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# Changing Information Systems Skill Requirements: Comparing Australia and Thailand

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# Changing Information Systems Skill Requirements: Comparing Australia and Thailand

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**Abstract**

*Due to the dynamic nature of information technology (IT) and its possible impacts on the nation's economical well being, decision makers face considerable challenges in formulating National IT policies, IT human resource planning, and information systems (IS) education. This paper examines the changing IS skills requirements from the perspectives of IT industry professionals and IT academia in two countries-Australia and Thailand. Preliminary results support the proposition that the desired IT skill set is changing, and new IS skills in both the technical areas and the human-oriented areas are likely to emerge in the next few years. Also there are measurable differences in the perceptions of the IS people between the two countries.*

**Keywords**

Information systems skills, human resource planning, education and training, national IT policy, developing country

## INTRODUCTION

The nature and variety of skills required of information systems (IS) professionals continue to pose a special challenge to those involved in national IT policy formulation, human resource planning, industry and technology development, and IS education and training. Many existing IS skills are becoming obsolete while new skills are emerging. The desired skill set demanded by the industry is constantly changing and the future trends are unpredictable, because the skills are dependent, to a large extent, on the dynamic technological landscape and the constantly evolving business environment.

A number of research studies have been devoted to consider the issues associated with the skill requirements of information systems professionals. Some have considered this problem from the point of view of curriculum development and IS education and training (Ang & Lo 1991; Ang & Winley 1993; Ang, Winley & Lau 1994; Shah & Martin 1997; Maier & Gambill 1997; Snoke & Underwood 1999, 2000). Others have approached this from a more practical point of view with respect to actual IS job requirements (Athey & Wickham 1996; Richards, Yellen, Kappelman & Guynes 1998; Athey & Plotnicki 1998). At a broader level, several studies dealt with national IT policies and human resource planning (NITC 1996; NOIE 1998; AIIA 1999, 2001, ITAA 2000).

The challenges faces developing nations are even greater. They have to address not only the dynamic nature of the IS skill set, but also the lack of a national Information and Communications Technology (ICT) infrastructure in their own countries. ICT infrastructure is not something that can be achieved overnight. It requires careful and long-term planning in policy formulation, capital investment, human resource planning and technology consolidation. To achieve this will require the cooperation of a number of agencies in the community (AIIA 2001):

- A forward looking government with integrated national policy including tax/funding incentives
- A vibrant industry to realize the economic potential of information and communication technology
- An responsive education and training sector to prepare the required human resource

The three sections cited in a report by the Thailand's National Information Technology Committee (NITC 1996), viz. a National Information Infrastructure (NII), a well-educated populace and adequate IT manpower, and good governance with a dare to dream and a resolve to act, reflects this recognition.

The present research aims to contribute to this discussion by contrasting the different IS skill requirements in a developed and a developing country. It parallels an earlier study by Lau, Ang & Winley (1997). In this paper, the two countries chosen are Australia and Thailand. The views of the IT professionals and IT academics in these two countries were polled by a questionnaire which measures their perception on the relative importance of a set of IS skills. Subjects were asked to rate the IS skill set with respect to their views on the current needs and on the future needs. This paper presents the preliminary findings as part of a larger and continuing research on the

changing IS skill requirements. The remainder of this paper will be devoted to a discussion on the research method adopted in this part of the study, the key findings thus far, and some preliminary recommendations based on these findings.

## RESEARCH QUESTIONS

Recognising the context of the large research study, we focus on three specific research questions in this paper:

- Will the relative importance of different IS skills changes in the next few years?
- What are the new IS skills that are likely to emerge in the future?
- Is there any difference between a developed nation (Australia in this case) and a developing nation (Thailand in this case) with respect to IS skill requirements?

## RESEARCH METHOD

Following along the research approach used by Ang et al. (1991, 1993 & 1994), a survey was conducted among IT professionals and IT academics in Australia and in Thailand on what they perceive as important skills for IS professionals in the workplace. The survey instrument (see below for details) was first administered to pilot group of 11 subjects in late 1999 with the aim to improve the quality of the questionnaire. After the questionnaire was revised it was sent to the intended subjects in the two countries. Data were collected over a period of time in 2000.

The raw data were analysed using a range of statistical techniques including descriptive statistics, reliability analysis, factor analysis and analysis of variance. We shall report only on those results that are directly related to the three research questions cited above. For a more complete treatment of these results see Mee-Ngern (2000).

### Survey Instrument

The survey questionnaire developed by Ang & Lo (1991) was modified and made more up-to-date so that it will fit into the context of the present study. The final questionnaire consists of 3 parts. It's structure is shown in Figure 1.

| | |
|---|---|
| Part 1 Demographics | age, gender, position, nature of employing organisation etc |
| Part 2 IS skills<br>(Present needs & Future needs)<br>19 items | 4 groups of skills:<br>• Programming (COBOL, C, C++, VB, Java)<br>• Systems development (Project management, OOD, CASE)<br>• Interpersonal (verbal, written, team/group)<br>• Database (Oracle, SQL, Access)<br>• Networks & telecommunications (client/server, telecommunication, LAN, WAN, Web) |
| Part 3 New skills | Open ended. |

Figure 1: Structure of the Questionnaire

Part 2 is the main part of the questionnaire, where subjects were asked to indicate on a 5-point Lickert scale the extent to which they agree or disagree with the statement that the nominated skills are needed at present and again the nominated skills are needed in 5 years time. Part 3 is an open-ended question that allows the respondent to indicate what new IS skills (not listed in Part 2) are likely to emerge in the near future.

### Sample

The subjects were from either Australia or Thailand. They were either IT professionals from the industry or IT academics from universities or training institutes. With this 2x2 classification, there are 4 groups all together. 400 survey questionnaires were mailed out, with 100 to each of the 4 groups. The response rate is shown in Figure 2.

| | Academic | Professionals | TOTAL |
|---|---|---|---|
| Australia | 44 | 10 | 54 |
| Thailand | 91 | 75 | 166 |
| TOTAL | 135 | 85 | 220 |

Figure 2: Number of responses received

## THE RESULTS

Due to space limitations, we shall skip over the results on descriptive statistics, reliability & factor analysis, and move directly to the 3 research questions.

For Research Question 1, Figure 3 shows the present-to-future movement of rankings of different IS skills for Australian IT academics and Thai IT academics. The Australian IT professional group was too small and is not reported here. The Thai IT professional group provided a response profile very similar to that of the Thai academics. Again for space limitation, it is not reported here. In Figure 3, a number of items show a present-to-future movement, but only those items that jump 4 or more ranks are highlighted with a line. This was done because it is probably better to be conservative in assessing movements in ranks since a number of the items have tied ranks. We note that both groups agreed that WAN & Telecommunications skills will move up in importance in futures while Visual BASIC becomes less important. The Australian academics also saw significant increased need for Web server administration and Team/group skills, while C++ programming will decrease in importance relatively speaking. Thai academics saw a smaller increase in Web administration but only by essentially 1 rank, and a decreased importance in LAN skills, falling behind WAN. This later view should not be taken as degrading the importance of LAN skills compared to WAN but that the critical shortages between the two may reverse in future. It is interesting to note that the Thai group ranked JAVA skills as number one, but both groups regarded COBOL programming as the least important skill in this set. The perceived low ranking of COBOL were shared by IT professionals in both countries.

| **Australian IT Academics views** (n=44) | | | | **Thai IT Academics views** (n=91) | | | |
|---|---|---|---|---|---|---|---|
| **Now** | | | **Future** | **Now** | | | **Future** |
| Verbal communication | 1 | 1 | Written communication | JAVA programming | 1 | 1 | JAVA programming |
| Written communication | 2 | 2 | Verbal communication | Team/Group skills | 2 | 2 | Team/Group skills |
| Project management | 3 | 3 | Project management | Object-oriented prog | 2 | 3 | Object-oriented Prog |
| JAVA programming | 4 | 4 | Java programming | Verbal communication | 3 | 4 | Web server admin |
| C++ programming | 5 | 5 | Team/group skills | Written communication | 4 | 5 | Verbal communicat'n |
| Visual BASIC | 6 | 6 | Web server admin | Web server admin | 5 | 5 | Written communica'n |
| SQL | 6 | 7 | SQL | SQL | 6 | 6 | Telecommunication |
| Object-oriented prog | 7 | 7 | Object-orient prog | Project management | 7 | 7 | Project management |
| Client-server | 8 | 8 | LAN | Visual BASIC | 8 | 8 | SQL |
| Team/group skills | 9 | 8 | WAN | Client-server | 9 | 8 | Client-server |
| LAN | 10 | 9 | Client-server | LAN | 10 | 9 | Oracle |
| Oracle | 11 | 9 | Telecommunications | Telecommunications | 11 | 10 | WAN |
| Web server admin | 12 | 10 | Oracle | Oracle | 12 | 11 | CASE |
| WAN | 13 | 11 | C++ programming | C++ programming | 13 | 12 | Visual BASIC |
| Telecommunication | 13 | 12 | Visual BASIC | CASE | 14 | 13 | LAN |
| C programming | 14 | 13 | CASE | WAN | 15 | 14 | C++ programming |
| Access | 15 | 14 | Access | Access | 16 | 15 | Access |
| CASE | 16 | 15 | C programming | C programming | 17 | 16 | C programming |
| COBOL programming | 17 | 16 | COBOL programming | COBOL programming | 18 | 17 | COBOL programmng |

Figure 3: Present-to-future Movement of Ranks for IT Academics in Australia & Thailand

For Research Question 2, data collected indicated the emergence of several new skills. The actual name of the skills used by each respondent may differ, but they can be grouped into broad categories to reveal the following trends. Australian IT academics identified that "new Internet skills" and "new interpersonal skills" are most likely to emerge in the future. The Australian IT professional group identified "new network/telecommunication" and "new interpersonal skills", but the number is too small to be generalisable. On the other hand both the IT professionals and IT academics in Thailand agreed that "new Internet skills" and "new network/telecommunication skills" will emerge. It is interesting to note that Australian IT people appear to place a stronger emphasis on the human-oriented skills while the Thai IT people seem to focus more on the technical skills.

For Research Question 3, t-tests or ANOVA were performed on those items to which the test is applicable. It was observed that IT professionals in the two countries essentially agreed with their mean importance ratings, except in the cases of CASE, SQL and maybe Oracle skills, where the Thai group had higher ratings. For IT academics the two countries differ a bit more. Apart from the Oracle skills, most of the significant differences were observed on items associated with the interpersonal skill group. This means that Australian IT people perceived different level of relative importance for interpersonal skills as compared to the Thai group. This reinforces the observation we made in the last part of the previous paragraph under Question 2.

## DISCUSSION

It would be premature to draw conclusive general statements from these preliminary findings. However, the results thus far do lend support to our original proposition that the desired IS skills set is changing. The overall trends of the perceived changes in the required IS skills by the two national groups were found to be rather similar. However, there were some differences. A noticeable difference relates to the stronger emphasis placed by Australian IT people on Interpersonal skills as compared to Thai IT people which place stronger emphasis on technical skills. Educational institutions and human resource planners will be well advised to take this into consideration in their planning.

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