

Introduction

The employability of ICT graduates is declining, according to Australian Government figures (Australian Government Department of Employment, 2014), with a large number of employers claiming they were unable to find applicants with the right mix of technical and communication skills. Recently, the Australian Federal Government Office for Learning and Teaching (OLT) set employability as a priority strategic area for Australian universities and commissioned three national projects around this theme, in particular to explore ways in which employability skills can be developed in graduates across a variety of disciplines. This paper reports on one of the funded commissioned projects which had the specific aim of aligning the expectations of employers, professional bodies, academic staff, graduates and students.

Each year the Australian Federal Department of Employment conducts research to identify skill shortages in the Australian labour market. The Department publishes the results of its research as individual occupational and cluster reports for groupings of similar occupations, (Australian Government Department of Employment, 2014). On page 1 of the report, the authors note issues with employers recruiting software engineers:

“Employers recruiting for workers with appropriate government security clearances, though, face some difficulties. This is particularly evident for software engineers.”

The report also highlights the fact that employers are placing a high value on soft skills (such as communication and stakeholder engagement), as many jobs require the successful applicant to liaise with clients and other stakeholders. They require prospective graduates to have an understanding of their business, and are looking out for the business acumen skills, as well as their problem solving and listening skills, among other things, (Australian Government Department of Employment, 2014). However, a disturbing point they make is:

“ ... nearly all vacancies attracted qualified applicants, with an average of 41.1 qualified applicants per vacancy. The vast majority, however, were not considered by employers to be suitable.”

This paper takes a first step into understanding more deeply the skills that ICT academics are aiming to develop in prospective graduates. Section 2 outlines the background and context for this study and presents the model for understanding employability. Section 3 outlines the data collection process from four ICT academics from one Australian university participating in the study. Section 4 addresses how academics are developing employability skills in their students using the Dacre Pool and Sewell Career Edge framework. This is followed by a discussion of the findings in Section 5. The conclusion highlights the themes emerging from the data and future work from the study is foreshadowed.

Background or Context

The Australian Government Department of Employment data shows that the employment rates for ICT professionals have been declining over the past years see Figure 1.

In their most recent report, the Department also notes that employers recruiting for software engineers had the most difficulty in finding suitable applicants, with 73 per cent of vacancies filled from a relatively small pool of applicants (28.1) and suitable applicants (1.5), see Figure 2, (Australian Government Department of Employment, 2014).

We noted in our earlier research, (Hamilton, Carbone, Gonsalvez and Jollands, 2015), that employers place a high value on soft skills (such as communication and in particular listening

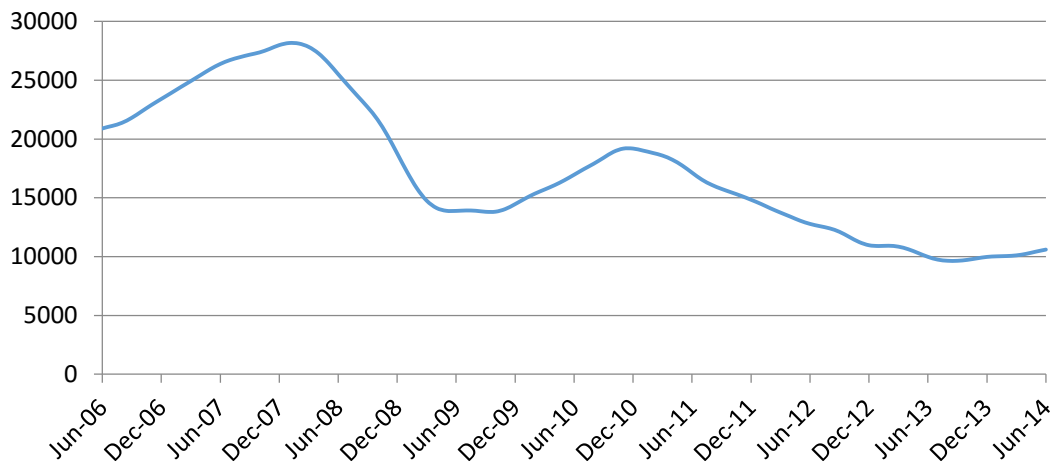


Figure 1: Internet Vacancy Index, ICT Professionals, five years to June 2014
 Source: Department of Employment, Internet Vacancy Index, trend.

skills as well as stakeholder engagement and business acumen), as many jobs require the successful applicant to liaise with clients and other stakeholders.

A number of employers commented on the difficulty in finding people with the right mix of technical and soft skills. A common theme that emerged was that employers are becoming more explicit in their requirements for applicants, and would rather wait for their ideal candidate than recruit someone who was 'close enough'. A number of contacts commented that there are few applicants with strong non-technical skills, like business acumen, project management and problem solving. Employers also placed a strong emphasis on soft skills, such as stakeholder management and communication skills. Applicants who lacked these were considered to be unsuitable.

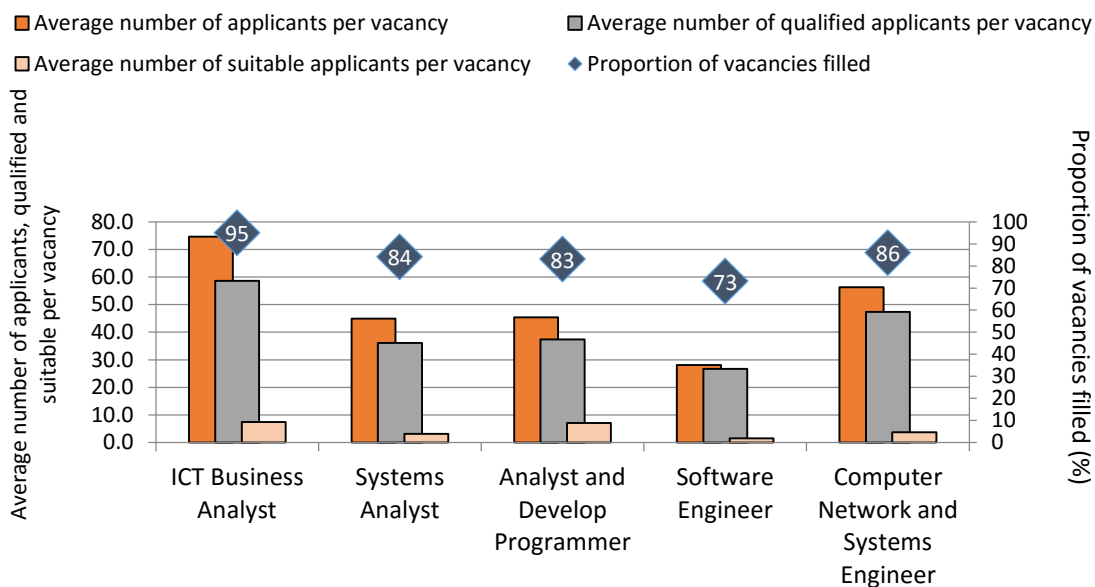


Figure 2: SERA Results, ICT Professions, Australia, 2014
 Source: Department of Employment, Survey of Employers who have Recently Advertised

Vacancy levels for ICT Professionals have been declining for the past few years, and in June 2014 were 23.7 per cent lower than they were five years earlier, (Australian Government Department of Employment, 2014).

Graduate Careers Australia (GCA) data show that employment outcomes for Computer Science bachelor degree graduates are below average, with 70.3 per cent having secured full-time work, compared with 71.3 per cent across all fields of education. Employment outcomes have fallen by 12.9 percentage points since 2008, (Graduate Careers Australia, 2014).

The Clarius Skills Indicator, (Clarius Group, 2014), shows there was a surplus of ICT professionals in the March quarter 2014, and this has continued to grow since March 2013. It is suggested that this surplus is due to a slowdown in new IT systems investment and a sharp increase in offshoring information services, (Dinham, 2014).

Employers recruiting for software engineers were more specific with their desired qualification and commonly sought a degree in software engineering. GCA data show that outcomes for these bachelor degree graduates are relatively stronger, with 83.2 per cent in full-time work in 2013, (Graduate Careers Australia, 2014).

Approach

This study was underpinned by a qualitative research methodology, with data collected through a series of small focus group discussions facilitated by the project leader.

Participants were drawn from RMIT University ICT academics who deal with industry projects, teach into the capstone projects and professional ethics courses and manage undergraduate and postgraduate courses and programs. One focus group was attended by 4 ICT academics. Participants filled in a short demographic questionnaire, and signed their consent form. Focus group questions were semi-structured and presented informally to promote discussion. The key questions discussed were:

- Where do your graduates work?
- What is the current involvement of industry in your program?
- Where do you address employability in your program?
- How do you assess students' employability skills?
- What teaching approaches do you use to cover employability?
- What are barriers to teaching employability?
- How do you know if your graduates are employable?
- What should industry's role be?

The discussions during the focus groups were recorded and were transcribed verbatim. The transcriptions were entered into NVivo and analysed thematically with a qualitative open coding approach based on themes drawn from the Dacre Pool and Sewell employability framework (2007), see Table 1. For the purposes of reporting the data in this paper, the notation used will denote the four participants as P1-P4, and will include the page number of their interview transcript.

From the responses to these questions we aimed to answer the following research questions for each discipline about what academics do to develop students'

- 1) knowledge of industry and the job market?
- 2) employability skills from experience (work or life)?
- 3) employability skills concerning their Degree subject knowledge and skills?

- 4) generic skills?
- 5) emotional intelligence?

Table 1. CareerEDGE Employability Framework, (Dacre Pool and Sewell, 2007).

Category	Sub-categories
Career development learning	business acumen*, career decisions, knowledge of job market, networking*, passion and interests, recruitment processes and preparation, professionalism*
Experience (E) – work and life	<i>none provided</i>
Degree subject knowledge, understanding and skills (D)	grades
Generic skills (G)	adaptability, communication, critical thinking, entrepreneurship, ethics*, imagination & creativity, lifelong learning, managing others, numeracy, planning, problem solving, teamwork, time management, using ICT, work ethic, working under pressure
Emotional intelligence (E)	self-awareness, self-management, awareness of others, managing others, motivation (Goleman 1998)

Results and Discussion

In this paper we present the responses on what academics do to develop students' employability skills.

1. What do academics do to develop students' knowledge of industry and the job market? What are academics doing to develop graduate employability skills?

Academics in the ICT discipline say that they keep in touch with industry contacts, either on the Industry Advisory Committees, or those which come to regular University Industry Days, or past students who move out into industry. Some also check job advertisements and read Government bulletins and present this information to students in lectures, and to other staff members via email.

"I don't have how effective they are but we have multiple channels. Time to time we have our industry expo's and..." (P1, pg7)

When asked for examples of where students can learn about industry, they point to particular courses:

"We've got two professional practice subjects so professional computing practice, PCP we call it, covers ethics and report writing, and communicating." (P4, pg16)

2. What do academics do to develop employability skills in students from experience (work or life)?

Many academics believe that students can develop the most relevant employability skills from working in teams, and particularly on industry-relevant capstone projects. They commented:

"The main channel is also where the projects...which is the capstone projects which [name removed] manages a lot and mine is not capstone but yeah you can call it capstone but the critical points varies but in that project space they quite heavily work directly with employers mostly." (P2, pg7)

"They're meant to be group projects for developing communication skills and working together skills, and all of that stuff." (P3, pg8)

"Mostly the working in the teams and then the soft skills are the ones in that area." (P1, pg9)

They point to networking opportunities, and work experience as relevant to developing students' employability:

"... well using that to communicate with people and you build on that communication skills and also to understand a bit more about how people do actually work in their roles and then out in the industry, that you maybe not have found out necessarily from university." (P3, pg8)

They also incorporate peer assessment, as many believe they will be working with their peers in teams in larger companies.

"For 20% of the assignment they have to assess their contribution to the group as well as the rest of the teams contribution individually. So even though it's a group assignment the submission they then have another 20% component added on for their peer assessment." (P4, pg17)

"... And in my courses yeah it's the same, they do peer reviews on each other and they do review of themselves as well. How they went and how they contributed and what they think they did." (P2, pg17)

3. What do academics do to develop employability skills in students concerning their Degree subject knowledge and skills?

Many academics believe that their industry contacts can keep them up with the required technical skill levels.

"We had an opportunity to meet up with some industry leaders and so I met with a couple of HR type people and then a couple of managers who I still speak to occasionally." (P2, pg7)

"Let's call it Deloitte forum where you get to meet the different people in Deloitte, you understand what they do, and what they're daily job is like in the different departments. That helped because it sort of gives you an idea of how things are done in the workplace. What sort of work or what sort of jobs you can expect to receive when you come into the workplace." (P3, pg14).

Others believe that their social networks can help keep them up to date with the technical skills required in industry:

"... new latest tools and technologies but they come around and say okay, use this particular tool to deliver this, and deliver this project for us, so the students will then quickly adapt and learn and they do the project for them in that particular tool." (P2, pg12)

"All the courses could teach Microsoft based technologies but the company might not even want Microsoft based technologies so they get the students to work in the technology that suits their need as well." (P2, pg13)

Hence the academics appear to believe they are preparing students for industry by teaching them the relevant technical concepts so they can adapt to whatever tools are required for their employment.

4. What do academics in your discipline do to develop students' generic skills?

One of the key learning outcomes for most ICT courses is the development of soft skills so many courses have introduced subjects like project management, or the development of project management skills spread throughout first to third year courses.

Communication and Ethical Skills

"We've got two professional practice subjects so professional computing practice, PCP we call it, covers ethics and report writing, and communicating. So they have to do these in group work." (P4, pg16)

"Well one of the scenarios we cover is if they're working for an unethical boss what would they do. Also in ethics in terms of they get access to sensitive data what they do with it" (P4, pg27)

Teamwork

"They have large component of the assessment is teamwork and it has peer review assessment". (P1, pg17)

"For 20% of the assignment they have to assess their contribution to the group as well as the rest of the teams contribution individually. So even though it's a group assignment the submission they then have another 20% component added on for their peer assessment." (P4, pg17)

Life Long Learning/Adaptability

"We can't teach all of the different software technologies and paradigms within 3 year bachelor's degree but what they're looking at is that they're able to end up doing something that they want to learn but as long as they know the concept basics they should be able to adapt." (P1, pg13)

5. What do academics do to develop students' emotional intelligence?

According to Dacre Pool and Sewell emotional intelligence is one of the keys to being employable. Emotional intelligence is about how well students are aware of their abilities and inabilities, and how they manage these but also being mindful of others and learning how to work with them so that the best in everyone emerges.

Academics were aware of the importance of emotional intelligence in developing employability skills and tried to develop these in students by making them review themselves, reflecting on what they know and don't know and how they contributed to the overall goal of the group. As one participant said:-

"...and in my courses yeah it's the same, they do peer reviews on each other and they do review of themselves as well. How they went and how they contributed and what they think they did." (P2, pg17)

"Now a lot of employability doesn't necessarily depend on what you learnt at the university. You know if you're an obnoxious person who insults everybody you're not going to be very employable." (P3, pg17)

A common practice used by academics to help students become aware of and manage others, was to create projects that involved teams, and develop assessment that measures performance based on how well team members were aware of other team members motivations, challenges and opportunities, and that of the business they were working towards building a solution. Example quotes include:-

“The other was business acumen, they said they didn’t want people coming along speaking out of turn at meeting and things, they wanted them to understand where the business was heading and who the key players were and where they would fit in.” (P4, pg23)

“They have to get together and video an ethical situation and present two solutions to it. So that requires quite a bit of trust in your group, quite a bit of cooperation and listening, just even to identify the dilemma in the first place, and then to work on it throughout the semester.” (P4, pg16)

It seems the academics recognise the gaps in their students but do not consider it their role to assess employability skills.

“I’m very uncomfortable with this notion of assessing employability. Assessing means you pass, you fail. Now a lot of employability doesn’t necessarily depend on what you learnt at the university. You know if you’re an obnoxious person who insults everybody you’re not going to be very employable.” (P3, pg18)

Many academics believe this can best be done by students undertaking their own networking and being proactive about their own development.

Recommendations/Implications/Conclusion

In this paper we have presented ICT academics perspectives on ICT student employability skills and many have strategies to develop graduate employabilities across multiple categories: knowledge of industry and job market, work experience, subject knowledge, generic skills and emotional intelligence.

ICT academics have kept in touch with industry contacts to keep students aware of the current state of the industry and job market, capstone projects are offered to provide students with a real sense of working for an organisation, academics focus on technical skills development but aim to educate students with concepts rather than the tool of the day, many subjects are devoted to professional computing practice to hone in on the generic skills development and these subjects require students to work in groups to develop their emotional intelligence.

Some academics believe it is better for students to undertake their own networking and be proactive about their own development. However, in other research, (Jollands, Burton, Carbone, Clarke, Grando, Hamilton, Smith, Xenos, Brodie, Pocknee, 2015), we find that students may realise there is a gap, but do not know how to bridge this gap.

Our recommendations are to try to engage students very early on in their ICT degree programs with learning employability skills. The aim would be to encourage them to focus on practices that enable autonomy and independent problem solving and identify their own career pathways. In this way they may develop portfolios or identify areas of weakness which they can focus on to develop their own essential and often unique employability skills by the end of their programs. The ICT academics have pointed to the embedding of employability skills into their curriculum throughout their whole degree. From the very first day of first year for all students, there are various different industry people who could work

with academics to deliver the curriculum. In this way the students gain an understanding of why particular skills are necessary and an insight into how they are used in industry, whether the workplace be for an entrepreneur, small business or large enterprise.

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