

**:: Refereed Article A1:****A case study of desired attributes for success within the ICT sector**

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**Abstract**

This paper examines attributes (soft skills) that are perceived as being critical to success within the ICT sector. The required attributes as identified by a study of 205 randomly selected ICT positions are compared with students' perception (based on a pilot study of a focus group of students). Overall, it is not possible to draw clear conclusions from the outcome of one case study only. However, we were able to identify some preliminary trends and identify a number of key factors for future studies.

**Introduction**

Within the past decade, we have witnessed rapid advancements in Information Communications and Technology (ICT) solutions. The most significant technological advancement of the recent years has been that of Web technologies and the Internet. Today, most organizations deal with complex information and sophisticated information management approaches and systems on a daily basis. Furthermore, the business environment has become globalized which has in turn increased complexity and competitiveness. This has meant that organizations are driven into the digital world. That is to say, to deliver products and/or services in a timely and cost effective manner (and remain competitive), firms have had to increasingly streamline business processes by the application of advanced ICT and Web-based solutions.

As the application of ICT enabled tools and web technologies in organizations accelerates (Harper, 2003; Industry Report, 1999; Pye & The Marchmont Observatory, 2000; Zyngier, 2003), there is a growing need for an ICT-knowledgeable workforce. Organizations need skilled information analysts, information managers, designers and developers of information management solutions. Overall, skilled ICT workers play a significant role in the day-to-day management of businesses. However, over the past few years, there has been much debate over whether or not technical skills are sufficient to guarantee success within the ICT sector. More specifically, numerous ICT sector strategists, planners and recruitment experts argue that technical skills are not sufficient to secure success in employment. A review of a number of recent cases of

recruiting ICT workers, suggests that there is an increasing expectation that ICT workers possess certain personal attributes to complement their technical expertise (Hasanali, 2000).

In 2006 a project was initiated to investigate key issues that concern the effectiveness (developing work-ready graduates) of ICT education within New Zealand. The preliminary results of this study identified key skills and personal attributes (amongst other parameters) as evident from the ICT sector's employment needs. Furthermore, the project involved a pilot study (case study) of a focus group of graduating students (35) of two ICT tertiary qualifications (a Bachelor of ICT program and a Graduate Diploma in ICT program). The study of the focus group aimed at validating research questions, clarifying key issues/trends and fine tuning methodology and/or research questions for future investigations. Some of the initial results of this study were published earlier (Asgarkhani & Wan, 2007).

The key research question for the study is as follows:

"To what extent does graduating ICT students' view of crucial attributes for ICT roles match ICT sector employers' view of winning attributes for ICT workers?"

This paper discusses the results of the pilot study mentioned earlier. Some of the key issues that will be addressed include:

- ICT sector employer's view of needed attributes
- Students' view of critical attributes for ICT jobs
- Students' view of key attributes that help in studying ICTs successfully
- Students' perception of the personal attributes they possessed and whether there have been improvements on personal attributes.
- A comparison between students' views and actual ICT sector employment needs.
- An assessment of a small sample of courses that are offered for the Bachelor of ICT and Grad Diploma in ICT at Christchurch Polytechnic Institute of Technology (CPIT) to determine the ways in which they contribute to development of student attributes needed in the workplace.

## **Research Methodology**

This paper outlines the results of a pilot study of key attributes within the ICT job sector. It compares these results with a study of a focus group of students about their view of winning attributes for the roles within the ICT sector. The results discussed in this paper are based on data collected from four sources:

- A review of some of previously published investigations discussing key issues about learning, ICT education, general developments, recent trends and perceived ICT sector's needs for information age workers (Asgarkhani, 2003; Asgarkhani & Wan, 2007; Dechawatanapaisal, 2005; Evans, 2003; Gregorian, 2002; ICT Skills Foresighting Group, 2006; Kozma, 2005).
- The key attributes seen as critical by the ICT sector, which were identified by evaluation and analysis of 205 randomly chosen job/ role descriptions within the ICT job market.
- Attributes identified as critical in an online survey completed by a focus group of 35 Bachelor of ICT and Graduate Diploma in ICT students.
- Assessments of five courses that are offered for the Bachelor of ICT and Grad Diploma in ICT qualifications at CPIT. Two assessments were performed. One by a graduate of the Graduate Diploma in ICT program. The second analysis was done by the lecturer of the courses that were evaluated. The purpose of this assessment was to validate students' view (claim) that they experienced improvements in some of the attributes they already possessed during the course of their studies.

## **Analysis of Preliminary Findings**

In this section of the paper, we discuss the preliminary results of this case study. Table 1 shows the top 10 attributes ranked by industry and the student survey. Column one in Table 1 is a summary of the results from the study of the ICT job

sector (skills and attributes requirements) and demonstrates the top 10 attributes required in ICT job market, as determined by evaluating 205 (randomly selected) jobs/roles within the

ICT sector. Column two illustrates students' view of the attributes that are required to be a successful ICT worker. Column three outlines students' perception of attributes they possessed at the time of the study. Column four shows students' view of attributes that facilitate successful ICT studies within the tertiary sector. Finally, column five illustrates attributes that have either been further developed or improved on during (as a result of) the course of studies (students' views).

**Table 1. Top 10 Attributes as ranked by industry and students**

Ranking	(1) Industry's view of required attributes for the ICT sector	(2) Students' view of attributes for being a successful ICT worker	(3) Students' perception of their own currently possessed attributes	(4) Students' view of attributes that can help achieve success in studies	(5) Students' view of attributes they developed or improved on during the course of studies
1	communication skills	problem solving	communication skills	communication skills	communication skills
2	people relations	communication skills	self-motivated	self-motivated	problem solving
3	team worker	attention to details	team worker	quick learner	handle pressure
4	leadership	organization	Problem solving	can-do attitude	team worker
5	can-do attitude	people relations	can-do attitude	problem solving	multi-tasking
6	self-motivated	team worker	quick learner	team worker	strategic thinker
7	attention to details	can-do attitude	attention to details	attention to details	attention to details
8	organization	quick learner	Creative	organization	leadership
9	mentor	commercial awareness	strong work ethic	handle pressure	organization
10	customer focus	self-motivated	handle pressure	leadership	quick learner

By comparing columns one and two, we can see that students' view of "attributes that help to be a better ICT worker" and achieve a better result in their future workplace (column two), mostly match the attributes required in ICT job market (column one). However, some mismatch also exists. For example, problem solving is seen by students as the most important attribute to be a successful ICT worker, whereas it is not included in the top 10 attributes as evaluated by the industry. It is surprising that attributes of being a quick learner and being commercially aware are not seen as being crucial by the job market while students rate them as being amongst the top 10. This may indicate that students are aware that ongoing learning and the ability to provide ICT solutions for businesses are critical to their future success.

At this point in time, it is difficult to say why this "match and mismatch" exists, as these results are from studying one focus group only. Some of the reasons may include communication of key job market issues to students by teaching staff; students' awareness of key attributes through self-learning (such as general reading, industry reports and job advertisements); students confusing requirements for academic studies with what is needed in reality within the job market.

By comparing columns one and three we could possibly say this focus group may not be seen as a group that is 'work ready'. Five of the top 10 attributes that students claim they possess (problem solving, quick learner, creative, strong ethic and handle pressure) are not seen as being amongst the top 10 attributes by the job market.

By comparing columns one and five, we can see that the attributes that students

think they have improved on (or developed) during the course of their studies are still not consistent with the attributes needed by employers. More specifically, five of the improved attributes (problem solving, handling pressure, multi-tasking, strategic thinker and quick learner) are not seen as being the top 10 attributes by the job market. One might argue that the case study indicates that academic studies have not helped in improving (or developing) students' attributes that meet the industry needs. However, this is the outcome of one case study only and cannot be generalized.

Finally, this study highlights some of the issues that may be worthwhile studying (investigating) further. These could include:

- To what extent the tertiary sector is aware of ICT sector needs (skills and attributes).
- Are tertiary institutions providing appropriate training to their students?
- Should tertiary institutions provide not only skill training but also methods of improving job market related attributes?

On a different note, it is fairly easy to understand why handling pressure and multi-tasking have been improved on. It could be a result of students

doing three or four papers at the same time. It is also interesting to see that strategic thinker is identified as an improved attribute. This could indicate that the focus group of students involved may have recently completed a course in ICT management.

By comparing columns two (students' view of required attributes for success as an ICT worker) and four (students' view of attributes that help success in studies) we can observe little inconsistency. More specifically handling pressure and leadership are seen as attributes needed for studies while people relations and commercial awareness are seen as attributes that are needed to be a successful ICT worker. This may indicate that students see that attributes needed for studies are not necessarily different from attributes needed for the workplace. However, it is interesting to note that students see leadership as an attribute that can lead to success in their studies. Students note handling pressure as being critical to success in studies. Once again, this could be due to students having to study three or four papers and complete the required assessments at the same time (that may be seen as having to handle pressure).

Looking at the results that are outlined in all five columns, we can see that communication, being a team worker and attention to details appeared in all columns (selected as top 10 attributes). Communication was rated as top attribute in four of five columns (not in column two).

Furthermore, attention to details is ranked seventh (from top) in four of five columns - once again, column two being an exception. On the other hand, being a mentor and customer focus are only seen as relevant by ICT employers - as students make no mention of them. This may indicate lack of job market maturity in the focus group that was studied.

Overall, in this case study, despite some mismatches, the students' view of winning attributes that lead to success in the industry are mostly in agreement with what ICT job market views as being key attributes.

Finally, we tried to validate students' view of attributes they either developed or improved on. We assessed five Bachelor of ICT and

Graduate diploma in ICT courses (three level 7 and two level 6 courses). These courses were rated against any of the eighteen attributes we find in Table 1 - namely: communication skills, people relations, team worker, leadership, can-do attitude, self-motivated, attention to details, organization, mentor, customer focus, commercial awareness, quick learner, problem solving, creative, strong work ethic, handle pressure, multi-tasking and strategic thinker. The rating was done by one graduate and one teaching staff who had considerable experience in planning, designing and delivery of the papers mentioned earlier.

The rating for each attribute (as related to a specific course) ranged from zero to five, as shown in Table 2.

**Table 2. Ratings for assessing impact of courses on attributes**

<b>Rating</b>	<b>Description</b>
<b>0</b>	No added value – the course did not contribute towards developing or strengthening this particular attribute.
<b>1</b>	Limited value added.
<b>2</b>	Some (moderate) impact on the considered attribute. That is to say, the course has some impact on developing or strengthening the attribute that is being assessed.
<b>3</b>	The course is seen to have noticeable impact on the particular attribute that is being evaluated.
<b>4</b>	The course strongly impacts the particular attribute that is being looked at.
<b>5</b>	The course has direct and significant influence on the given attribute.

The outcome of the evaluation of those courses considered for this experiment can be summarised as follows:

- The highest possible score that could be given to a course was 90 (18 attributes times highest possible score of 5). Overall, the three level 7 papers scored higher than the two level 6 papers. Cooperative industry projects was rated as 80%, that is to say, overall this course is seen to be strongly relevant to developing the key attributes that are perceived as desirable within the ICT sector.
- The actual scores given to papers (courses) by the two assessors were at times different. However, there was agreement in trends. That is to say, both assessors were in agreement that certain courses helped develop or improve some specific attributes.
- The outcome of this experiment seemed consistent with the outcome of the study reported in the last column of table 1. In other words, most attributes that were seen (by students) as having been developed or improved during studies, were those also chosen by the two assessors as those likely to have been impacted by completing the courses that were evaluated.

This was a simple experiment in order to test the methodology and its feasibility/validity for validating students' perception of developing or strengthening attributes during the course of studies. The framework for this test has been fine-tuned. We will be investigating a larger number of courses (assessed by a larger group of students, graduates and other experts) in order to increase statistical certainty of the outcome of this experiment. A summary of the average scores given to the five papers that we investigated can be seen in Table 3.

**Table 3. Ratings of courses**

	Attributes	Paper 1 Management of ICTs	Paper 2 Contemporary Issues in ICTs	Paper 3 Cooperative Practical Industry Project	Paper 4 Information Systems – Alternative Development Strategies	Paper 5 Information Systems – QA and Change Management
1	communication skills	4.5	3	5	1	1
2	people relations	2.5	1	5	0	0
3	team worker	4.5	1	3	1	1
4	leadership	2.5	1	3	0	0
5	can-do attitude	2.5	2	4	2	2
6	self-motivated	2.5	3	4	1	1
7	attention to details	1.5	2	4	2	2
8	organization	4.5	3	5	3	3
9	mentor	0.5	0	1	0	0
10	customer focus	1.5	1	4	1	1
11	commercial awareness	1.5	0	4	2	2
12	quick learner	0.5	2	4	1	1
13	Problem solving	1	2	5	1	1
14	Creative	1	1	3	1	1
15	strong work ethic	4	4	5	1	1
16	handle pressure	4	3	5	2	2
17	multi-tasking	1.5	1	4	0	0
18	strategic thinker	4.5	1	5	0	0
<b>Total Score</b> (out of 90)		<b>45</b>	<b>31</b>	<b>73</b>	<b>19</b>	<b>19</b>
<b>Rating (percent)</b>		<b>50%</b>	<b>34%</b>	<b>81%</b>	<b>21%</b>	<b>21%</b>

## Summary and Conclusions

The ever-increasing need within organizations for skilled ICT workers has recently caused ongoing debate as to whether technical skills are enough for employees to be effective workers. Furthermore, personal attributes have been capturing increasing attention by employers in the ICT job market. Today, a competitive ICT worker needs to not only possess technical skills but also demonstrate certain attributes in order to be successful within the workplace.

The results of the first study (analysis of skills and attribute needs within the ICT sector) are not yet final; only 205 ICT roles have been analysed to date. However, the top 10 winning attributes as identified and a comparison with the outcome of the study of our focus group can explain (to some extent) why employers are reluctant to employ some potential ICT workers (who may seem to lack certain attributes), despite a clear shortage in the marketplace. By comparing the five columns in table 1, we discussed the match and mismatch between the industry view for attributes and students' perception.

Students' selection of top 10 attributes that "help to be a better ICT worker" demonstrates how much students (in this focus group) understand the job market needs. Students' perception of attributes they already possessed can potentially demonstrate whether they are currently "work-ready". The top 10 attributes that students think they have developed (or improved on) during the course of studies implied little change in bringing them closer to be work-ready. The results of the comparison of attributes rated by students as "helping success in studies" and "helping success as an ICT worker", show that students see little difference between attributes that lead to success in studies and those that result in success at workplace.

As this case study is focused on one small focus group only (in one tertiary institution) the results cannot be generalized. Furthermore, due to the fact that students in this focus group were in the last year of their studies at the time when the survey was conducted, the results may be slightly biased, as it may reflect the attributes that are associated with their particular course of study at that time (such

as handle pressure, multi-tasking, and strategic thinking). However, the outcome of this study may help identify potential future studies in order to further clarify some of the issues that have been discussed earlier, such as:

- Validating the trends in this case study by increasing the number of focus groups (from different educational institutions) that have been studied.
- Investigating the reasons for inconsistencies between students' view and industry's view. This could enable us to recommend changes in the ways in which we help students to have a realistic view of the job market needs.
- How much confidence students develop (for entering the job market) after completing the course of studies
- To what extent perceived winning attributes (by both students and industry) actually help students to be successful in the job market after completing studies.
- To what extent the perceived winning attributes for education help students to be successful in completing studies.

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