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Do General MBA Programmes Provide an Adequate Education in IT? Results from a Survey of IT Academics' Perceptions in Australia

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Executive Summary

This paper reports on a survey of the extent to which information technology (IT) is taught in general MBA programmes in Australia. The results establish a baseline for future studies. The study finds widespread penetration of IT units into general MBAs but the amount and type of content is only sufficient to give students a partial preparation for the general management task with respect to IT. The results indicate to employers what they can expect of MBA graduates in terms of IT knowledge and competence.

The survey finds considerable agreement among IT academics that the following seven topics should be core in general MBA programmes: overview; information systems management and control; organisational structure and management concepts; IT planning (strategy); organisation and management of the IT function; future developments; and management of change. The survey also finds significant variation in the coverage of these topics across programmes, revealing an expectation gap between what should be taught and what is taught.

We find that there is a need for two core units on IT management to ensure that the agreed core material is adequately covered. At present, no general MBA programme provides this. Most assume students will take only one IT unit and consequently aim for breadth of coverage at the expense of depth. The survey reveals no evidence that the expectation gap will decline over the next five years. Intending students should shop around for programmes with appropriate IT provision. Institutions need to make some hard but important choices to make room for increased provision in order to better serve graduates and their business employers.

There are several important conclusions for executives. First, employers cannot expect MBA graduates to be well-prepared for the business task of managing IT. During recruitment of MBA graduates, they should explicitly check the graduates' IT management preparation. Second, for the foreseeable future, employers should include in their strategic human resource development plans the development of individuals' IT management competencies. Third, employers need to deliver a clear message to MBA awarding institutions that they need to provide more substantial curriculum coverage of this important area.

Introduction

Management education is widely recognised as an important input to national economic well-being (Karpin 1995). To continue to meet national needs it is necessary that educational programmes prepare managers for the challenges of today's and tomorrow's workplace. Managing information technology (IT) is a relatively new challenge for most general managers. In the 1960s and 1970s firms were often

content to leave IT management to the IT manager, or Chief Information Officer. The result has been widespread dissatisfaction among business managers at the lack of business payoffs (Strassmann 1985). Today, managers with general business accountability opt for a more active role in managing IT because of the opportunities it presents, its high cost, and the level of risk involved. For management students, it is increasingly important to master the challenge of IT.

The provision MBA programmes make for IT management is competitively important for business schools. The scope and intensity of competition has increased over recent years as new schools have entered the market, and is further increasing with globalisation. For provider institutions, how their management programme treats IT may be seen by potential students as an indicator of its current relevance, and hence it can be an important element in the competition for fee-paying students.

Despite such strong motivation there is relatively little information available as to whether IT management education is adequate. This paper makes three contributions. (1) As the first study of its kind in Australia, it establishes a baseline against which future studies can measure change. (2) It identifies deficiencies in current provision. (3) It develops recommendations for what needs to be done to rectify the deficiencies and to prevent future deterioration. In making these contributions, the paper provides MBA directors and IT academics with data and arguments to help them improve existing provision and thereby improve our ability to gain the business benefits IT has to offer.

We start by formulating the research question. We describe the study and the data collection method. We then use the data to show how Australian MBA programmes have responded to the need to include some form of IT unit. We compare responses regarding what academics consider important (both now and for the future) with what they currently teach. We find a gap between what academics see as needed and what their institutions provide. We discuss the implications of this gap and make recommendations for plugging it.

Research Question

The MBA qualification is considered by many to be the pinnacle of management education. There are both general and specialist MBA programmes. The specialist programmes lead to a qualification that emphasises some functional specialism. The general programmes provide graduates with a rounded education in all the principal elements of business without specialisation. They are directed to preparing graduates for senior management positions in which they might expect at some stage in their career to have major business responsibility for IT. It is therefore the most appropriate management qualification to investigate in respect of its treatment of IT for other programmes cannot be expected to take IT seriously if MBAs do not.

Prior research on IT in the MBA has largely been conducted in the US. It investigates the educational opportunities IT affords (Leidner & Jarvenpaa 1995, Alavi et al 1995, Ives & Jarvenpaa 1996), and curriculum design issues (Silver et al 1995, Slater et al 1995). Trauth and her colleagues (Trauth et al 1993, Lee et al 1995) investigated the adequacy of current provision. They carried out a joint academic/industry study of the knowledge and skill requirements for IT professionals. They highlighted an expectation gap between the two parties. Ramakrishna and colleagues (1995) report similar gaps between the IT-based knowledge and skills senior business managers want in MBA graduates and what business schools are providing.

There is also concern within institutions, particularly among IT academics, that, despite IT's apparent importance to business, it is not accorded a proportionate position in the curriculum (Targett 1991). Stohr (1995) notes that some US business schools are actually moving IT out of the core despite the need for managers who understand the technology. This suggests an expectation gap between the education academics think should be provided and what MBA programmes provide.

Given the increasing importance of IT to business, and the indications that there are deficiencies, or expectation gaps, elsewhere in the world, it is important to determine whether a similar problem obtains in Australia. The research question we ask is: Do general MBAs provide an adequate education in IT for students preparing for senior roles in general management?

Research Method

This study has been undertaken as part of an international collaborative project coordinated by the Information Systems Research Group (ISRG) at Warwick Business School. The principal objective of both the international and individual national studies is to investigate the match of IT content with the

demands the increased importance of IT places on the general manager (Baker et al 1995). The research is essentially exploratory, with the aim of establishing some baseline data. This paper reports some findings from the Australian part of the study. A complete summary of our results can be found in Sauer et al (1996). International comparative results will be published separately.

Data Collection Method

We conducted the research using a survey instrument designed by the ISRG. Minor changes were made to the instrument to reflect Australian terminology and academic calendar. To identify all institutions in Australia delivering a full-time, general MBA programme we used the Good Universities Guide to Management Education (Ashenden et al 1994). Part-time and specialist programmes were excluded from further involvement. All qualifying institutions were contacted by telephone to verify that their programmes were full-time, general MBAs.

Administering the Questionnaire

IT coordinators (or subject leaders) were contacted by telephone and, following a brief explanation of the survey, invited to participate. Where there was no designated IT coordinator, MBA coordinators were asked to pass the questionnaires to the most appropriate person.

The survey was self-administered in two parts. Part A collected data about the characteristics of the IT course units available — each institution returned as many copies of Part A as there were IT units in their MBA programme. Part B collected data about the programme and the position of IT course material and units within that — each institution returned just one copy of Part B. All responses related to academic arrangements for 1994.

Copies of the questionnaires and supporting material were sent to the academics identified at each institution. Two institutions, whose MBA programmes did not offer any IT units either as core or electives, were sent Part B only and asked to complete those questions relevant to their situation.¹

Survey kits were mailed to 31 institutions, including the two receiving only Part B. Follow-up calls were made at regular intervals. A cut-off was declared 11 weeks after the first mailing.

Of the 29 institutions sent part A, 22 responded. All were usable (76% usable response). Of the 31 institutions surveyed, 23 returned Part B (71% usable response).^{2 3}

Approach to Analysis

Ideally, to tackle the question — Do general MBAs provide an adequate education in IT? — researchers would start with some agreed standard of adequate provision. There are some standard curriculum guidelines (eg Nunamaker et al 1992) but there is much diversity of opinion and practice regarding what is appropriate (Silver et al 1995). This study therefore investigated whether or not there was some level of agreement among Australian IT academics regarding what should be taught both with and without constraints of space and time in the curriculum. We compared current provision against both ideal and constrained choices to identify any expectation gap. The study thus provides an answer to the research question by addressing the following questions:

- 1) Is there an agreed academic core?
- 2) What is the level of current provision of IT units?
- 3) How do curriculum topics compare with academics' expectations?
- 4) What are academics' expectations for the future?

¹ Although their current IT content was nil, what they saw as the ideal IT content, and what changes they believed should or would take place, were germane to the study.

² In total 21 institutions returned both Parts A and B, two returned B only, one returned A only, and one of the 21 returned an unusable B. Consequently, although we use 22 institutions' returns, there is a small difference in the sample in respect of Parts A and B data.

³ For the institution in which several academics undertook to complete the survey, we received two separate responses to Part B (in addition to several valid Part A responses). As only one Part B response could be used for each institution and in the absence of inconsistencies in objective data, we used the return which had been more fully completed.

Results And Analysis

Is There an Agreed Academic Core?

Our first task was to determine whether there was consensus among academics as to the essential curriculum for IT. We looked at two survey questions. The first asked which of 22 topics were, under ideal circumstances (ie no curriculum constraints), core, elective, or to be excluded. The second asked for a constrained choice of just 5 core topics from the same list. We conclude that the list was substantially complete because under the twenty-third category (Other Topics) no single topic was named by more than two respondents.

Table 1: Academics preferences for topic treatment in MBAs (N=22)

(Some row totals sum to less than 22 because of incomplete or spoiled returns)

TOPIC	CONSTRAINED	UNCONSTRAINED			
	Core	Core	Elective	Exclude	Don't know
Overview	22	22	-	-	-
Information systems management and control	11	18	3	-	1
Organisational structure and management concepts	7	18	3	1	-
IS/IT Planning (strategy)	12	17	5	-	-
Organisation and management of the IS/IT function	10	17	4	-	-
Future developments	7	16	6	-	-
Management of change	12	15	6	-	-
Financing, QA, IS evaluation	5	14	6	1	1
Human resources	3	14	7	1	-
Storage and retrieval of data	3	14	8	-	-
Information requirement analysis	6	12	10	-	-
Social implications and responsibilities	-	11	9	2	-
Management of systems development	6	10	12	-	-
Developing and implementing IS	2	10	12	-	-
Hardware, software, comms technology	4	10	11	-	-
Internationalisation	1	9	11	1	-
Spreadsheet set-up, manipulation and analysis	1	4	8	6	-
Presentation graphics software	1	4	8	6	-
Statistical packages	-	3	8	7	-
Word processing	-	2	6	10	-
CASE tools	-	2	9	8	1
Programming languages	-	-	10	11	-

When asked to identify core topics under ideal circumstances, seven were named by two-thirds or more unit coordinators (bold topics in Table 1). Apart from Overview and Future Developments, all the topics were managerial, either relating to business management or functional IT management. These constitute relatively uncontroversial inclusions in the set of core topics. A further five received the support of between 50% and 64%. These include Information Requirements Analysis, Storage and Retrieval of Data, and the Management of Systems Development suggesting that there is reasonably strong school of thought that topics which are semi-technical are core. This interpretation is further supported by the fact that 10 respondents (45%) included Developing and Implementing Systems as core. However, the data also indicate that a slightly weaker but still strong school of thought sees these topics as elective. Their position in the curriculum is plainly more debatable.

Seven to ten topics cannot be covered in depth in a single MBA unit yet in our survey no programme contained more than one core IT unit. It was therefore thought to be more realistic to consider the responses for a constrained choice of only five topics. The top seven topics were the same as when the choice was unconstrained (Table 1).

Table 1 demonstrates that, apart from the Overview which was included by all the respondents, there was less agreement under constrained choice. No other topic was chosen by more than 12 (ie 55% of the respondents). The topics jointly ranked as sixth were included by only 7 respondents (ie 32%). The indications are that within an agreed outer bound of ideal core topics, there is a considerable diversity of opinion about what are the core topics under conditions of scarce curriculum space and time.

What is the Level of Current Provision?

In identifying the population, we found 31 general MBA programmes of which only 2 did not teach any IT units. This suggests that there is IT coverage in 93.5% of programmes. In terms of our sample, only 2 out of 24 responding institutions did not teach any IT units. Even on this more conservative calculation, we find 91.6% of programmes having IT units.

Table 2 summarises existing provision of core and elective units. No programme offered more than one core unit. Six of the thirteen programmes offering elective units offered more than one elective unit in IT.

Table 2: Number of MBA programmes offering core and elective units in IT (N=22)

Core/Elective	No of MBA Programmes
Both core and elective unit/s	6
Core unit only	9
Elective unit/s only	7
Total	22

These figures show that in 15 out of 22 programmes (68%), some IT study is compulsory, but in none is more than a single unit compulsory⁴. In addition, we found that in just nine programmes was it possible to study more than one IT unit.

We sought to identify the types of IT units offered. The survey response contained data on a total of 34 units. As this is a very small sample on which to conduct a statistical analysis we relied on expert judgement to develop a classification scheme. One of the authors examined the unit titles and contents and developed a classification scheme based on the data. The classification scheme and the labelling of units according to the scheme was then checked by a second author.

Our classification identified three distinct types plus a fourth catch-all category. They are summarised in Table 3. We also asked for each unit whether it was offered as core or elective. Table 4 summarises the current level of provision by type of IT unit.

⁴ One return included a second core unit, research methods, but this was discarded as not an IT unit.

Table 3: Classification of types of IT unit

IT Unit Type	Description
Computing Skills	Basic computing skills using commercial software packages and fundamentals of computing technology.
Introduction to Management Information Systems (MIS)	Systems fundamentals including applications, and development and planning of information systems. Usually some organisation structure and organisational change.
Managing IT	General management issues relating to IT, eg IT in business strategy, organisation structure, organisation change, implementing IT and the management of the IT function.
Special topics	Applications of IT in specific functional areas.

Table 4: Current level of provision by type of IT unit

IT Unit Type	Core	Elective	Total
Computing Skills	3	2	5
Introduction to MIS	10	7	17
Managing IT	1	4	5
Special Topics	1	6	7
Total	15	19	34

Table 4 demonstrates that only 50% of our sample had either a Managing IT or Introduction to MIS course as a core unit, even though these are the more appropriate types of unit for general management. By contrast, Table 1 shows that under unconstrained choice the top seven topics had the support of at least 66% of unit coordinators. We also found that all respondents identified at least five non-skills topics as core, a clear indication that most believe that there should be at least one core unit devoted either to Managing IT or Introduction to MIS. With unconstrained choice (Table 1), unit coordinators identify an average of 10.3 non-skills topics to be core with a standard deviation of 3.3. Our assessment is that 10.3 topics is close to 2 units worth of content. This is consistent with our finding that on average only 3.6 of the non-skills topics are Taught A Lot and 4.9 Taught Some per unit (Table 5 below). We conclude that there is a sizeable gap between what academics believe needs to be taught and the scale of current provision of IT units.

Table 4 shows that units which introduce MIS dominate the IT component of general MBAs, accounting for 62.5% of the core IT units. While accounting for only 37% of electives, they are nonetheless the single largest grouping in that category. By contrast, Managing IT units account for 6% of the core units and 21% of the electives. The lack of a consensus about which topics should be included in a single core unit means that it is not possible to make any definitive judgement about whether this is appropriate.

There are currently three core Computing Skills units, with an average of 2.5 unit coordinators viewing each of the six skills topics as core. There is more of a disparity in respect of electives where there are currently just two Computing Skills units, but an average of 8.2 coordinators viewing each skills topic as worth including on an elective basis. As skills are currently only viewed as core by a small minority and as we find no evidence of increasing importance for skills over the next five years, indeed for two topics we find a significant decrease in importance (Table 6), we do not discuss the provision of Computing Skills units further.

How Do Curriculum Topics Compare With Academics' Expectations?

Table 5 shows how many programmes currently teach each academic topic either Some or A Lot. It also classifies them using a taxonomy derived from Galliers et al (1994). The taxonomy identifies four broad areas: Information Systems (IS) which covers both technical and managerial activities of the IT

function, Organisational Development (OD) which relates to organisational structure and change, Strategy (SS) which encompasses business strategy and competitive advantage, and Information Infrastructure (II) which includes hardware, software, communications, data, methods, methodologies and standards. The majority of the topics (6 out of 16) relate to the IS function and the rest are almost equally divided between Strategy (2 out of 16), Infrastructure (2 out of 16) and Organisational Development (3 out of 16). One of the two SS courses, IS/IT Planning (Strategy) is likely to contain significant IS content. Three are unclassified because there is scope for very different approaches to teaching them which would warrant different classifications. Inspection of Table 5 shows that although there are more IS topics currently being taught than other topic classes there is no major difference in the amount topics are taught across topic classes.

Table 5: Topics currently taught

Topic	No. of units teaching "A Lot" (N = 34)	No. of units teaching "Some" (N = 34)	Topic Class
Overview	18	9	-
Hardware, software, comms technology	7	10	II
Storage and retrieval of data	5	12	II
IS management and control	11	14	IS
Human resources	5	11	OD
Management of change	12	13	OD
Management of systems development	7	16	IS
Information requirements analysis	7	9	IS
IS/IT planning (strategy)	12	7	SS
Org structure and management	10	8	OD
Developing and implementing IS	10	9	IS
Financing, QA, IS evaluation	3	11	IS
Org and management of IS/IT function	9	9	IS
Future developments and implications	4	13	-
Social implications and responsibilities	2	7	-
Internationalisation	0	10	SS

While Table 5 presents a picture of how much topics are taught currently, it provides no standard by which to assess provision. Given our finding that there is disagreement about what should be core and in order to discover whether business schools are in fact teaching what they believe to be important, we compared each programme's current curriculum against the unit coordinator's preferred core content defined in terms of the constrained choice of five topics. The current curriculum was classified in terms of the 16 non-skills based topics taught in the principal unit⁵ and the amount of provision measured on a four point scale (Not Taught, Taught A Little, Taught Some and Taught A Lot). For each of the five topics preferred we identified the extent to which it is included in the principal unit. Of the 95 comparisons made (five topics for each of 19 respondents for whom data were available on both the relevant questions⁶) only in three instances did we find a topic not currently taught included in the ideal core unit. Nearly 50% of the topics included in the ideal core unit are currently being taught "A Lot",

⁵ Where a particular school offered only one unit we took that as the unit to compare with and where a school offered more than one unit we took the unit identified as core to be the unit for comparison.

⁶We did not have data in respect of how much each of the skills topics is taught.

another 33% are currently being taught to 'Some' extent and the rest are taught 'A Little'. In general, it would seem that IT units substantially meet their academic coordinators' expectations in respect of a single core unit.

Table 6: Academics' assessment of topic relevance now and in five years time in order of current relevance

Topic	Mean (Now)	Rank (Now)	Mean (5 Years)	Rank (5 Years)	Correlation
Overview	4.39	1	4.18	4	0.85
Management of change	4.17	2	4.36	1	0.78
IS management and control	4.14	3	4.32	3	0.71
IS/IT planning (strategy)	3.96	4	4.35	2	0.78
Org structure and management	3.86	5	4.09	5	0.78
Org and management of IS/IT function	3.74	6	3.96	8	0.77
Management of systems development	3.61	7	3.26	15	0.78
Future developments and implications	3.61	8	3.95	9	0.47
Human resources	3.57	9	3.91	10	0.81
Information requirements analysis	3.52	10	3.65	11	0.61
Storage and retrieval of data	3.48	11	3.26	14	0.86
Financing, QA, IS evaluation	3.43	12	4.00	7	0.55
Internationalisation	3.41	13	4.09	6	0.36
Hardware, software, comms technology	3.39	14	3.00	16	0.62
Developing and implementing IS	3.35	15	3.30	13	0.48
Social implications and responsibilities	3.17	16	3.48	12	0.55
Spreadsheet use	2.95	17	2.45	18	0.66
Statistical packages	2.76	18	2.76	17	0.76
Word processing	2.70	19	2.05	21	0.65
Presentation graphics software	2.50	20	2.40	19	0.63
CASE tools	2.29	21	2.30	20	0.83
Programming languages	1.90	22	1.60	22	0.77

What Are Academics' Expectations for the Future?

We investigated IT coordinators' views about the future so as to identify any likely emerging expectation gaps. We therefore asked them about the relevance of the 22 topics in five years time as compared with their current relevance. Table 6 reports the mean values and correlations for the 22 topics measured on a scale of 1 to 5 ranging from no relevance to very relevant. The topics for which there is a significant difference between the two means (at .05 level) are shown in bold.

Table 6 reports the correlation between the responses for 'Now' and 'in 5 years' to be extremely high. The correlation for the 22 topics taken individually ranged from 0.36 to 0.86, with an average correlation of 0.68. Of the above correlations, only Topic 16 (Internationalisation of information systems) has responses which are not significantly correlated ($p < 0.05$). Of the rest, two are correlated significantly at $p < 0.05$ level and the remaining 19 are correlated at $p < 0.01$ level. The high correlations suggest that most respondents do not expect the relevance of the topics to change in a significant manner over the next five years.

However, the balance of change is for topics to be more rather than less relevant in five years time. Of the five non-skills topics for which the change in mean was significant, four increase in relevance while only one decreases. Of the sixteen non-skills based topics the mean relevance increases for twelve and only declines for four. At present, only the top four topics' average relevance scores above 3.90

whereas IT coordinators rate 10 above 3.90 in five years. We interpret this as indicating that IT academics expect to need more curriculum space than they have at present.

We asked IT coordinators about changes in the amount of curriculum time and space available to IT over the next five years. We found that 50% expect that more time will be devoted to IT in five years time. We found that 45% of IT coordinators expected the time to stay the same or even diminish. We can therefore expect an increasing expectation gap for these programmes. It is unclear whether, where there is increased provision, it will meet the need.

Discussion And Conclusions

This study has examined existing IT management provision against the standards of academics in respect of the present and five years hence. The use of these standards permits us to make some assessment of the provision of fundamentals of IT management.

We have found a high level of agreement among academics about seven topics which should be core under ideal circumstances, but under constrained choice there is greater diversity of opinion. Responses to what is considered ideal stand more as an indicator of how much material academics believe is core and hence as a standard against which to measure current provision.

Our study has found IT units are included in over 90% of all general MBA programmes in Australia. This is potentially misleading in that only 50% of general MBA programmes have core units of the Introduction to MIS or Managing IT types. Consequently, in 50% of programmes students can graduate with no formal introduction to managerial aspects of IT. In a world where it is increasingly believed that IT is central to the critical issues facing business, this indicates too great an opportunity for graduates to avoid being prepared for this dimension of the general management role. It compares poorly with our interpretation that academics believe that core material warrants two units.

We find limited opportunity to study IT in depth. Only 27% programmes found IT sufficiently important to offer a core unit plus follow-up electives, and only 41% provided the opportunity to study a second unit. The fact that in more than 40% of programmes students would be able to take just the one unit and that in the rest many, if not most, would choose to take no more than one unit means that few graduates receive what academics regard as an ideal core education. When we restrict our attention to Managing IT and Introduction to MIS unit types, the adequacy of provision is shown to be even more deficient. Only one programme offered a core unit of one of these two types and an elective of the other type.

Analysis of the unit types gives us a more discriminating picture. Table 4 shows that the available units are dominated by the Introduction to MIS type (50%) which focus on the more technical issues of systems development and the internal management of the IT function. By contrast, units of the Managing IT type, which focus more on the strategic role and business value of IT, and issues of organisational structuring and transformation, make up only 14.7% of the total. Only one programme in Australia was found to have a core unit of this type.

The analysis indicates that existing IT provision concentrates on delivering an understanding of the tasks and issues facing the IT functional manager rather than the general manager. This is valuable for those who choose to move into the IT function on graduation, and will help graduates in interacting with IT staff when in line management roles. We would expect this to be most valuable in the first years after graduation. By contrast, there is very little provision for students to master the general management issues associated with managing IT.

Our reading of the study's findings is that academics are coping with the restrictions on curriculum space and time by compromising depth for breadth. Although there is no consensus on a constrained core, when we compare actual provision against constrained core topics within programmes we find consistency. This means that the topics covered vary considerably across programmes reflecting different academics' beliefs about priorities among topics each believes core.

As a secondary analysis we therefore investigated the kinds of choices academics are making by examining the data relating to the extent each non-skills topic is taught in designated core units. We find that on average twice as many topics are taught Some (average 8.8 per core unit, 97 topics in 11 units) as are taught A Lot (average 4.2 per core unit, 46 topics in 11 units), further suggesting that under conditions of scarce curriculum space and time academics are compromising by offering breadth of coverage rather than depth.

When we looked at academics' expectations for the future we found the pressure for curriculum space and time likely to increase in the next five years as a result of the increasing relevance of non-skills topics and limited ability to increase provision. This is not a happy prospect for employers seeking MBA graduate managers with a sound preparation for managing IT.

This study demonstrates the need for change. IT academics need to critically review their own priorities and to instigate change where it is in their power and to lobby for change where it is not. Given the importance of IT in today's business world, students are being poorly served if they are not required to undertake some IT study. Those programmes that do not currently have a core IT unit should review this. Those programmes whose core unit is not of the Introduction to MIS or Managing IT type should change to one of these two because it is clear that Computing Skills is not regarded as an appropriate core subject by a strong majority of the academics surveyed and that the relevance of its topics is decreasing.

For programmes which already have a non-skills core unit the next step is to ensure appropriate breadth and depth of topic coverage. A second core unit would be ideal. Where the second unit is elective or where a new single core unit is being designed, IT coordinators are faced with a choice about emphasis. There is room for debate as to whether Introduction to MIS or Managing IT is preferable as a single core unit. Arguably, the fundamentals provided by Introduction to MIS are a necessary foundation for Managing IT. Arguably, Managing IT issues are *sui generis*. Arguably, a combination is required to produce hybrid managers (Earl & Skyrme 1992). We cannot resolve such arguments here because to some extent they turn upon contingent arrangements such as when other management topics are taught in the programme. For example, there is a strong argument that it would be inappropriate to teach IT for competitive advantage and IT strategy in advance of a unit on business strategy. What is clear is that there is a problem of inadequate curriculum space and time. Given the current emphasis on Managing MIS in core units, under scarcity where only one unit is available, a shift to a greater emphasis on the Managing IT topics seems warranted.

The academic expectation that the importance of many topics will increase together with the finding that only half our respondents were optimistic that more space and time would be available within MBA programmes suggests that for a substantial proportion of programmes the current shortfall in provision will worsen. The consequences are not easily predictable. It will be bad for business where IT management skills are still in short supply. We are concerned that it will be demotivating for IT academics and could lead to some losses to academia as staff make career changes. In a field where it is already difficult to hire good teachers, any losses of this kind will be damaging both to the programme in question and the discipline.

For prospective students wanting to ensure they are well prepared for the IT dimension of management, it will pay to shop around. There is currently no guarantee that any given programme will include adequate preparation for Managing IT. Nor is it realistic to suppose that this will change immediately. For students wishing to have the option to study IT management in greater depth, they should look for programmes with at least one core and one elective unit. They should also ascertain that they include at least the seven topics marked in bold in Table 1 as agreed as core under both constrained and unconstrained choice.

For businesses employing MBA graduates, it is clear that they cannot take for granted a strong preparation in IT. For them, it will pay to quiz prospective employees. There is no reason to believe that all or even most MBA programmes will provide graduates with a strong preparation for managing IT even in five years time. Employers should expect for the foreseeable future to have to take in graduate managers with limited preparation for managing IT and to develop for themselves this area of competence.

In summary, our study has found coverage of IT topics in most Australian general MBA programmes, but there is no cause for complacency among academics as to the preparation they provide for the business management of IT. We have found significant gaps between what academics believe should be provided and current educational provision. We have found no evidence that these gaps will narrow in the next five years. Their persistence will not be good for industry, graduates seeking employment, or business schools. There is sufficient cause for concern that further surveys of this nature will be a valuable aid to monitoring the progress of IT management education.

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