

The employment expectations of Master's Engineering students studying in the UK

Abstract

Since the mid-1990s, master's level study has experienced massification in terms of participation in the UK. Although the Higher Education Academy undertakes valuable surveys examining the master's and research postgraduate student experience, they occur near the end of a student's study journey. Up until 2014, there had been limited research undertaken on the expectations of applicants and students entering this level of study. This led to independent bodies such as the Higher Education Commission commenting that "Postgraduate education is a forgotten part of the sector" [1]. The Postgraduate Experience Project funded by Higher Education Funding Council for England (HEFCE) for the first time explored the expectations of applicants and students in, through and out of study and those of employers recruiting master's graduates. This paper will report the key employability findings from this groundbreaking research of PGT applicants and students enrolled in engineering and engineering related disciplines, as well as employers. It will demonstrate how through understanding the perspectives of all stakeholders, employability expectations and future career prospects can be effectively managed and balanced.

Keywords—*postgraduate; masters; engineering; employment; expectations; employers*

I. INTRODUCTION

There are two major issues facing Masters study (known as PGT hereafter) in the UK. Firstly, although the PGT market saw a dramatic expansion in the UK up until 2010, there has been a substantial decline in the overall PGT student numbers since 2011, most noticeably amongst UK and Overseas domiciled students [2; 3; 4; 5; 6]. The part-time study mode, traditionally dominated by UK domiciled students, along with Science, Technology, Engineering and Mathematics (STEM) disciplines were greatly affected. Although intuitive reasons can be made to explain the decrease, including the lack of a viable funding scheme for UK students to fund their studies up until 2016 [7; 8], there has been limited research looking at applicant and student motivations for participating at PGT level and the barriers they face. Without this knowledge and understanding, it is challenging to develop practical strategies to reverse the decline.

Secondly, there has been limited research exploring the expectations of applicants, students in and through the student study journey. Although the Higher Education Academy

(HEA) have undertaken valuable surveys for a number of years examining the master's and research postgraduate student experience, they occur near the end of a student's study journey thus they do not benefit the student who has completed the survey nor enable the institution to undertake timely change to improve the experience of the student or effectively manage the expectations. Furthermore, there has been limited research on employers' expectations and demands for master's graduates and employment outcomes. However, this has not stopped HE institutions in recent years from suggesting in its marketing literature that a master's degree will improve employment and salary prospects.

This led to the Higher Education Commission (HEC) commenting in 2012 that "postgraduate education is a forgotten part of the sector" (Higher Education Commission, 2012:17). A number of organisations expressed concern about the future of postgraduate education in the UK including the HEC, the 1994 Group, the Higher Education Policy Institute (HEPI), the National Union of Students (NUS) and the Sutton Trust, and they called for further research to be undertaken. This led to the implementation of HEFCE's Postgraduate Support Scheme (PSS) Phase 1 in November 2013 which funded 20 projects from a £25 million publicly-funded programme. The aim of Phase 1 was to test ways to support the progression into Master's education in England by working with universities and employers to stimulate the participation of applicants who would not have otherwise progressed to this level of study. The Postgraduate Experience Project (PEP) was one of the 20 projects funded and was the largest consortium comprising 11 universities (nine English [9E Group], one Welsh and one Scottish), which are geographically dispersed across the UK.

II. AIMS AND OBJECTIVES

The overarching aims and objectives of PEP were constructed to maximise the sector's knowledge regarding the participation, progression and attainment of new PGT students across the participating universities and employers. It aimed to provide an understanding of issues within each institution, and across the 9E Group, as well as giving a UK perspective through the participation of the Scottish and Welsh universities. PEP wanted to produce baseline data that would provide immediate insights into applicant and student behaviour and undertake practical research to provide practical outcomes that could help widen and increase the participation of all applicants and students in order to sustain the PGT market but especially UK domiciled.

III. METHODOLOGY

The data collected across the entire project with applicants, students and employers comprised 6 main surveys and focus groups. Demographics variables were collected. All the questionnaires were designed to be created and undertaken using SurveyMonkey (online survey software). The surveys were executed using rigorous ethical procedures as laid down by the lead institution's ethics committee. All participating institutions were required to lodge the ethical approval for each survey with their relevant committee.

The surveys collected detailed information for the first time on:

- why applicants and students were considering postgraduate study;
- the barriers students faced entering, progressing and completing their studies;
- how and why different demographic groups chose their course and institutions;
- students concerns and anxiety levels regarding academic and non-academic issues;
- attitudes towards fee levels, level of prior study debt and the impact of issues related to access to funding;
- employers attitudes towards master's level graduates and their opinion of the value of the skills obtained at this level.

The majority of the data collected was nominal. Descriptive statistics plus a range of appropriate statistical tests were undertaken (mainly frequencies and Chi Square tests) using the Statistical Package for Social Sciences (SPSS) to compare the difference in percentage between groups.

The findings reported in this paper are from the three main surveys which are the Non-enrolment Survey (applicants that did not enroll but rejected/accepted a place), the Entry to Study survey (applicants who enrolled onto their PGT study) and the Employers survey.

The valid sample size across the 11 participating universities for the Non-enrolment survey was 514. It was undertaken in mid-2014. The valid sample size for the Entry to Study survey was 1226 and comprised 52% of engineering and engineering related disciplines (technology and computer science). It was undertaken in September 2014. There were no statistical significant differences between the engineering and engineering related discipline responses and those for science, technology and mathematics. The valid sample size for the Employers survey was 64.

IV. RESULTS

The research highlighted that demographic variables such as domiciled status, generational status, mode of study, age and route into study were key factors in the motivation to undertake study and expected outcomes of applicants and students. The definitions for these are:

Domiciled status: The country where a student's permanent residence is when they are not studying. It assumes the following categories: United Kingdom (UK), other European Country (EU and Overseas (OS)).

Generational status: A student whose parents (or guardians) have not been to university is described as a first generation student and those that have had one or both parents attend is known as second generation.

Mode of study: This refers to the study load of the student, whether full time or part time. Mode of study can be defined by hours each week or credits being undertaken.

Age: The age groups used were Under 25 years of age, 26-30 years of age, 31-40 years of age, 41-50 years of age and above 51 years of age.

Route into study: Two questions in the Entry to Study survey were used to calculate this variable: 1) year of highest qualification; and 2) activity before commencing PG course. Students coming straight from university were the ones who completed their highest qualification in 2014. Students coming straight from work were the ones who completed their highest qualification before 2014 and were in full-time or part-time paid jobs in the few months immediately before starting their postgraduate courses. All the other cases were labelled as 'Other' route into study (e.g. on voluntary work).

For employers, size of company and discipline were key factors in their attitude towards the importance of master's qualifications and the recruitment of employees.

The significant findings below refer to 'noticeable or substantive' differences in findings and not necessarily 'statistical significance'.

A. *Motivations and expected outcomes for undertaking PGT study by applicants and students (Non-enrolment and Entry to Study surveys)*

- For applicants, career prospects were the third most cited reason for considering PGT study.
- The three most cited reasons provided in the Entry to Study survey for students who enrolled were: To improve my employment prospects, I was interested in the subject and to develop a more specialist set of skills and knowledge.

- For UK respondents, improving their employment prospects was noticeably higher in comparison to EU and OS respondents. The most expected outcome of undertaking PGT study in the Entry to Study survey was specialising knowledge of the subject followed by widening knowledge.

B. Student and employer attitudes to a postgraduate qualification (Entry to Study and Employers Surveys)

- Three quarters of all respondents stated that they believed employers valued a PG master's qualification more than an UG one. However, the majority of the employers stated that this was only sometimes the case. Employers valued more highly work experience and relevant skills than the academic qualification when having to decide between an eligible undergraduate candidate and an eligible postgraduate candidate for the same position.
- The majority of the companies that did not employ masters-qualified candidates considered this level of qualification not relevant for their business development, or the size of their company as it was too small.

C. Skill development (Entry to Study and Employers Surveys)

- Respondents expected to develop a wide range of skills through undertaking their current PGT course.
- OS respondents were more likely to expect the course to provide research networking opportunities, and develop skills to enable them to present themselves with confidence, and increase their confidence about independent learning skills in comparison to UK and EU.
- Generally, full-time respondents were more likely to have higher expectations of skill development than those who were part-time.
- Respondents over the age of 30 years of age were less likely to expect to develop employer networking opportunities and research papers writing skills, and to present themselves with confidence.
- The majority of companies intended achieving their future skills requirements by offering their own apprenticeships, in-house training and through recruiting graduates with an undergraduate qualification. Recruiting graduates with postgraduate qualifications was not a relevant strategy to achieve the skills required for their future business needs.

D. Expected outcome of skills (Entry to Study and Employers Surveys)

- Knowledge of the subject was considered the most important skill by respondents to be developed in undertaking a postgraduate qualification. Work experience and business awareness were considered the least important by them. However, employers cited work experience as the most important shortlisting criteria, and limited work experience was pointed out as one of the most common issues when employing postgraduate candidates.
- Some employers agreed that a higher level of an employee's qualification did equate with a higher skill base. This was considered to be the case with particular academic-related skills such as high-quality research/technical skills, subject-specific specialist knowledge and high-level, analytical thinking and problem-solving skills.
- The employers that did employ masters-qualified employees stated that they did this to obtain specific skills such as subject-specific specialist knowledge, high-level analytical thinking/problem-solving skills, high-quality research/technical skills, and new ideas to help innovate. Workplace professionalism was not an expected skill, and commercial awareness was the least expected skill when employing postgraduate candidates.
- The most common issues when employing postgraduates were limited work experience and unrealistic expectations of their role in the company. In addition, graduates' inability to demonstrate the required skills and the lack of required skills were sometimes a critical issue for some of the companies.

E. Immediate postgraduate completion expectations (Entry to Study Survey)

- Around two-thirds of the respondents expected to find a job appropriate to their level of skill and knowledge.
- The expectation to find a job appropriate to level of skills and knowledge was the most common expectation for both full-time and part-time respondents. However, this was the case for two-thirds of full-time and around one-third of part-time respondents. The second most cited expectation for part-time was continuing with current role with their current employer and for full-time it was to progress into further study.
- The expectation of progressing into further study (e.g. PhD) was the second most mentioned expectation amongst the respondents particularly for those who were OS domiciled.

F. *Immediate postgraduate completion future impact and career area (Entry to Study Survey)*

- Respondents expected to be able to enter a specialist role and to earn more money/be on a higher pay grade.
- EU and OS respondents were more likely to expect to take on more responsibilities in comparison to UK.
- The majority of respondents expected to have a career related to their postgraduate studies.

G. *Company collaboration with universities (Employers Survey)*

- The majority of companies had never engaged with universities.
- The most common collaborations for two of the nine companies were offering internships or a place as part of a degree, attending career fairs, and working with university careers services.
- Only one company had been offered the opportunity to contribute to the curriculum design/delivery of undergraduate or postgraduate courses by a higher education provider. This opportunity was considered important by many of the companies in order to keep universities up to date and to shape the work skills of graduates.
- The most cited barriers for this collaboration were lack of management time, communication issues between universities and business, and lack of up-to-date practice.

H. *Priorities of higher education institutions in the perspective of employers (Employers Survey)*

- The priorities of HE as most cited by the companies were to design and deliver courses that meet industry needs, ensure that programmes contain both theory and applied knowledge and skills and develop the personal and social skills that graduates will need in adult life, particularly those related to lifelong skills development.

V. RECOMMENDATIONS

The findings that have been reported in this paper highlight the complexity regarding the motivations to study and expected employability and future career outcomes of the PGT applicants and students. The employers' findings highlighted above enabled the participating HE institutions involved in the project to consider the employers perspective in the development of future course developments and importantly, help identify ways to effectively balance and manage the expectations

and outcomes of all stakeholders. PEP made 16 recommendations about the sustainability of master's level study in the UK for different groups of participants and stakeholders. Five of these were specifically directed at employability and product development.

They are:

- Provide more opportunities for the student to obtain relevant course-based work experience.
- Work with business and industry more closely to develop course content that is current and applicable.
- Explore the benefits of increasing integrated offerings across non-traditional disciplines such as arts, humanities and social sciences.
- Build closer working relationships with business and industry in non-traditional integrated disciplines.
- Explore the benefits and viability of increasing the number of integrated degrees with placement options.

It also recommended further national-wide research on understanding applicant and student transition behaviours, financial issues, employability outcomes and product development.

The Chair of the UK Council for Graduate Education described the work of PEP as *'Its legacy sits as one of the most comprehensive reviews of postgraduate taught student attitudes and ambitions and sits as a seminal study of this often overlooked sector of UK University's portfolios'* [10].

ACKNOWLEDGMENTS

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