

The impact of work placement on graduate employment in computing: Outcomes from a UK-based study

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This study followed recent computing graduates into the workplace and explored their undergraduate experiences of work placements and subsequent impact on graduate employment. Whilst studying at one of 14 Scottish universities, participants (n=99) had registered interest in a student placement. Factors influencing the ability to secure a placement included recognition of the benefits derived from completing a placement, and parental experience of higher education. We found that graduates had benefited from work experience financially, earning more than those who had not completed placements. They had also found graduate positions more quickly and were more likely to be in work than those who had graduated without completing a placement. The study provides evidence of the long-term benefits of work placements to inform students, university staff, employers, and, where appropriate, to influence government policy in increasing access to student work placements.

Keywords: Graduate employment, work placement, graduate outcomes, career prospects, graduate salary

Placements, co-operative education and internships, where students use and extend the knowledge and skills gained at university in the workplace, are not a new feature of higher education (Linn, 2015). They are, however, increasingly cited as a panacea for bridging expectations between employers demanding skilled graduates and universities tasked with supplying them (Silva et al., 2016). The headline statistics would support this view (for example, Higher Education Statistics Agency, 2016): employment experience, such as a student work placement, is consistently associated with improved employment rates when graduates who did a work placement are compared with those who did not do a placement. On the face of it, this is a compelling reason for gaining work experience while studying, but not all students have access to work experience through their courses. Furthermore, many university-organized placements are competitive, so that even those who aspire to gain a placement may be unsuccessful, while some simply do not recognize the potential benefits and fail to pursue the opportunity. There is currently little knowledge and understanding about the ways in which students' backgrounds and contexts contribute to their decision-making around taking a placement, meriting further investigation. This article describes a study exploring the experiences of recent computing graduates across Scotland, UK. The study investigated graduates' historical experiences of non-compulsory placement while they were at university and the impact of student work placement beyond graduation. This involved identifying participants' perspectives on the contribution of placement to the process of obtaining a graduate job and their subsequent career development. Participants included graduates who had completed a placement, alongside those who had expressed interest but had not completed one. A second area for consideration necessarily emerges: if placement *is* found to be beneficial, to what extent are all students equally placed to realize those benefits? Thus the study also asked participants about their approaches to applications and asked about their parents' experience of higher education.

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In this article, the term placement is used to encompass all types of relevant paid work experience undertaken while studying, irrespective of length or academic credit. Previous work on the transition from study to work (in particular for the computing discipline) sets the context for the study.

Transitions into Employment

UK government research describes computer science (CS) graduates as “relatively slow to move into work” (Business, Innovation and Skills Research, 2016, p.62). In the UK, 10.3% of CS graduates are unemployed 6 months after graduation, compared to the overall average of 6.1% (Higher Education Statistics Agency, 2016). Data focusing on a greater longitudinal window shows that 4.9% of CS graduates from 2010-11 were unemployed 40 months later (Higher Education Statistics Agency, 2015), an improvement on the 6-month figure but still the highest unemployment rate across the disciplines surveyed. In an extensive review of unemployment in computing, Shadbolt (2016, p.57) describes the “confusion” of job roles and associated skills. In the process of securing graduate roles, computing graduates are required to demonstrate a wide range of skills, knowledge and aptitudes (Fincher & Finlay, 2016). There are regular capacity and demand fluctuations in the sector, with international companies expanding and contracting their global workforce, according to demand and the cost of labor (Donnelly, Grimshaw, & Miozzo, 2011). While the likelihood of gaining stable employment in IT may be uncertain at times, there is evidence to suggest that it also offers relatively good prospects for upward social mobility: Marks and Baldry (2009, p.60) suggest that software work “offers open-access socio-economic mobility to those with the necessary talents without the significant value baggage which might be associated with the traditional professions”. In the context of the current debate about the role of higher education in promoting social mobility (for example Marginson, 2016a), the relative success of computing, combined with the known positive impact of work placement on graduate employment (Shadbolt, 2016), sets access to work placement as a cornerstone for consolidating the social mobility of graduates.

While the literature around placement emphasizes a wide range of benefits accruing to students and graduates, placement is also at the heart of an instrumental debate in the UK about the need for universities to produce *work-ready* graduates who can easily navigate the transition into employment. From employers’ perspectives, placements bring new skills into their organizations and provide good quality and good value workers, often later recruited to permanent positions (for example, Brooks & Youngson, 2016; Maertz, Stoeberl, & Marks, 2014). From students’ perspectives, placements provide valuable real-life learning experiences, improve their employment prospects, and inform their career plans (BIS Research, 2016; Smith, Smith & Caddell, 2015). Indeed, the “majority of those who had not undertaken any form of work experience later rued this decision” (BIS Research, 2016, p.8) indicating, with hindsight, an appreciation of placement as a lost opportunity to enhance employment prospects, develop industry contacts and enhance study-based skills and knowledge. Similarly, Wilton (2012) found that graduates who had completed placement unanimously felt that it had bestowed an advantage in the labor market and cited both experience and new contacts as providing that advantage. Brooks and Youngson (2016) found evidence of work placements leading to better degrees and contributing to easier routes to graduate jobs. There are also wider benefits from work experience, including the development of skills and confidence (Linn, 2015; Matsouka, & Mihail, 2016) and acquiring dispositional knowledge (Clark & Zukas, 2016). Less positively, there is some evidence of a “shadow of exploitation” whereby some employers expect placement students to do the work of full-time staff for significantly less pay (Chillas, Marks, & Galloway, 2015, p.13). Furthermore Chillas et al. found that not all placements provided opportunities for learning.

Competition for placements, with its associated need for lengthy and time-consuming applications, has been found elsewhere to present a barrier to placement, in particular for students who embark on the process with less confidence and optimism (Brooks & Youngson, 2016; Ramirez et al., 2016). Employment prospects are not *universally* improved following a work placement in spite of increased achievement, as further employment disadvantages are noted for Black and Minority Ethnic groups (BME) and those with lower socioeconomic status (Shadbolt, 2016). Moores, Birdi, and Higson (2017) found the placement experience “is associated with a smaller – but still present – BME achievement gap” (p.9).

In the UK, there is increased interest in further integration between work and education, for example in the recent introduction of Degree Apprenticeships where apprentices (students) are employees attending university. Competing models of industry involvement in education provide an additional imperative to explore the impact of work placement on graduates’ early careers.

This study set out to explore the experiences of computing graduates from Scottish universities by investigating their current professional situations in the context of their experiences while at university. The focus was on placements, from the challenges of getting appropriate work placements while at university, to the subsequent impact on graduate careers. The data presented in this article is framed by this question: do student work placements bring benefits after graduation by providing specific advantages to graduates, such as more efficient routes to a graduate job and/or better pay?

RESEARCH METHODS

Participants were drawn from computing graduates who had previously registered for two national placement services in Scotland (e-Placement Scotland and Careerwise). Two complementary methods were used: a questionnaire and semi-structured interviews. Both placement service teams, together with university course leaders, emailed graduates across a range of Science, Technology, Engineering and Maths (STEM) disciplines using their last contact email address. Graduates were invited to complete an online questionnaire and be entered into a prize draw. This study concerns the 99 valid responses received from Computing graduates only. Survey respondents were invited to take part in a follow-up interview, and interviews were arranged with 14 participants. Over half the survey respondents and interviewees came from students who had attended the institution hosting the research. In developing the data collection approach, the project team adhered to the host institution’s research ethics code of practice and, following a self-assessment of ethical issues arising, obtained approval as both the survey and interviews satisfied the requirements of anonymity and informed consent specified. The questionnaire was derived from previous studies into students’ experiences of placement (e.g., Ramirez et al., 2016; Smith et al., 2015; Smith, Smith, Taylor-Smith, & Fotheringham, 2017). Both the questionnaire and interview protocol were piloted before implementation.

The questionnaire and interviews asked respondents about their experiences of placements (and other work experience) whilst at university; their early careers, including the process of getting a graduate job; and their current status. The questionnaire and interviews also asked whether one or both of their parents had attended university.

The semi-structured interviews (n=14) explored participants’ career narratives in detail, including their experiences of placements and related activities (from their current perspectives), getting jobs after graduation, and working. Interviewees were encouraged to discuss ‘soft’ skills, perceived work

cultures, and networking. The interviews were recorded and then transcribed using intelligent verbatim transcription to minimize the appearance of filler words, repetition and digression, and the data utilized to further illuminate the questionnaire results.

RESULTS

The survey respondent sample (n=99) consisted of 91 participants with an undergraduate degree and 8 with a Masters degree (MSc). There were 23 female participants, 75 male and 1 preferred not to answer. In each case these categories were broadly representative of those who registered for placement. The respondent sample was obtained through emails sent to graduates who, during their time at university, had registered with the placement services e-Placement Scotland and Careerwise. For those who had registered with e-Placement Scotland, contact was made via emails to 386 individuals through their 'legacy' university email address, and to 362 individuals who had provided a personal email address. Personal email addresses proved to be a more effective route for obtaining a response. Around 400 graduates who had registered with Careerwise were contacted. Overall, the survey response rate was in the order of 16%, however, for this study the computing-only responses were considered. Of the interviewees, 3 were female; 11 male. Table 1 shows the participants' placement experience (four respondents did not complete this section of the survey). The results are discussed around the following themes: i) participants' access to work placement while at university, ii) access to graduate work, and iii) salary levels and time taken to find work.

TABLE 1: Participants' experience of work placement at university.

Work placement experience	Survey respondents	Interviewees
Completed a placement	63	10
Did voluntary work experience in IT	5	0
Applied for a placement, but was not offered one	5	3
Applied, but couldn't do the placement	1	0
Didn't apply	21	1
Total	95	14

Access to Placement

Survey participants were asked about accessing work placements. Reasons for not applying included a lack of knowledge about placements (n=4), lack of awareness of benefits (n=4), wanting to focus on degree (n=5), visa constraints (n=2), and nothing suitable being available (n=1). One person was offered a placement, but could not take it due to family issues. These reasons for a lack of engagement with placement are consistent with other recent findings (e.g., Ramirez et al. 2016).

It has been suggested that placement experience, along with participation in various extra-curricular activities, increases students' attractiveness in terms of employability and that such experiences are specifically sought after by employers. Bathmaker, Ingram, and Waller (2013) use Bourdieu's concept of *the game* (1986) to capture the part played by such experiences when students prepare for the graduate jobs market. For example, one interviewee who had completed a placement suggested: "[Placement]'s not really an optional thing. I think almost everyone I know, the main reason they've got a job is because they did an internship".

Some of those who did not apply showed a lack of understanding of *the game* during the decision point around placement; for example, free text survey responses include: “I didn’t think I had to. I was naive and thought after graduation that I could just walk into a job”. One respondent lacked access through an absence of information and awareness: “Unaware of the opportunity. Unaware of the benefits a placement could have had. No information about doing a placement or internship”. Others prioritized their studies, including finishing their degree, over placements.

Some interviewees mentioned a positive university culture of placements. Fincher and Findlay (2016) mention a tipping point within a course whereby if enough students apply for work placement a wider group starts to consider applying, and that was in evidence: “I noticed my friends were all applying and getting them so I figured I should do it because of them” (interviewee). Notably, one third (n=32) of survey respondents had arranged their placement themselves.

Most of the interviewees had placement experience (10 out of 14). Of the four who did not get a placement, three had applied but been unsuccessful; the one who did not apply was studying overseas, where no paid placements were available. One interviewee gave the following reasons for not being successful:

I feel like it was harder for me to get a [placement] job because of [there being no in-built placement on the course] as well because I have no office-based experience which definitely helps....well, I couldn’t get paid ones and I couldn’t afford getting unpaid ones because when you finish uni you’re pretty much on your own so you have to support yourself financially.

For another, “I was just thinking about getting to uni, having some fun, and finishing it – that’s it. When you’re 18 or 19 you’re not thinking about stuff like placements”.

Table 2 contains the breakdown of parents’ higher education (reported by their offspring) in relation to student placements. Respondents whose parents had attended higher education (HE) were significantly more likely to have done a placement (Chi-Square: $\chi^2(4, n=88) = 22.57, p<0.001$); however, respondents whose parents had *both* attended HE were not more likely to have completed placements than those where only one parent went to university. The data refers to the 59 survey respondents who answered this question.

TABLE 2: Students’ access to placement in relation to their parents’ experience of higher education (HE).

	Yes: had a placement		No: did not have a placement		No placement, but did relevant voluntary work		Total	
Neither HE	27	61.4%	15	34.1%	2	4.5%	44	100%
One parent HE	18	75.0%	4	16.7%	2	8.3%	24	100%
Both HE	14	70.0%	6	30.0%	0	0.0%	20	100%
Total	59	67.0%	25	28.4%	4	4.5%	88	100%

Access to Graduate Jobs

Many participants cited work placement as important in securing their first graduate job. When asked if they felt work placement had been a factor, the following survey response is typical: “Yes, I would not have been able to get an offer or interviews without my placements”. Another survey respondent

succinctly expressed a rule for getting ahead: “Basically this put me ahead of other people [who were] without any work experience It gave me lots of stories and examples from real life that helped me on every single interview”.

Interviewees also cited experience gained on placement as valuable support for graduate role applications. One interviewee stated that:

I think what helped me was the placements gave me the study experience which already put me ahead of other guys in my class or in my year, so because when they have a pile of their applications, like what puts you on top is experience.

While another, “I had so many examples of things I have done and my skills in relation to my job”.

The participants in this study who had completed a placement were more likely to be currently employed, as is consistent with other studies and HESA statistics (HESA, 2016). This data is presented in Table 3. Aside from those in employment, three survey respondents were in full-time education and seven did not provide information about their current status.

TABLE 3: Survey respondents’ current employment.

	Currently employed	Currently unemployed	Currently in full-time education	Total
Placements	57 (91.9%)	2 (3.2%)	3 (4.8%)	62 (100%)
No placements	24 (80%)	6 (20%)	0 (0.0%)	30 (100%)

Participants were asked if they were in a graduate or non-graduate role. However, this question seems to have been misunderstood, since the majority of those respondents who selected their role as being a non-graduate role had salaries and job titles which the researchers associated with graduate work. Participants’ understanding of graduate versus non-graduate role categorization should be explored further.

Salaries on Graduation

A differential in graduate salary based on work placement was also uncovered. Here the data refers specifically to the period 2010-2016 for which sufficient data was available for analysis.

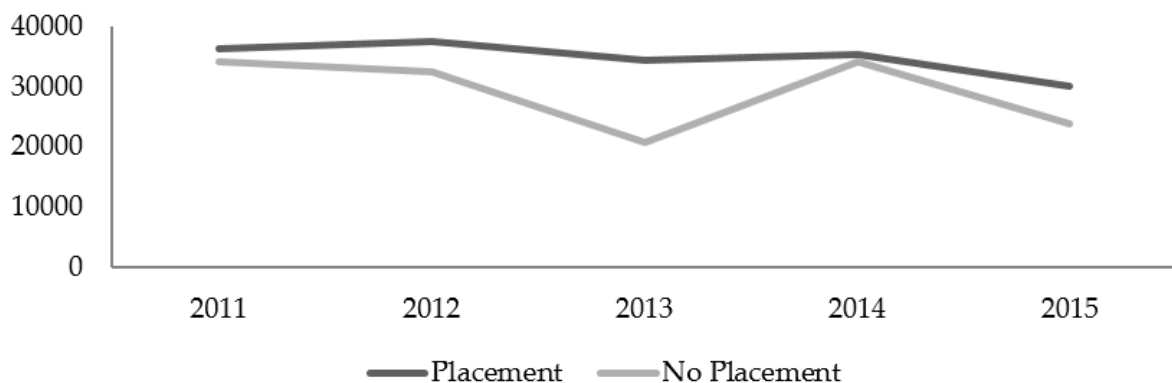


FIGURE 1: Salary plotted against year of graduation – ‘placement’ and ‘no placement’

Figure 1 shows the differential in salary performance between those who had undertaken placement and those who had not, using average salaries calculated according to graduation year, as salaries are expected to rise as years pass since graduation. These results indicate higher salaries, on average, for graduates who had completed placements.

Finally, respondents were asked how long it had taken them to secure a job after graduating and the results are shown in Table 4.

TABLE 4: Time taken for survey respondents to secure a job after graduating.

Any placements?	Had job before graduation					Total
	1-6 months	6-12 months	13-18 months	3 or more years		
Yes	26 (50%)	19 (36.5%)	5 (9.6%)	0 (0%)	2 (3.8%)	52 (100%)
No	2 (11.1%)	11 (61.1%)	2 (11.1%)	1 (5.6%)	2 (11.1%)	18 (100%)

Overall, placement seemed to increase the speed with which graduates moved into work. For those who had completed a placement, 50% had secured a job before graduating, compared with only 11% who had not had a placement. This represents a future potential loss of earnings between placed and non-placed students. It is also a counter-argument to some students' rejection of placement, based on a decision to complete their courses as quickly as possible in order to move into a graduate job and start earning sooner (Ramirez et al., 2016). It is possible that factors which increased students' likelihood of completing placements also increased the speed with which graduates found work. However, this is not evidenced within the socio-economic factors collected in our wider dataset or in the interview narratives.

DISCUSSION

In spite of activity at universities to promote work placements, not all study participants recognized the benefits accruing from placement. Survey text responses from those who had not achieved a placement indicate a lack of social resources that might otherwise have encouraged them to pursue placement with more vigour. These comments indicate a lack of understanding of the part that a placement is likely to play in their career post-university. Previous research has revealed that developing an awareness of work culture, and consequent work-based social skills, is beneficial in facilitating access to workplaces (Smith & Smith, 2016). Of course this is not a level playing field: Bathmaker et al.'s (2013) study found that middle-class families with relevant social networks helped their children to get good placements and sometimes paid their travel and maintenance; whereas working-class students could not leave their paid part-time jobs to take on unpaid placements. This phenomenon was also observed by Smith et al. (2015), with two-thirds of their student participants expressing doubt about whether they could have taken up their placements if these had not been paid positions. The positive relationship between parents' HE and students getting placement in this study may reflect graduate parents being able to contribute more financial support to their offspring, enabling students to be more flexible about retaining part-time jobs and taking up (even paid) placements. Similarly, Chillias et al. (2015) found that instead of levelling the playing field for graduate jobs, the current emphasis on internships for employability within the ICT sector was "compounding social class advantage" (p.13) as cultural and economic capitals, such as soft skills and access to finance, facilitated a wider range of placements. Elsewhere, in terms of social mobility, Roberts, Brammar, and Cobb (2017) found recognition by students in disadvantaged cohorts that

work placement would have lasting impact on their employability through enhancing their CVs and providing evidence of work for future job applications. The importance of university and national placement programs should not be underestimated; supporting infrastructures and contextualized activities can be crucial in promoting and opening up the possibilities of work experience to more diverse groups of students.

Work Placement Used to Secure Graduate Work

In this study, graduates with work placement experience were more likely to be employed at the time of the survey, reflecting findings elsewhere (for example, Shadbolt, 2016). From their perspectives as graduates, participants who had completed a placement felt that this work experience had been essential in gaining their graduate jobs, by establishing sought-after skills and experience. Several interviewees had purposively used work experience narratives in job interviews, to create a picture of both technical competence and having a good attitude to work. Clark, Zukas, and Lent (2011) similarly found placement to be a rich context within which to acquire an understanding of workplace culture. However, recognizing the breadth of the IT profession, their study unearthed widely varying work cultures.

Overall, participants felt that work placements were considered by graduate employers to be an indicator of merit. Merit, as recognized by recruiters, is commonly based on determination to find work, graduating from an elite university and having relevant work experience (Brown, Hesketh, & Williams, 2004; Marginson, 2016b; Morley, 2007; Smith et al., 2015). Most universities have policies designed to widen participation that take account of social context; the same is not true of most employers. As a means of overcoming prejudices amongst recruiters, Cai (2013) proposes that universities work to overcome employers' beliefs in a hierarchy of institutions, and challenge the use of poorly understood educational credentials as a proxy for graduates' ability (e.g., see Fincher & Finlay, 2016). Our findings suggest a more inclusive approach to hiring for graduate roles may be too late for many in their transition to work—those who did not recognize the benefits of a work placement or manage to secure one are likely to find the graduate employment market more difficult to negotiate. Rather, universities should work with employers to provide good quality, inclusive, paid placements.

Work Placement, Graduate Jobs and Salaries

Work placement was found to lead to both higher graduate salaries and a shorter time taken to find employment. However, there was considerable confusion in this study about the nature of work in terms of whether the participants deemed their job to be graduate-level or not. Many with professional job titles reported not being in graduate-level employment. In terms of salary alone, Wilton also found “notably higher earnings for work placement graduates” (2012, p.616), although he reported variation according to course studied.

As Tomlinson (2017) observes, universities are not in a position to change “economic realities” (p.348). However, universities do have emancipatory potential through developing key skills in students, facilitating the recognition and articulation of those skills, and in providing opportunities to practice their skills. They have an important role to play in increasing awareness of work placements as a route towards graduate employment. Furthermore, universities have an important part to play in informing government policy and working with employers and employer bodies to create work placement opportunities for students. This study has provided evidence to inform universities in

their approaches to work placements. In particular, by presenting evidence of the benefits of work placements in securing well paid graduate jobs, swiftly.

Work Placement as a Site of Challenge

As discussed in the literature review, work placement has been approached as a site of challenge as well as opportunity, with concerns around issues such as a lack of genuine learning opportunities on placement and the potential for placement students to be exploited (Chillas, Marks, & Galloway, 2015, p.13). Competition for placements is thought to present a barrier particularly to students with low self-efficacy facing complex application processes requiring time and effort. Perhaps most fundamentally, the role of placement as a mechanism for overcoming social and economic disparities is challenged by data suggesting that further employment disadvantages persist for those from lower socioeconomic backgrounds who have completed placement (Moore, Birdi, and Higson, 2017).

In this study, some challenges are apparent around pre-access to placement, principally lack of knowledge and awareness of placement, however, the numbers reporting this are small. Perhaps more significant is the apparent positive relationship between parental experience of higher education and the likelihood of taking a placement, which could be potentially understood as a barrier for those whose parents have no higher education experience. More reassuringly, the study does not provide any further evidence for problematic experiences of students while actually on placement. However, the problem of unequal access to placement is perennial and enduring, and issues around inclusivity in placement practice (and in wider forms of work-integrated learning) and enablers of inclusive approaches (e.g., Mackaway, Winchester-Seeto, & Carter, 2014; Mackaway, Carter, Winchester-Seeto, & Whiteford, 2017) merit further examination by academics and placement professionals, as well as by policy-makers.

Limitations and Contextualization

Neither the survey nor the interview sample were fully representative of the wider group of students registered for placement. Although responses were received from graduates of 14 universities and one further education college, more than half of the survey respondents and interviewees had attended a single university. This university has extensive support for computing students to get paid work experience. Further, as the survey distribution relied on staff having access to graduates' current email addresses, successful graduates may be over-represented, both in terms of gaining placements and doing well in their careers.

CONCLUSIONS

This study investigated graduates' perspectives on placements: the role of placement in finding work, and, with the benefit of reflection, the impact of placement on their early careers. The study found that a work placement enhanced access to graduate roles and a link was found between work placement and graduate salary: overall, graduates who had completed a student work placement were in work more quickly and earned more. So, the benefits are clear; how all students realize these benefits is less clear. Explaining the value of the placement opportunity is something universities can work on. Universities and employers also need to work together to help students who are dissuaded from taking up placements by financial challenges, such as needing to prioritize part-time jobs.

The challenge for universities is to consider how resources can best be directed to promote inclusivity in their approaches to work placement, especially with respect to their relationships with employers.

Greater awareness of how students approach opportunities for work experience should feed into the design of meaningful placement preparation and post-placement reflection. Targeting resources, such as placement tutors and the development of new curricula, in order to increase access to work placements is a worthwhile activity for universities—as long as equality of opportunity is addressed. Government policies leading to initiatives to widen access to university and increase work experience must encompass influence *beyond* university entrance, through universities and on to employers.

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