths.

The data presented appears to be an accurate reflection of the employment trends across the sectors concerned, where investigation into other University statistics reflects similar results. Other UK institutions offer both BA and BSc Product Design courses, and the outcomes from the establishment reflect those outlined in relation to the two separate institutions highlighted in this study, with similar disparity in terms of overall employment rate and salary levels, as well as inequalities in areas of employment between the two courses. One interesting development being considered is cross course projects, allowing cross-fertilization of student experience and potentially opening up new employment avenues for each group.

There is evidence that both of these approaches can produce well rounded, capable product designers as shown by the ability of students from both of these courses to win prizes and awards at National

and International design competitions. Several national awards have been won by students from both courses reinforcing the belief that both can provide students with the necessary skills and learning opportunities to compare well with other students at other Universities throughout the UK.

5 CONCLUDING REMARKS

This paper has shown that the approach to the teaching of product design in the UK can be quite different depending upon establishment, and can provide students with quite diverse experiences and environments in which to learn and practice product design. It shows that both approaches can be valid, valued and give excellent experiences and employment prospects to students..

Whether the approach is to focus upon the "engineering innovation" of products, or the "creative originality" of them, they both involve some similar elements that provide students with a core understanding of the process of product design and development. The application of such and problem solving skills that students develop as a result make them highly employable and sought after across a variety of design sectors.

Both courses can be seen to be successful in educating product designers, evidenced by graduate employment rates and roles, whilst the differences in content show that there is room for a variety of approaches and specialist focus within product design education in the UK.

This study demonstrates that it is possible for product design courses to employ quite different approaches, emphasizing either engineering or industrial design aspects, and both provide vibrant, engaging learning experiences that prepare students well for future employment in the engineering or design sector, or both.

The authors recognize that this "snapshot" of data represents only limited insight into the future careers of graduates and the relative success of each course in preparing students for employment, and future work is planned into investigating the longer term trends associated with such data. Further work into evaluating the perceptions and aspirations of students with regard to engineering or design roles following graduation is also planned.

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