Towards Understanding the Non-technical Work Experiences of Recent Australian Information Technology Graduates

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Abstract

This paper is a part of an education research degree study where the main objective of the research is to describe and analyse the non-technical work experiences of recent Information Technology (IT) graduates with a view to generating a substantive theory of the relationship between non-technical work experiences of IT graduates and their University studies. It discusses the findings from the seven in-depth interviews conducted so far. The findings from the pilot study provide an insight into understanding graduate perceptions of the practical relevance of their University courses to the development of knowledge and non-technical skills applicable to their work experience.

Keywords: ICT education, computing education, IT graduates, non-technical skills, workplace experience, study-work transition, graduate work experiences

1 Introduction

The relationship between higher education and working life has attracted increasing interest in recent years According to Dahlgren, Hult, Dahlgren, af Segerstad and Johansson (2006) much of the research was interested in the match between the output of higher education and the societal demands for trained person power and few studies examined either the experienced impact of the education or specific work task requirements. Johnston (2003) also highlighted that there was little information in the research literature on graduate employment from a graduate's perspective. She emphasizes the need for more research directed towards graduates' experiences in their early employment years particularly in relation to their working conditions and culture.

She also says more research is essential to understanding the relationship between (a) higher education and work and (b) employers' explicit expectations and graduates' experienced expectations. According to Dahlgren et al. (2006), research has hitherto described the transition from higher education to working life in rather general categories and there is sparse knowledge about how graduates construe themselves as professionals or how they experience transition.

In the field of Information Technology, minimal research literature exists on understanding graduate perspectives of their work experiences or how they relate their courses of study to their work experiences, especially during the early employment years.

Anecdotal evidence and some recent literature suggest that graduates from all disciplines are lacking in job skills and are not prepared for real work situations (AC Nielsen Research Services 2000, The Australian 13 March 2006, Hagan 2004, Business Council of Australia 2006, Snoke 2004). There has been heated debate within the IT profession about the adequacy of preparation of IT graduates for real work situations. Billett (2000) engages in a discussion identifying the gap between the requirements of the workplace and the ability of educational institutions to meet the requirements and the effect it can have on work performance. Such gaps have huge implications for many (the workforce, profession, employers and Universities) and hence are a serious concern for all. The fast changing and complex nature of IT means that employer expectations of university to prepare graduates to suit their needs may well be overly demanding, unrealistic and unjustified. The need to close the gap by having ongoing consultation between academics and employers is not only desirable; it is now an absolute necessity.

The IT industry is multi-dimensional and simple definitions of the needs of employers are not possible. This has resulted in rigorous discussion over many decades in how to fit graduates to the professional IT workplace. Research that pays attention to graduate perceptions of the practical relevance of their courses or the development of knowledge and skills applicable to their work experiences provides insights into understanding the transition of graduates from University to the workplace and is of interest to the whole higher education community (Richardson and Kabanoff 2003, Dahlgren et al. 2006).

The main objective of the research discussed here is to describe and analyse the non-technical work experiences of recent Information Technology graduates with a view to generating a substantive theory of the relationship between non-technical work experiences of IT graduates and their University studies. Section 2 discusses the study rationale, research objectives and the research questions.

Section 3 explains the research design including the methodologies, methods and the research criteria used. Section 4 reports the findings from the in-depth interviews conducted so far. Section 5 presents conclusions and future work.

2 Study rationale, research outcomes and questions

A recent survey of businesses in Australia and New Zealand found that employers value good communication and people skills above academic qualifications and work experience (The Australian, 01 Nov 2006). The 2006 graduate outlook survey found that more than half (57.5%) of the 127 respondents wanted good interpersonal and communications skills in job applicants; 35% rated academic qualifications as most important; 4 out of 10 employers told Graduate Careers Australia they would not hire applicants who did not have good communication skills.

According to Wong, von Hellens and Orr (2006), non-technical skills and personal attributes such as team work, communication skills, integrity, reliability and self-motivation are considered more important than purely technical skills in IT graduates. The study also found that 78% of jobs advertised for IT graduates specified non-technical skills. Non-technical skills were rated more highly than all the other skills (business-related, general IT/IS skills and personal attributes). There was a general consensus evident from the job advertisements and questionnaires that non-technical or soft skills such as interpersonal communication, the ability to communicate with others, adaptability and self-motivation were more important for graduates than technical skills in terms of employment prospects.

Developing a better understanding of non-technical work experiences of IT graduates is important for at least two reasons. Firstly, there is evidence to suggest that there appears to be mismatch between the employer expectations of graduates and skills of graduates. Figure 1 shows the contexts in which gaps of expectations or of skills are likely to occur. This research is trying to find out why this mismatch seems to be present and what kinds of issues may be the source(s) of this mismatch.

Second, past and current literature focuses on academic, professional associations and employer perspectives of graduates (ACS 2005a-2005e, The Australian 01 November 2006). Understanding and studying the lived experiences of IT graduates at work has been given little or no attention. This research takes a step forward in addressing the missing link of understanding graduate perspectives on the relevance of their University study to their non-technical work experiences. The research findings have specific implications for IT academics, graduates and employer groups and general implications for the whole higher education sector.

2.1 Research question(s)

The main research question is: What do the non-technical work experiences of recent Information Technology graduates in professional practice tell us about their University studies?

2.1.1 Sub-questions

Qn.1: What are the typical non-technical requirements of IT professional practice?

Qn.2: From a graduate's viewpoint, what are the elements of his/her University study program that contributed towards the graduate's fulfilling the non-technical requirements of his/her IT professional practice?

Qn.3: From a graduate's viewpoint, how well did his/her University studies prepare him/her to meet the non-technical needs of his/her professional practice?

2.2 Benefits of this research

The following groups should benefit as a result of this research.

1) Students/Graduates – Studies such as this following young IT graduates into their professional practice would give invaluable insight into the kind of issues they face while on the job. It will also help to find out if they were able to cope with practical situations and what elements of their course of study contributed to the non-technical skills needed in their workplaces.

2) Academics -The research findings will encourage IT lecturers to have ongoing collaboration/conversations with industry so as to incorporate the elements that are crucial for employability of graduates as a part of curriculum development, design, training and assessment.

3) Universities – Lived experiences of graduates at work will assist Universities to better educate their graduates to cope with major issues in relation to the non-technical skills needed in workplaces.

4) Industry - Employer groups will also gain a better understanding of the sort of issues that graduates generally face at workplaces (from the graduate's viewpoint) and will realize the need for employers to work closely with Universities in order to prepare graduates who are ready for work. They will gain realistic expectations of the non-technical skills and work readiness of new IT graduates.

3 Research design

This section presents the discussion of the research design and justification of the methodology chosen for this investigation.

3.1 Research methodology

Given the purpose of this study and the nature of the research question, an exploratory and a qualitative methodology that uses in-depth interviews as the research method was chosen for this research. There are two main reasons for choosing qualitative inquiry. Firstly, the topic needs exploration. Second, there is a need to present a detailed view of the topic. Figure 2 shows the methodological map for this research.

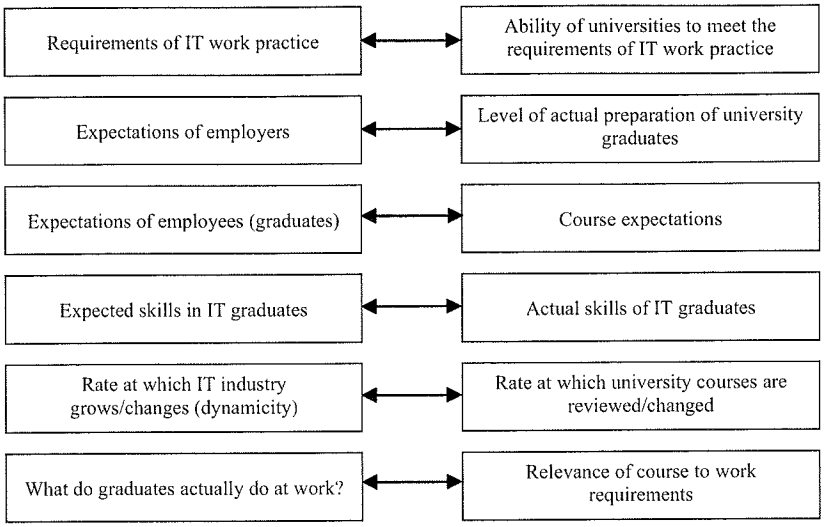

Figure 1: Gaps in expectations and gaps in skills

This research views the experiences of graduates at professional sites as an opportunity to illuminate details of the perceived relationship between workplace requirements and University studies in IT. The view taken is holistic. It recognises that workplaces are complex, messy and diverse, that personal experiences differ from person to person and form course to course, and that multiple perspectives exist (Beckett and Hager 2002).

The courses or workplace requirements are not viewed as a specification of objectives, but as a social construct in a variety of contexts. The focus will be on the graduate experiences in those contexts (including the relation between courses/studies and the workplace experiences) with respect to the particular social circumstances prevailing.

This research follows the qualitative traditions of *Grounded theory* because it uses an approach that will generate and develop a theory from the data collected through interviews. Hence the goal of this qualitative research is not to make sweeping generalisations but to present contextual findings grounded in data, staying as close as possible to the construction of the world as participants originally experienced it (Creswell 2003).

In a grounded theory study, the key is to generate in-depth data that can illuminate the patterns, concepts, categories, properties and dimensions of a given phenomenon (Glaser and Strauss 1967, Strauss and Corbin 1998).

To generate enough data an appropriate sample size is essential. In a grounded theory study this sample size is usually achieved through a process called theoretical sampling or theoretical saturation, which occurs when no new relevant data seems to emerge regarding a category. This means that with interviews there is no set number for when theoretical saturation can occur (Glaser and Strauss 1967, Strauss and Corbin 1998). According to Morse (2000), the sample size is dependent upon the scope of the research question. Thomson's (2005) review of fifty grounded theory studies from various disciplines over a three-year period (2002-2004) that used interviews found that the average sample size was 31. After excluding one study that had a sample size of 350, the average sample size was 24. Seventeen of the studies had an average sample size between 20 and 30 and seventeen others between 10 and 19. The sample size for this research really depends on the point of theoretical saturation. However the literature on this topic suggests that saturation normally occurs between 10 and 30 interviews.

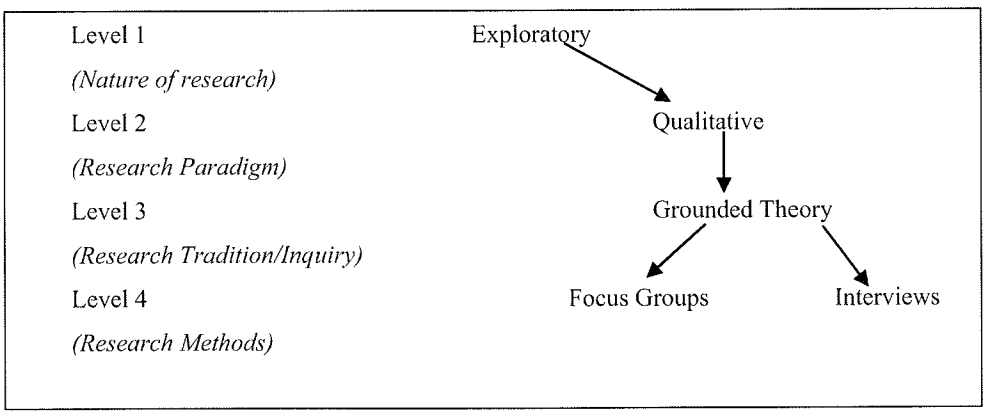

Figure 2: Research Design (Methodological Map)

3.2 Research criteria

Since this research is interested in understanding the non-technical work experiences of recent IT graduates and the relationship between their University studies and non-technical work experiences, all participants must have an Australian Bachelor's degree in IT or a related discipline. They should have graduated within the last three years and studied at the University as a full-time student. Graduates can be Domestic students or International students. For convenience, they should be working around Sydney so they can take part in focus groups and interviews. The participants should also be currently employed and have been working in a paid IT professional position for 6 months to 3 years. Graduates could have completed work experience as a part of the University course but should not have had any other previous paid IT work experience. Graduates who did not study as full-time students will be excluded from this study as they may have been working part-time and picked up their workplace skills from their part-time jobs. Graduates who hold qualifications higher or lower than Bachelor degree in IT will also be excluded as this research focuses only on Bachelor degree graduates. Graduates who have had work experience in IT or related areas prior to the completion of their University degree (but not as part of their University course) will also be excluded, as their experiences will be different from those of the fresh graduates with no prior work experience.

The research acknowledges that there is a sample bias in the above research criteria. The graduates chosen for the study are employed. The fact that they are all employed is not something that can be ignored. This may be more due to personality traits (ability to handle problems or complex situations, sort out issues for themselves, get up and go attitudes) than their courses or what subjects they studied at University.

Further, any experience in any workforce, even if part-time, provides individuals with work related skills. Some of the skills graduates use in their current IT job may have come from their past experiences in non-IT or casual jobs during or before University studies. Such graduates may be better positioned for success at an interview or in a workplace than those graduates who have no prior work experience.

4 Data collection, analysis and findings

So far seven in-depth interviews of an hour each have been conducted with IT graduates. All interviews were audio-recorded. During the interview several questions were asked about their non-technical work experiences and they include: 1) non-technical skills they needed for their current work; 2) where they picked up their non-technical skills from; 3) what they thought were the most useful aspects of their studies in relation to their work; and finally 4) the challenges for them at work. Responses were probed to gain deeper levels of meanings, make important connections and to identify subtle nuances in their expressions. During the analysis of the 'interview data' from the pilot study, major issues and themes raised by graduates were identified. A theme is defined as a common meaning or an idea that runs through most of the data or a minority idea that captured a particular emotion or factual idea. From this preliminary analysis, dominant themes were identified and described. In parallel, a visual chart organizing ideas to form patterns and themes was developed.

4.1 Non-technical skill requirements at work

The first phase of the interview asked the graduates about the non-technical skills that they needed in their current job roles. On the issue of the non-technical skills that were needed at work, several responses were received. The dominant skill that was needed was communication. This section presents the preliminary categories of non-technical skills that have been identified from the interview data.

(a) *Communication Skills*: Both verbal and written communication skills were important in graduates' work roles. While communicating with clients from overseas, the use of simple and clear language that communicated the message effectively was essential particularly when there was no possibility of having face-to-face meetings. Graduates were required to provide both formal as well as informal feedback about their work to both superiors and peers. They were required to be tactful in providing their own ideas and feedback in a professional manner. According to graduates,

> I would say you had to be a very good communicator. In particular have excellent written communication skills because reporting as such is a large component both in the talking of the campaign and simply explaining the concepts to the sales team, which is you know a lot of it. You have to be very concise in the way in which you communicate. That will be the number one…
>
> Because I'm in Consulting, I need to be able to clearly and accurately communicate to client management. I need to be able to translate tech speak into plain English
>
> From e-mails to project proposals to review comments in documents etc. our writing needs to be clear and comprehensive at the same time
>
> The standard skills, listening, speaking are necessary for meetings and presentations.
>
> Be someone who can talk and write simple e-mails so it means what you intended it to mean …

(b) *Teamwork Skills*: Most of the time graduates had to work as a part of a team. They required the skills both to be able to listen to what others in the team said as well as to be able to communicate their own ideas to the rest of the team members. Graduates were required to manage several different tasks within their own department or team to across departments all at once. There were instances when they had to fill in someone else's role for a short while due to absenteeism or because of the lack of human resources.

(c) *Conflict resolution and negotiation skills*: Graduates need good negotiation skills to resolve in a professional manner, any unexpected conflicts that might arise within

their team or with their clients. Graduates were expected to solve any problems that might have arisen as a part of the project or work that they were doing for their clients. They were also required to have good risk management skills by thinking ahead about the project activities and work they were involved in so as to identify and manage any issues/risks that were likely to arise. The following response from a graduate illustrates this point.

> Areas of conflict could be, for example, if you are in a project and the scope is too large or the expectation is too high or time frames are being pressed and being able to I guess sit down and put forward what the issues are and then discuss what potential solutions are and work through that together... Sometimes there is like a lot of force that is put on you to doesn't matter what's needed just deliver and then I guess the skill is to be able to come up with something that meets both people and that is not easy...
>
> When 2 teams are arguing about scope ownership I am the one who needs to arrange compromise and agreement and ensure ALL parties are happy... very difficult to do...

(d) *Managing expectations*: While dealing with local and international clients, graduates were required to understand their client's expectations as they were changing all the time. They were also required to manage meetings effectively with clients and establish reliable and timely communication channels.

Graduates needed to be aware of managing the various stakeholders with whom they worked including clients, peers and their supervisors. They were required to manage and work effectively with a variety of people particularly when they were working on multiple projects or tasks.

While dealing with clients, other peers and supervisors they were required to be both patient and empathetic although they might have been frustrated with their own work related or personal problems. They had to stay cool and calm even when under extremely stressful situations. According to some graduates,

> You have to be a people person. That's probably the key... it is also the enthusiasm to do the job like your charisma towards customers, clients, people around you...
>
> The first and most important one would definitely be people skills. This is important because you are constantly meeting and interacting with new people as well as ones you already know. You also have to interact with groups in meetings and know how to talk to the different people.

(e) *Abstraction versus generalisation*: Graduates were required to see the bigger picture of where their work fitted with the rest of the IT project work in which they were involved. A graduate says,

> I think in terms of going through the one I struggled with the big picture... that wasn't really until second or third year at Uni that I really started to get better at that because it is easy to just look at your focus tasks...

(f) *Eye for detail/design*: In addition to their technical work, graduates were expected to have a good eye for detail or design. This is typically the ability to see things beyond the obvious tasks/activities of the projects they were working on. The following statement illustrates this point.

> You know you have to be very very meticulous in how you look your creatives, be critical in how people respond, have to imagine how people would respond to a website you design (or) a creative that you send out.

(g) *Time Management*: Graduates were required to manage their time effectively by being able to understand their workload, work priorities and scheduling work for themselves appropriately. The common challenge graduates face in relation to time management is best illustrated by one graduate's experience as stated below.

> There was a project like a 6 months project quite a long one and I was given a lot of responsibilities and there was about seventeen different systems that I have to have ownership over and there was lots of politics going on and lots of moving targets so... sort of what had to be reported each week and what the deliverable was and who the contacts were and the process for escalating issues... everything was constantly being iteratively tweaked every week and... coming on to the project everything was still early days.. I was told here is your assistant, figure out who your contacts are, learn what these systems do and then determine if they are actually in scope for this project and if they are in scope then start engaging for the subject matter, experts so forth and so forth... and going through that project came across a lot of non-technical issues. There were so many different things happening all the time and I was often I guess overwhelmed and confused and no one has time to sit down with you for maybe four days straight and walk through with you step by step. Maybe I will spend 5 minutes with you and later on if you have a quick question... I cannot walk through everything with you.

(h) *Ability to learn from mistakes*: Graduates needed the ability to improve themselves by learning lessons from the mistakes they committed at work. A graduate says,

> I have definitely been thrown in the deep end with having to facilitate meetings with clients when I am not completely aware of the topic that is when a colleague is sick and I step in. This is always a good way of learning what not to do.

4.2 Development of non-technical skills required at work

The second part of the interview looked at how and where graduates had picked up their skills. Several interesting as well as unexpected responses were received. Some of the factors that contributed to the development of their non-technical skills are:

(a) *Previous careers*: For some graduates their non-technical skills came from a totally unrelated (non-IT) career such as boiler-making, bricklaying, customer service at pubs etc.

(b) *Family relationships*: Graduates felt their family relationships helped bring out their social skills and overcome their fear of speaking out. They learned to work with others and develop discipline and organisation skills. The following statement supports this point.

> My parents also encouraged me to be involved in various outside school activities when I was younger (e.g. Dancing, Sports etc.) where I learnt to communicate with various people that were not always familiar, thus building my social networks.

(c) *Friends/Social networks*: Friends and social clubs played an important part in the development of understanding different points of view, backgrounds, and multiculturalism as well as developing their ability to communicate their ideas to varied audiences. According to graduates,

> I participated in Rotary Youth Speaks competitions, in Business Experience placements at school. These all taught me to be professional and clear in communication in the workplace

> Basically getting involved with you know... I was too shy but started getting involved with you know the O-week that is the orientation-week so that helped to improve communication skills...

(d) *Natural talent and interest*: Some graduates believed that they naturally possessed some of the non-technical skills. For example, one graduate developed an eye for detail and design because of her interest in photography. She says,

> I would say quite an early component came from the fact that for the longest time I have been doing photography it has slowed down a little bit of late but and that really contributed to it. A lot of it (eye for details and design) and I would say the majority of it would have come from on the job because my how do I put it, my web development and design was not a part of the university curriculum as such. I have always had the interest in web design but it is something that I never really came across in my studies

(e) *Other formal courses*: Graduates who studied other courses or subjects (such as psychology, sociology, international business) during or before their IT courses, thought that those subjects greatly helped enhance their non-technical skills such as communication and presentation skills and a good understanding of business knowledge and skills.

> When I first came to Uni I was actually a lot more involved in humanities side of things and I had completed four units of English, major and did philosophy on top of that as a part of a distinction course. So and I was working at a university level. So it was very funny kind of skills because for somebody you know. Initially I had 2 ideas in my mind, the techie side of me said do IT and non-technical side of me said go to journalism. So I think it is a matter that non-technical is unfortunately never really gone away. I have also tried to keep up with a written work component throughout university of course. I have also had a lot of subjects where I had to do a lot of report writing.

(f) *Previous work experience*: Other previous work experience that they undertook on a part-time basis such as tutoring while at University was helpful in the development of social skills, the ability to communicate with a large group of people and the management of their time and priorities. Following are some of the statements from the interviewed graduates.

> I did tutoring at University that helped a little bit. I had a classroom of 20-30 students and I would take them through the course material. It helped being able to transfer knowledge, communicate ideas, check someone's understanding and I am sort of a picture person... it helped to sort of illustrate things on a big board and visually explain things

> Tutoring was invaluable. Also gave confidence. It was good for presentation skills

g) *Extra-curricular activities at school*: Some extra-curricular activities at high school helped them understand the importance of teamwork and team dynamics. They also contributed to the development of self-confidence.

4.3 Most useful aspects of university courses

During the final stage of the interview, IT graduates were asked questions about the most useful aspects of their University studies. Some common answers emerged. They indicated that subjects such as project management taught them key non-technical skills they needed at work. These included using planning tools, coordination of a variety of tasks and organising their thinking. Thesis subjects were valued for the research skills and documentation skills they helped develop. Subjects where assignments or projects involved teamwork were also regarded as useful for developing teamwork and report writing skills. Subjects where there was a need to do presentations in front of the class and academics helped develop confidence as well as presentation skills. However there is unanimous agreement on practical work experience subjects and their value. Almost all those interviewed thought that the best part of their studies at the University and the most useful for when they commenced full time work was when they actually undertook a work placement in the IT industry. According to the graduates, the work placement provided exposure to clients and professionals who helped develop their social engagement skills. Presenting reports and findings in their own words helped them feel that they were accountable and responsible for their actions and ideas. Further, it helped them to put their education and theory to practice. It also contributed to the development of self-confidence through real situations where their maturity and responsibility was tested away from the safety of a learning environment. This point is illustrated by some of the graduate responses in the statements below:

> There is a particular subject that we did it was a software engineering subject. The objective of the subject was that you actually worked on a real industry problem out at the sponsoring company ... it also gave an opportunity to be out in the industry to see how people dress and how people communicate... It takes away from that brand new,

> the unknown and makes you more comfortable because you have already had exposure ...
>
> The best subjects I did at Uni to cover these were the Industry placement studies as part of the BIT course. I did two 6-month placements during which I worked fulltime. These were the most practical studies I did. Other subjects involving presentation skills were good to help example, International Business
>
> So if you look at the sort of project management subjects I was doing for instance the written there was a huge written component, huge sort of you know, how do I put it, communications component generally because you will be up presenting things as well to a group to your lecturers whatever and what not. So I think in a way it's sort of developed around the university has helped to, sort of make my writing I guess my communication in general a lot less flowery and a lot more focused towards IT and being quite objective. So I would say that that is where I developed this you know my written skills for the most part.

4.4 Immediate challenges faced by IT graduates at work

Finally, graduates were also asked about the challenges they currently faced at work. Some interesting responses were received. Some major issues that the graduates were faced with include:

(a) *Gender domination*: The IT industry is male dominated. It was necessary at times for graduates to be aware of their roles and the gender imbalances surrounding their work environment. According to a graduate,

> ...the team I work with is very international and dealing with a lot of cultural diversity and it is also very much of a boys' club so and it is a kind of high standards with males and working with them comes across lots and lots of obstacles and challenges
>
> I think generally when you look at the I guess the hierarchy of the people's status it is very male-dominated. So at the lower level you may have a combination of males and females but the higher you go towards partnerships the less and less females there are. And because females and males operate and think differently... so the higher you go the more you need to sort of factor that in when you are relating with your colleagues. So it is probably not impacting on how well you can deliver or perform but just in terms of your social networking skills. It influences I guess your approach to how you socialise. It is not really the work that you do but then the social environment at work is very largely a part of your work...

(b) *Time and priority management*: Management of their workload and priorities was challenging particularly when they were working on several different projects or tasks at the same time.

(c) *Cultural awareness*: Being able to understand and communicate with international clients in Asia-Pacific or European countries was very challenging as there was a striking difference in their culture and workplace activities. Graduates had to take extreme care in composing all communication including e-mail messages to get their message across in a simple, clear, professional as well as timely manner.

(d) *Managing client expectations*: Juggling between different client expectations was another challenging task. It was important for graduates to keep in touch with their clients on a regular basis and provide them with the required status reports so they were able to effectively develop or create solutions that met their expectations and needs. One graduate says,

> I need to be able to see the value in everything we do here for the client and communicate the benefits constantly to give comfort to the client that they are spending money on things worth value

(e) *Coordination of people and resources*: Determining the resources required for the work to be done, scheduling meetings, coordinating attendance at meetings, venue selection and discussion item development were quite challenging as they needed to be aware of several factors such as personalities, experience, expertise, budget etc. According to some graduates,

> When you are dealing with four campaigns on one day you have to work out exactly how you are going to manage your workload, how to allocate work to other people. I currently have one girl who works besides me. She is little more junior and when things get little bit more crazy on my end you know I have to know when is the right time to start giving jobs to her and jobs that are good for her so she can learn her role better. So a lot of resource management as well...
>
> When I was working on a project and one of my team members who specialises in a particular area was about to go on leave. It wasn't a big issue at the time; however, I knew a deadline would be looming in a month or so later. In order to mitigate the issue of being left without resources and to stop it becoming an issue, we had to mitigate the risk by training up another resource in preparation
>
> The first and most important one would definitely be people skills. This is important because you are constantly meeting and interacting with new people as well as ones you already know. You also have to interact with groups in meetings and know how to talk to the different people. A lesser one would be the ability to be assertive as you must get your views across to other people so that your project can be benefited.

(f) *Limiting reaction*: Some graduates found it difficult to keep their emotions in check. They had to be extremely cautious in providing feedback and waiting for the right moment or right place to discuss their opinions in a professional manner. Some graduates also thought by saying something their manager disliked they risked their promotional opportunities. In another example, a graduate who used his expertise to help a staff member from a different department was advised not to go beyond his

duties to assist staff under another manager. Another graduate says,

> ....every time something popped up try not to react to it straightaway. Understand that often things are complicated and then move slowly and if you react instantly you have not necessarily factored in everything that is involved so when something happens pause think about it cross reference with a peer or senior and maintain I guess the to do lists and using an issue log and constantly tracking all of that and having regular whether it is every twice a day or even every second day regularly sitting down and without getting involved in all the details having a few bullet points written down ...
>
> All of a sudden you have a hierarchy in place. You can challenge but you still have to be respectful. You are no longer on the playing field...

(g) *Ability to "sell" ideas:* It was challenging for some graduates to speak out about their innovative ideas. They needed a tactical approach to present their ideas to the superiors at the right place at the right time. They felt sometimes unsure about the reactions they might draw from their immediate managers and peers. According to a participant,

> Getting sign-off and agreement on things that is selling the work we have done and having everyone approve, agree with decisions that have been made. This can be very challenging and frustrating...

(h) *Reliance on tools*: It was also important for graduates to acknowledge that although they had systems and tools in place for example, planning, it was important to expect changes as they were dealing with people and that too much reliance on tools alone was not sufficient for success.

(i) *Learning curve with new systems*: Graduates felt that they had a steep learning curve with new systems, tools and technologies that were used at their workplaces. This was quite a challenge, as they had to adapt to systems quickly with limited coaching or mentoring.

> You also need an ability to pick up new things as you have to learn new skills when you start your job as a new graduate

(j) *Limited mentoring*: Some graduates were thrown into their jobs with little orientation or mentoring. They had to ask around for more information to learn about the organization, their team's role, or the project the departments was working on. They found this stage quite challenging because they were unsure about many things at work and had to take their conversations with people at work in a slow yet impressive way. According to a graduate,

> Feedback sessions were always filled with constructive feedback never with praise or these were your accomplishments. So you slowly feel smaller and smaller and I guess that makes you unmotivated and takes away from you the feeling of being a good work employee

(k) *Professional development*: Some graduates were interested in professional development but the challenge was to convince their employers to invest in the graduate's professional development activities such as undertaking a part time master's degree or attending professional development activities.

4.5 Future work – generation of theory

More interviews are planned for the next phase of the research and interviewing will continue until the saturation point is reached using the grounded theory approach. A coding model will be developed to enable collation of data from interviews with multiple graduates and to identify specific patterns of responses. This coding model will be used to create an NVIVO project that is a collection of qualitative interview data. The final stage of the research will include the generation of a theory of the relationship between non-technical work experiences of IT graduates and their University studies. The following paragraph summarises the overall approach that will be used in the generation of such a theory.

This study did not begin with any pre-conceived ideas. Based on the literature review, the research began with a general area of interest and will allow the theory to emerge from the data. According to Strauss and Corbin (1998, p.12), avoiding preconceptions helps the researcher to be more faithful to the data and be more open to what is actually happening. So the research question on hand simply identifies the phenomenon of interest to this research.

Grounded theory looks for what is, not what might be and therefore needs no test. Grounded theory finds its concepts in the data; it does not force the data by bringing ideas that need to be tested subsequently. Glaser and Strauss (1967) stress that verification is built into grounded theory and that it is reinforced by the claim that constant comparative method provides a means of testing the hypotheses against evidence. Grounded theory is for building theory – not verifying it. The resulting theory is an integrated set of propositions, not findings. This is a limitation of this approach. Grounded theory can result in a substantive theory or a formal theory. Substantive theory is grounded in research in one particular substantive area for example in this research – non-technical work experiences of IT graduates.

The theory developed from this research will be constrained by the fact that it was generated from a single study conducted within the NSW region. It is possible that comparing experiences of participants from different states in Australia could result in a modified theory. This possibility provides avenues for future research.

5 Conclusion

Current literature on the understanding of IT graduates and their non-technical work experiences during the early years of work is inadequate for identifying the source of some of their problems or dealing with the challenges posed by the mismatch in employer expectations of graduates and graduate skills.

Harvey (1999) highlighted that it was the graduate attributes that determined a graduate's success in the workplace rather than a specific degree. However, Crebert et al (2004) further point out that the list of

desirable graduate attributes used by employers is becoming longer and more complex. In this context, the possibility that sometimes employers have unrealistic expectations and are themselves unclear in their own minds about what to expect in graduates cannot be ruled out.

The IT industry is multi-dimensional and simple definitions of the needs of employers are not possible. There is no *one size fits all* approach to these issues. Little has been resolved over many decades in terms of fitting graduates to the professional IT workplace. Knight (2003) says that lack of work experience, unrealistic aspirations, and competition for jobs, poor academic results, poor career planning, degree-work mismatch, lack of communication skills, self-presentation and self-motivation can present huge problems for employability. According to Scott and Yates (2002), it is when things go wrong that professional capability is most tested. Such situations require professionals to combine the most appropriate knowledge for that situation, i.e. both job-specific skills and generic skills, to develop an ability to read the situation and determine a suitable strategy. They discuss whether individual graduates can be "emotionally intelligent" (graduates with higher order personal and interpersonal skills who can problem solve, think creatively, communicate, negotiate and find solutions rather than know them) and if Universities have contributed to the initiation or fostering of such skills. They conclude that 'while technical enterprise is a necessary capability… it is certainly not sufficient to produce a successful graduate'.

The proposed grounded theory study will serve as a first step in understanding graduate perceptions and will both describe the non-technical workplace experiences of recent IT graduates and present a theory of the relationship between non-technical work experiences of graduates and their University studies. The likely research outcomes at the conclusion of the study include: 1) a snapshot of the non-technical experiences of recent Australian IT graduates at their workplaces; 2) identification of the components (if any) of an individual's degree that contributed towards the non-technical skills needed in his/her workplaces; 3) generation of a theory that will show a relationship between non-technical work skills requirements of recent IT graduates and their University studies; and 4) possible recommendations for undergraduate IT curriculum design.

Finally, this study is of interest to IT professionals, as it should have an impact on employers, educational institutions and the young IT graduates who are likely to be the direct beneficiaries of this research findings and recommendations.

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