Student Work Placement: Friend or Foe?
A study of the perceptions of university students on industrial work placement

Sian O'Briain

Sian.OBriain@nuim.ie
Department of Computer Science,
Faculty of Science and Engineering
National University of Ireland Maynooth
Maynooth, Co. Kildare, Ireland

**Susan Bergin, Martina Bourgoin, Aidan Mooney, Paula Murray
and Qingyang Zhao**

susan.bergin, aidan.mooney, industrial.placement {@nuim.ie}
Department of Computer Science,
Faculty of Science and Engineering
National University of Ireland Maynooth
Maynooth, Co. Kildare, Ireland

Abstract

At the National University of Ireland Maynooth, Computer Science and Software Engineering students are required to undertake an industrial work placement module as part of their course. The work placement is typically six to eighteen months long and takes place in the penultimate year of the degree. This paper evaluates students' perception of the quality of the learning experience they received through work placement. The voice of many key players involved in the process is captured, including, the students themselves, members of the academic department and the Industrial Work Placement Office; and importantly this paper is authored by representatives of each of these groups.

In particular, the paper evaluates the types of preparations students make prior to commencing a placement, the transferable skills acquired and improved during their placement, and student perceptions of the advantages and disadvantages of their placement. A mixed data acquisition model is used for gathering data including questionnaires, interviews and focus groups. The gathered data is analysed and a critique on the findings is presented. The paper concludes with recommendations and considerations for any institution that is interested in offering an industrial work placement component.

Keywords

1. Introduction and Motivation

An industrial work placement provides students with a valuable opportunity to gain practical work-experience and to apply the knowledge that they have acquired from their formal learning. It is anticipated that a work placement can help students to acquire and improve skills that are advantageous for future employability. These skills such as teamwork, problem-solving, communications and leadership skills and self-confidence can be extremely valuable both in the work-place and in recreational life.

Many third level institutions now offer students the opportunity to undertake a work placement as part of their undergraduate degree, for example, at the National University of Ireland Maynooth work placement is offered on courses such as Computer Science, Multimedia, Engineering, Business, Accountancy, Finance and Economics. This paper focuses on students participating on an industrial work placement as part of a BSc in Computer Science and Software Engineering (CSSE). The placement takes place in the penultimate year and is usually for a period of six months, but can last up to eighteen months. Students typically find a suitable work placement by engaging with the Industrial Placement Office. This involves application preparation (CV, cover letter, portfolio, etc.), company research and interview preparation (mock interviews, etc). Students have full autonomy in deciding which advertised job to apply for but must accept the first job they are offered. Evidence to date indicates that some students will apply for all jobs, while others will cherry pick due to job description or other personal factors such as location, industry type etc.

In the academic year of this study, four students were successful in securing paid employment within the university. This provided an excellent opportunity for a team of students, academics and industrial placement officers, key stakeholders in the placement process, to carry out a collaborative investigation on student learning and experience through work placement. After preliminary discussions, a team of six people (two from each group) committed to work together to evaluate key areas. This paper explores three research questions, motivated by the teams' desire to better understand student involvement in finding a position as well as student perception of the value, or lack thereof, of their industrial experience. It is important to note that one

drawback of the study is the absence of the employer voice and future work will focus on capturing this as well. The following three questions are addressed in this paper:

1) What preparations prior to commencement of work placement do students undertake?

2) What transferable skills are acquired and improved upon during the work placement?

3) What do students perceive as the advantages and disadvantages of work placement?

2. Literature Review

In line with the research questions, a review of the literature was carried out to try to identify studies on the value of industrial placement and the impact on transferable skills acquisition. With regard to the value of different types of learning, Katula and Threnhauser (1999) carried out a study on experiential undergraduate learning including, cooperative learning, internships, study abroad and service learning. They contend that the goal of an industrial placement is to present students with an understanding of the organisational structures and procedures in a working environment and to provide an opportunity for professional development. Indeed, the importance of life-long learning is highlighted in Teichler's study (Teichler, 2003) on the future of higher education. This study raises questions as to whether today's graduates are meeting employer's needs and highlights the need for this to be addressed in light of on-going changes in higher education e.g. expansion of higher education, internationalisation and diversification.

Cranmer's study (Cranmer, 2006) on the impact of employability skills and learning on graduate labour market prospects in the UK concluded that undergoing a work placement as part of a degree course is beneficial in finding employment within six months of graduating. Cranmer argues that despite the best intentions of academics, employability skills cannot effectively be developed within the classroom as the limitations inherent within the agenda will consistently produce mixed outcomes. The study found that structured work experience and employer involvement in course design and delivery had a positive effect on graduates' employment prospects. They argue that resources would be better utilised to increase employment-based training and/or employer involvement in courses. Closer to home Forfás published sectorial

reports including the 'Future Skills Needs of Enterprise within the Green Economy in Ireland' (2010) which advocate that structured placement programmes enhance graduate employability and benefit both the employer and the student.

Of particular importance to our work is student perception of skills acquisition. Kubilis (2000) found that computer science students undertaking a work placement were lacking in communication skills, in particular interpersonal communications, documentation and technical writing, user interview skills and presentation skills. The author argues that the development of these skills must be addressed in curriculum planning. In a study of high-tech companies in Silicon Valley on employer satisfaction of college graduates communication skills, it was found that employers would like better oral and written communication skills, including the use of vocabulary and self-expression (Stevens, 2005). Poor language skills were found to be an obstacle to being hired and it is very clear that the employers put considerable value on strong communication skills despite the emphasis on technology. Stasz (Stasz, 1997) carried out a study of several technical firms including transportation, traffic management, microprocessor manufacturing and healthcare firms. It was found that communication skills rank second highest with a score of 4.2 out of 5 (after applicant's attitude) in the factors employers used for making hiring decisions. The paper argues that stronger links are needed between colleges and employers and promotes the value of work experience in helping students learn skills in context.

Andrews and Higson (2008) propose that employers' ideas on what skills and attributes improve graduates chances of employment are quite similar across the globe. They reviewed the quality of the graduate labour market and the ability of graduates to meet the need of employers. More specifically they carried out an exploratory study analysing the perceptions and experiences of business graduates and employers in four European countries (UK, Austria, Slovenia and Romania). Their analysis concluded that the similarities in the demands and expectations that employers have of business graduates were remarkably similar, particularly with respect to core components of business graduate employability: the value of hard business-related knowledge and skills; the importance of soft business-related skills, i.e. writing skills, presentation

skills, team building skills and interpersonal skills and competencies; and the need for prior work-experience. Thus work experience, and an ability to utilise soft skills was found to be essential in order to promote business-graduate employability on a pan-European scale.

3. Methodology

To evaluate the research questions a mixed-method approach was utilised that included qualitative and quantitative elements, using both primary and secondary data. The primary instrument used to gather data was a custom-made online questionnaire with a follow-up focus group meeting to discuss the findings.

In order to develop a draft, a review of online resources that had similar intentions was carried out and three sources were found to have a somewhat similar intent (IBEC, 2012; Australian Department of Education, Training and Youth Affairs, 2000; The Gallup Organization, 2010). Using this information a list of key areas that could be addressed was drawn up. In addition, the lead author met with students who had previously been on work placement and carried out informal interviews to learn about their experience and again to determine possible topics to examine. Once this process had been completed an initial questionnaire was designed which the team iteratively reviewed and edited until an agreed final questionnaire evolved. The resulting questionnaire was composed of a blend of closed questions, using a symmetric agree-disagree five-point scale with optional follow-up open ended questions that allowed students to provide further information if they desired. The final questionnaire was composed of 34 items, with 9 items designed to provide data on research question 1, i.e. student preparedness, 17 items on research question 2, i.e. skills acquisition and 8 items on research question 3, i.e. perceived advantages and disadvantages.

The team endeavoured to ensure that the resulting survey was of a very high quality, reduced bias and had strong reliability and validity. Although it is impossible to remove all bias we aimed to minimise coverage bias (sample is not representative of the population) and to reduce response bias (respondents answer questions in the way they think the questioner wants them to answer). To do this the questionnaire was

emailed to the class and also a link to the online questionnaire was posted on the class Facebook page (only accessible to students in the class). It was hoped that this process would reach as many students as possible and provide a statistically representative sample. To encourage students to respond honestly, the questionnaire was sent out by the lead author, a classmate, with a clear explanation as to the goals of the study. Students were assured that the data would only be presented in the aggregate and that their responses would be completely anonymous.

The team also paid attention to factors that can influence survey reliability and validity. Survey reliability refers to item consistency, that is, if you ask a number of questions about the same factor, all should receive similar responses and if the survey is repeated under identical conditions, the same response should be obtained. To measure internal consistency reliability, Cronbach's coefficient alpha can be applied if groups of items measure different aspects of the same concept to determine how well the different items complement each other in their measurement of different aspects of the same variable. This was not necessary here as each question measured a different concept. Survey validity refers to how well a questionnaire measures what it is intended to measure. To ensure good validity, considerable time must be spent designing clear unambiguous questions and appraising the resulting questionnaire by multiple reviewers. In order to ensure high validity in our results we iteratively designed the questionnaire and included multiple reviewing stages with up to five reviewers at each stage.

After the questionnaire data had been gathered and initial results had been generated a focus group meeting took place involving all team members. The team worked through the findings on each item and commented where appropriate. The meeting was recorded to ensure that each voice (student, placement officer and academic) could be captured. The recordings were analysed by three of the team members and a list of the important points was drawn up (where at least two people had picked out the point as important). This list was circulated to the full team for review to rule out the possibility that an important point had been excluded.

4. Findings and Analysis

Of the thirty three students currently on work placements, seventeen students (11 male and 6 female) completed the questionnaire, giving a high response rate of 52%. The gender breakdown is also representative of the cohort. This section provides a summary of statistical findings and also documents some of the qualitative answers received. A summary of the focus-group analysis is also provided.

4.1 Research Question 1: What preparation prior to the commencement of their work placements do students undertake?

In terms of preparation, 65% of students indicated that they made sure the job(s) they applied for suited their interests before applying. However, only 47% felt they understood what the job entailed. In preparation for the interview, 88% researched the company, 77% researched the role and 60% prepared answers to common interview questions. Only 19% carried out mock interviews with a friend or staff member.

Students were also asked to comment on what they did to prepare for the job they had secured. Sixteen students provided comments, with six indicating they did nothing to prepare (four gave no reason) whilst two commented as follows: *"Nothing since the project wasn't defined very well", "Nothing Really. Had college work to be doing."* One student made logistic preparations but nothing else and the remaining students either carried out preparations as requested by their future employer (n=3) e.g. *"Was sent a brief outline of my first project. Researched the software mentioned in it", "I was given a number of topics to research after the interview and started a week later"* whilst the remaining students showed their initiative by preparing without the company requesting it: *"… I worked on my excel skills and researched the bank I would be working in", "Briefly studied the technologies that I would be using".*

Students were also asked to reflect on what they would do differently if they were to start the work placement process again. Fifteen students responded. Their answers can be categorised as follows: nothing (n=3), make personal adjustments (n=3) e.g. *"Make more time for myself during the evening. Maybe have changed my sleeping pattern before I*

went to England...", get more involved (n=1) "*Ask more questions and get involved in everything.*", prepare better (n=7) "*Spend more time studying what I would be working with so I could complete the work faster.*", "*Probably get in touch with the company and ask them what I should be researching and preparing*" and look for a different type of job (n=1).

Focus Group Analysis on Research Question 1:

It was noted that students would like to know more about their positions before they start; some employers provide a clear job description but others do not. The placement officers were able to partially explain this however, as on average 50% - 60% of students do not get offered the job they were interviewed for, as employers see a better fit elsewhere, and this influences the amount of details a student can end up getting. There is quite a variance in how students prepare for interviews with some proactive students researching tools and technologies while others appear to do very little. It is interesting that many students tried to ensure the job suited their interests, however, anecdotally, the student team members felt this wasn't the case and that classmates were panicked and applying for jobs in the hope of securing something rather than hand-picking jobs. This may result in students taking a role that does not suit their interests. Some of the team wondered what the students interpreted as 'their interests'. Can it be assumed that they mean interest in the position itself or could it refer to extrinsic factors such as location of the job, salary, prestige? The findings therefore needed to be interpreted with caution. All members of the team felt it was really positive that the majority of students researched the company and the role.

The low number of students participating in mock interviews is disappointing, especially given that this is a service provided by the Placement Office. It was suggested that perhaps this is because the students that responded were placed early and therefore exited the process without need for a mock interview. However, it was also felt that making a mock interview a compulsory part of the process could be very beneficial. Also, it was felt that more advertising of such services would be useful and the Placement Office would seek to encourage all students to participate in at least one mock interview.

4.2 Research Question 2: What transferable skills were acquired and improved upon during the work placement?

The results of sixteen Likert-scale statements used to evaluate this question are summarised in Table 4.1.

I have gained or improved on the following during my work placement:	n	Disagree /Strongly Disagree	Neutral	Agree/ Strongly Agree
Teamwork Skills	17	0.0%	5.9%	94.1%
Strong work ethic	17	5.9%	5.9%	88.2%
Interpersonal Skills	17	0.0%	5.9%	94.1%
Analytical Skills	17	5.9%	11.8%	82.4%
Decision-making	17	5.9%	5.9%	88.2%
Leadership Skills	17	0.0%	35.3%	64.7%
Creativity	17	0.0%	17.6%	82.4%
Writing Skills (diary, reports etc.)	17	5.9%	35.3%	58.8%
Communication Skills	17	0.0%	5.9%	94.1%
Initiative	17	5.9%	17.6%	76.5%
Problem-solving Skills	17	5.9%	5.9%	88.2%
Flexibility/Adaptability	17	0.0%	5.9%	94.1%
Organisation / Time Management	17	5.9%	11.8%	82.4%
Self-confidence	17	0.0%	17.6%	82.4%
Entrepreneurial Skills	17	17.6%	41.2%	41.2%
Reflective Learning (from diary writing)	17	17.6%	47.1%	35.3%

Table 4.1: Findings on skills acquisition

Students were also asked if they believed that having a higher level of a transferable skill on commencement would have helped them on placement. Seven responses were given, three of which indicated that the students felt sufficiently prepared, for example, "*No, I feel I was prepared*", "*No, I felt that I learned enough skills in university to do the placement and a lot of skills that I have learned during the placement could not be acquired through education.*" The remaining respondents paid reference to having better

presentation skills, business management skills, and two comments on higher levels of team skills e.g. "*More emphasis on the importance of developing team skills*".

Students were also asked to comment on the skills they felt they had improved upon or gained during work placement. Nine comments were received which included improvements in presentation skills, project management skills and team work skills. Also several very positive reflections were provided, for example *"I feel like I'm a much harder worker after having spent very long days in work. I'm a lot more knowledgeable about the build process too", "I feel like I have much more confident in my skills, and it will help me once I start job-hunting after graduation", "work placement is awesome!", "Most of what was gained is just stuff that cannot be thought in a classroom".*

Focus Group Analysis on Research Question 2:

Students were asked to rate how much the sixteen transferable skills had been improved or acquired during work placement and the strong positive response of students on all bar two skills is excellent, with more than 80% of the students indicating an improvement or acquisition on eleven key skills including, teamwork, communication and problem-solving. Transferable skills like these have been repeatedly identified in the literature and locally by the Placement Office over the last 13 years to be significant in future employability. The strong work ethic is notable since this is probably the first full-time job for most students and discovering that doing a job entails a full-days' work for five days every week can be challenging. Most will have had part-time jobs but by their very nature they are shorter in duration and require less commitment.

All team members felt the perceived improvement in reflective learning was disappointingly low. A discussion took place on what could improve this and some suggestions included using a structured learning log with probing questions rather than a free-hand diary. It was also noted by the Placement Office that perhaps it is too much to expect the students to write up the diary on top of full-time work and further discussion is required. Although the results on reflective learning are low, the students throughout the survey provide reflective comments and this is very encouraging.

4.3 Research Question 3: What do students perceive as the advantages and disadvantages of work placement?

With regards to the placement being for a period of six months, 82% felt that this was an adequate duration and similarly 82% believed the experience would help them to choose their future career path. Importantly it was found that 94% of students would recommend a placement to other students. Fourteen comments on the advantages of placements were received. The comments focussed on the value of real-world experience, applying skills learnt in University and the opportunity to gain new skills not as readily accessible in University, for example:

"We get to see how the work we do in class relates to work being done in the real world".

"You gain practical experience from industry, helping with making career decisions and getting your foot on the ladder if you decide to come back to the company".

"It allows you to make a more informed decision about further education and possibly secure a job in the process if you feel private industry is indeed for you".

"It gives me a good starting point for when I start working after college. It's also nice to get a break from college work; to put my skills to practical use".

"Exposure in a professional environment and experience in a potential career".

"It can help you gain practical skills, determine what area of work you would like to go into and let you know what life will be like when you start a real job!"

"Getting to put your skills to use, and also finding out what the real world is like".

"Experience that I'd never gain in college .Facing real life problems. Working on your own initiative. People dependent on you. Real working hours. No homework".

"Great work life experience before leaving college".

"It definitely opens up a whole different side of things that you would never experience in a purely classroom based course and the experience gained will be very useful I imagine after graduating".

"Understanding more what you learn in the college and get involved in real work environment".

Nine comments were received for the disadvantages of work placement, focussing on trying to find a job while doing college work, the difficulties of having to work full-time (less free-time, lack of sleep etc.) and concerns about re-adjusting to college after the placement, for example:

"You are expected to keep up with a 9-5.30 job and still have your diaries/reports etc. to write up".

"That I can't immediately go work for that company afterwards. Some colleges (from what students in <company name omitted> tell me) have their placements at the end of their degree so they can really hit the ground running".

"A lot of time was spent in the first semester of 3rd year, trying to find a placement, doing any projects that were given to me by potential employers. It was difficult to fit it in with my study".

"Lack of sleep!!"

"when choices get slim, you may not get the placement you want"

"Less free time. Not learning other subject knowledge(apart from the one I practice/learn in work)"

"Might get out of the study habit".

"Might be hard to get back in to study mode for 4th year. Not much of a break or time to prepare for final year. Not everybody will get a decent work placement so others might be at a far more advanced level for 4th year."

Focus Group Findings on Research Question 3:

All members of the focus group were very pleased and not surprised that 94% of the students can see the value of placement. This is particularly impressive considering only 53% would return to the same job. This is an excellent finding. Further, the team felt that as students continue on their career path, with new work-experiences students, may reflect differently about returning to the placement position. It is also very significant that most respondents (82.4%) believed the placement was helping them to choose their future career path. The placement officers verified that in their experience over the past 13 years students repeatedly struggle with the challenge of having a full-time position but all agreed it was excellent preparation for life after University. All team members were delighted to see so few negative comments.

5. Final comments and conclusions

This paper describes a study to determine (i): how students prepare for work-placement, (ii): what transferable skills they improve and acquire and, finally (iii):

what students perceive as the advantages and disadvantages of work-placement. With regards to preparing for placement the primary findings indicate that a considerable majority of students researched the company and the role, and prepared answers to common interview questions. However, less than one in five participated in a mock interview and the Placement Office intends to address this in the future. Aside from reflective learning skills student responses indicate a considerable improvement in transferable skills, which is an excellent finding in terms of producing well-rounded graduates and improving employability prospects. In addition, the students perceive many benefits in placement, including the opportunity to participate in a real-world experience and improve soft skills. The disadvantage of having to cope with a full-time job and the hours/commitment that goes with that is really not negative at all as it will stand to the students upon completion of the placement. The worry that it may be too difficult to re-adjust to college life after placement requires further investigation to determine if this is a cause for concern and appropriate action taken if necessary.

Work placement is a key element in preparing the students for future work and employment and the positive value the students surveyed in this study have of placement is very encouraging. This was an exciting study and gave very real and honest results. Students are to be commended for their frank responses. Finally, although this study involved three of the major stakeholders in the placement it would be very valuable to carry out a further study in the future that also involved employers.

References

R.A. Katula &. E. Threnhauser, "Experiential education in the undergraduate curriculum," *Communication Education,* vol. 48, no. 3, pp. 238-255, 1999.

U. Teichler, "The future of higher education and the future of higher education research," Tertiary Education and Management, vol. 9, no. 3, pp. 171-185, 2003.

S. Cranmer, "Enhancing graduate employability: best intentions and mixed outcomes," *Studies in Higher Education,* vol. 31, no. 2, pp. 169-184, 2006.

Forfás, 2010. *Future Skills Needs of Enterprise within the Green Economy in Ireland.* [online] Available at: http://www.forfas.ie/media/egfsn101129-green_skills_report.pdf. [Accessed 17 September 2013].

N. J. Kubilus, "Assessing a computer science curriculum based on internship performance," Journal of Computing Sciences in Colleges Volume 15 Issue 5, May 2000 , vol. 15, no. 5, pp. 301-307, 2000.

B. Stevens, "What communication skills do employers want? silicon valley recruiters respond. , 42: 2–9. doi: 10.1002/j.2161-1920.2005.tb00893.x," Jnl of Employment Counseling, vol. 42, no. 1, pp. 2-9, 2005.

C. Stasz, "Do Employers Need the Skills They Want? Evidence from technical work," Journal of Education and Work, vol. 10, no. 3, pp. 205-223, 1997.

J. Andrews. & H. Higson, "Graduate Employability, 'Soft Skills' Versus 'Hard' Business Knowledge: A European Study," *Higher Education in Europe,* vol. 33, no. 4, pp. 411-422, 2008.

K. McGann & G. Anderson. IBEC. 2012. *National Survey of Employers' Views of Irish Higher Education Outcomes.* [online] Available at: http://www.ibec.ie/IBEC/DFB.nsf/vPages/Education_and_training~Key_issues~national-employer-survey-14-01-2013/$file/Survey%20report%20Final.pdf [Accessed 17 September 2013]

Australian Department of Education, Training and Youth Affairs (ACNielson Research Services). 2000. *Employer Satisfaction with Graduate Skills Research Report*. [online] Available at: http://tls.vu.edu.au/portal/site/design/resources/DETYAFullReport.pdf [Accessed 17 September 2013]

The Gallup Organization, Hungary upon the request of Directorate-General for Education and Culture. 2000. *Employers' perception of graduate employability*. [online] Available at: http://ec.europa.eu/public_opinion/flash/fl_304_en.pdf [Accessed 17 September 2013].