How Do IT Students Stay Up To Date With Changes in IT?

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ABSTRACT

The information technology industry is subject to rapid change. There have been concerns expressed in the literature about the ability of information technology professionals to keep up to date with developments and it is likely that it is even more difficult for students to do so. New graduates require marketable skills in order to gain good employment, but the skills most in demand change regularly. This paper reports on a project that investigated the channels of information that undergraduate and postgraduate telecommunications management and electronic commerce students use to keep up to date with employers' needs. The role of instructors in this process is also discussed.

INTRODUCTION

Information technology (IT) has been changing rapidly over a long period and this rate of change is likely to continue or increase (Benamati & Lederer, 2001; Fordham, 2001). This rapid rate of change has produced many opportunities for organisations, but has also brought with it many challenges (Lederer & Mendelow, 1990). Amongst these challenges is the struggle for organisations to obtain personnel with the appropriate knowledge and skills in order to meet the growing demands for IT services (Doke, 1999). This is mirrored by the continual requirement for IT professionals to keep up to date with the skills required by organizations (Benamati & Lederer, 2001; Klobas & McGill, 1993).

Previous research reported in the literature has investigated the importance employers place on various skills and perceived deficiencies in these skills (e.g. Doke, 1999; Leitheiser, 1992; Nelson, 1991). Whilst the call for improved communication and social skills has been consistent, the technical skills in demand have varied dramatically over time. Less has been written about students' perception of the importance of various IT skills, though this was addressed in a recent study that compared Australian and American students' perceptions of IT job skills (von Hellens, Van Slyke, & Kittner, 2000).

Given that the skills required by IT professionals change over time, IT professionals need effective methods to keep up to date. The methods used by IT professionals to keep up to date were studied by Klobas and McGill (1993). They identified the existence of a variety of information gathering strategies and noted that while IT professionals tended to be diligent in their efforts to keep up to date, a majority found it difficult to do so. In a more recent study, Benamati and Lederer (2001) investigated the coping mechanisms adopted by IT professionals and noted that many mechanisms were not successful.

If it is difficult for experienced IT professionals to keep up to date, it is likely that it is even more difficult for IT students to do so. New graduates require marketable skills in order to gain good employment, but the skills most in demand change regularly. Little has been written about how IT students keep informed of employers' requirements or about how they ensure that they can meet these requirements. Yet this knowledge would be of use to both educational institutions aiming to facilitate this process and to potential employers hoping to recruit students with the required skills. This paper describes a project that investigated the channels of information that undergraduate and postgraduate telecommunications management and electronic commerce students use to keep up to date with employers' needs. The role of instructors in this process was of particular interest.

THE RESEARCH PROJECT

This research was conducted by survey. Participants in the study were students enrolled in several electronic commerce and telecommunications management courses. Students who have successfully completed these courses can also pursue Cisco certification as the courses make use of the Cisco curriculum. Participants were recruited during class and completed a questionnaire on the spot. It was stressed that the completion of the questionnaire was voluntary and that it formed no part of their assessment in the course.

The questionnaire was designed to be easy to read and understand and to require no more than five minutes to complete. The questionnaire contained three types of items. The first type asked about:
- Age
- Gender
- Amount of previous work experience (both total and IT experience).

The second type of question related to the degree they were undertaking and their perceptions of:
- Whether the skills provided by their degree are those employers require
- The importance of industry certification for their future employment.

The third type of question related to the information that students might use to keep up to date with what skills employers require. Information about IT is available from a variety of sources in a variety of formats and the term 'information channel' can be used to describe the various combinations of sources and formats of information. The questions listed information channels that may be used to keep up to date and asked participants firstly whether they had used each channel within the last three month and also to rate the importance of each channel to them as a means of knowing what skills are in demand. Importance was measured on a 5 point Likert-type scale ranging from (1) 'Not important' to (5) 'Vital'. The initial list of channels of information was drawn from Klobas and McGill's (1993) report of the methods used by IT professionals to keep up to date with developments in IT. Several additional channels were included after consultation with industry contacts. The final list of information channels contained the following:
- Newspaper employment pages
- Newspaper information technology sections
- University instructors
- Other students
- Work colleagues
- Magazines (e.g Packet Magazine)
- Internet sources (e.g. Cisco, Lucent)
- Books
- Vendor presentations

The participants in the study were 85 students (57 male, 28 female), with an average age of 26.1. Participants were at either undergraduate (41 students or 48%) or postgraduate level (44 students or 52%). The participants had on average 4.0 years work experience of which 1.7 years was in the IT industry. Table 1 summarises some of the background information about the participants in this study.

Table 1: Background information about participants

		N	%
Gender			
	Female	57	67%
	Male	28	33%
Degree level			
	Undergraduate	41	48
	Postgraduate	44	52
Work experience* (mean = 4.0 years)			
	No	24	28%
	Yes	61	72%
IT work experience (mean = 1.7 years)			
	No	52	61%
	Yes	33	39%

* Work experience includes both IT and non-IT experience

RESULTS AND DISCUSSION

Overall, the students appeared to be diligent in their efforts to keep up to date with employers' skill requirements. The average number of channels used by the students during the previous three months was 3.8 (and the most common number used was 5). Thirteen students had not made any attempt to keep up to date during this period and four had made use of all nine listed channels. The information channels are ranked by frequency of use in Table 2. The most frequently consulted channels were newspaper employment and IT sections and Internet sources. University instructors had been consulted by about half of the participants during the previous three months. Other students had also been used as a source of information by quite a few students (40%). This high level of use of other students to provide information about employers' skill requirements is understandable given the easy accessibility of other students (Klobas & McGill, 1993). Work colleagues were ranked 7th overall, but as only around a third of the participants had IT work experience this means that most of those with prior experience had consulted their colleagues (75% of those with prior IT work experience had consulted their colleagues). The least used channels were books and vendor presentations. It is likely that students were conscious that information about employer skill requirements derived from books was not going to be sufficiently up to date to meet their needs.

Table 3 shows the importance rankings of the individual information channels. The most highly ranked information channel was Internet sources such as the Cisco and Lucent sites. As well as being frequently used, newspaper IT sections and employment pages were also considered very important (ranked two and three). University instructors were ranked 4th in importance which was consistent with their frequency of consultation by students. Although other students were con-

Table 2: Information channels ranked by frequency of use

Rank	Information channel	Number	Percentage
1	Newspaper employment pages	56	65.9
2	Newspaper IT sections	52	61.2
3	Internet sources (e.g. Cisco, Lucent)	47	55.3
4	University instructors	43	50.6
5	Other students	34	40.0
6	IT magazines (e.g Packet Magazine)	29	34.1
7	Work colleagues	24	28.2
8	Books	20	23.5
9	Vendor presentations	17	20.0

sulted by many students they were not considered as an important channel of information (ranked 7th). This suggests that students recognise that although other students are an easily accessible source of information, they are not necessarily an accurate or reliable source. In future research, it would be interesting to determine how well student perceptions match those of employers. Both books and vendor presentations were considered of low importance.

In addition to the items about methods used to keep up to date, participants were also asked several questions that addressed whether they believed they were in fact obtaining the skills employers required. A majority of participants believed that their degree would provide the skills employers require (67.1% 'yes', 5.9% 'no' and 27.1 % 'not sure'). This high level of confidence suggests that although only around 50% of students had consulted their instructors about employer skill requirements during the previous three months (and instructors were only given a medium ranking of importance), students do implicitly accept that instructors know what skills students require. Industry certification was also seen as a very important means to ensure that students obtain the necessary skills (mean importance score was 4.18/5 for those students not yet working in the IT industry).

Table 3: Information channels ranked by importance

Rank	Information channel	Mean	Standard deviation
1	Internet sources (e.g. Cisco, Lucent)	3.55	1.40
2	Newspaper IT sections	3.38	1.44
3	Newspaper employment pages	3.30	1.30
4	University instructors	2.88	1.42
5	IT magazines	2.62	1.43
6	Work colleagues	2.54	1.43
7	Other students	2.41	1.13
8	Books	2.24	1.34
9	Vendor presentations	2.13	1.32

Demographic Differences in Use and Importance

Patterns of use and perceptions of importance were further examined to determine whether gender, level of study or previous IT work experience had an influence. Differences in use were explored using c^2 tests and differences in importance were explored using independent sample t-tests. These factors had surprisingly little influence on patterns of use and perceived importance of information channels.

The first demographic factor considered was gender. No significant difference was found between the number of information channels used by male and female students. The only significant gender difference was for the levels of use and perceived importance of Internet sources. Male students used Internet sources more frequently ($c^2(1) = 6.98$, $p < 0.008$) and perceived them to be more important for keeping up to date with the skill requirements of employers (3.85 versus 2.93, $t(80) = -2.96$, $p = 0.004$).

The possible impact of previous IT work experience was considered next. No significant difference was found between the number of information channels used by those with and without previous IT work experience. The only significant difference in usage of information channels was related to consultation with work colleagues and with other students. Those with previous work experience not surprisingly consulted with work colleagues more frequently ($c^2(1) = 17.97$, $p < 0.001$) and appeared to consider them a more important channel of information (2.73 versus 2.04, $t(80) = -1.98$, $p = 0.051$). Presumably those with previous IT experience would have received better quality information from their work colleagues, than would those without IT work experience who would have been receiving information from a pool of people with perhaps limited direct IT experience.

Those without IT work experience consulted other students more frequently ($c^2(1) = 5.94$, $p = 0.015$), but there was no difference in perceptions of the importance of other students between those with and those without previous IT work experience (2.39 versus 2.48, t (80) = 0.32, p = 0.753). As previously mentioned, this suggests that other students are consulted because of their accessibility rather than their credibility as a source of information. Those with previous IT experience have other accessible sources of more credible information and hence do not rely so heavily upon other students.

The differences between undergraduate and postgraduate students were similar to those between those with previous IT work experience and those without. This is consistent with postgraduate students being more likely to have previous IT work experience than are undergraduates (54.5% of postgraduates versus 22% of undergraduates have previous IT work experience). Undergraduate students consulted other students more frequently ($c^2(1) = 6.69$, $p = 0.010$) but did not value their information more highly (2.63 versus 2.23, t (80) = 1.63, p = 0.107). Postgraduate students also consulted work colleagues more frequently ($c^2(1) = 4.59$, $p = 0.032$). However they did not value their input more highly (2.68 versus 2.37, t (80) = -0.987, p = 0.327). This finding differs from the added importance given to work colleagues by those with previous IT experience, but the means are in the same direction and the result may reflect the fact that 45.5% of postgraduates do not have previous IT work experience.

CONCLUSION

New graduates require marketable skills in order to gain good employment, but as the IT industry is subject to rapid change the skills most in demand change regularly. The project reported on in this paper investigated the means that a sample of IT students use to keep up to date with employers' skill needs.

Overall the participants appeared to be diligent in their efforts to keep up to date with employers' skill requirements. The average number of channels used by the students during the previous three months was 3.8 and the most common number used was 5. The most commonly used channels were newspaper employment and IT sections, and Internet sources. The same three channels were rated most highly in terms of importance however the ordering was different with Internet sources being seen as most important.

Instructors were ranked relatively highly (4th of 9 channels) in terms of both frequency of consultation and importance. In addition, the feedback from participants about the match between the skills provided by their degrees and employers' needs suggests an implicit confidence that the knowledge of instructors is up to date. Whilst students have a wide variety of information channels available to them and do indeed make use of them, instructors have a major role to play in providing up to date information about employers' needs. They need to be highly accessible and to ensure that their knowledge of employers' skill requirements remains current. Instructors should use studies of employers' requirements to assess their course offerings and help guide their students. They can also use the results of studies such as this one to better understand students information seeking behavior.

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