Do We Teach Enough **IT Skills** in Management Accounting Courses?

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A SURVEY OF ACCOUNTING EDUCATORS THAT EXPLORES THE CURRENT USE OF INFORMATION TECHNOLOGY CONTENT IN MANAGEMENT ACCOUNTING EDUCATION SHOWS THAT ACCOUNTING STUDENTS ARE NOT BEING TAUGHT THE **IT** SKILLS THEY WILL NEED IN THE BUSINESS WORLD.

EXECUTIVE SUMMARY Anecdotal evidence points toward a growing gap between the information technology (IT) skills demanded of management accountants and those supplied by higher education. To ascertain how much and which IT skills are taught in management accounting courses, we sent a comprehensive, Web-based management accounting/IT survey to management accounting educators in the colleges and universities of North America. The analysis of survey data reveals that the extent of IT content in management accounting curricula leaves much to be desired. We discuss implications of the survey findings and suggest directions for restructuring management accounting curricula.

In corporate America, management accounting traditionally provided managers with the information essential for making strategic business decisions. Before the proliferation of information technology (IT), most data was in paper form, and management accountants manually collected and processed it for management decision making. Thus, production of information and its use by corporate managers went hand-in-hand without losing the vital links that connected it to management accounting activities.

Rapid IT advancements in the 1990s, however, significantly transformed business data processing. Developments such as large data storage systems and efficient information retrieval contributed to the effectiveness of management information systems, and corporate management accounting systems integrated IT into their practices. IT is now viewed as a core business driver and a key to generating profits in highly competitive

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environments.[1] Spending on IT by American corporations, large or small, has increased rapidly.[2] With proper integration of IT into management accounting, a post-modern chief financial officer who uses IT can practice management accounting far more effectively than a CFO without such integration.[3]

When looking at current management accounting texts, however, there is a deep void in the coverage of essential topics related to IT concepts widely used in business practices, such as data warehousing and data mining. Management accounting textbooks continue to focus on concepts based on manually driven business information processing. When weighed against concerns about information literacy in organizations, these trends present a perplexing IT paradox.

IT in Management Accounting Classrooms

IT-related topics are typically covered in accounting information systems (AIS) or management information systems (MIS) courses, with the hope that students will integrate knowledge from both the IT and management accounting perspectives. In many traditional accounting programs, there are few opportunities for students to take elective courses that go beyond the basic AIS/MIS courses and examine IT in further detail. Consequently, students often are unable to visualize links between the two disciplines unless instructors show them relevant examples and challenge them with rich exercises. Ignorance abets the reluctance of students to embrace IT. While some students may venture into the emerging knowledge base and self-learn the necessary skill sets in the workplace, they are a small exception.

As IT becomes increasingly embedded in business transactions, it is imperative that students have proper training from both IT and management accounting perspectives. Management accounting education also may help resolve the IT paradox that shows a lack of correlation between productivity and investment in technology.[4]

Survey of Educators

Given the importance of IT in the business world, we surveyed accounting instructors about the content and integration of technology in management accounting curricula. Based on previous studies published by the Institute of Management Accountants (IMA®), we designed a questionnaire that focused on a variety of IT-related skills deemed important in a management accounting career.[5] We sent the survey to all instructors with management/cost accounting interests as identified in the Prentice Hall Accounting Faculty Directory. A total of 101 instructors responded to our questionnaire. The need to maintain anonymity was stressed during the study in order to increase the response rate. Table 1 presents the types of accreditation and degrees offered from respondents' schools. Of the schools with college-wide accreditation, 44.55% also have accounting accreditation.

Table 1: Descriptive Statistics of the Responses

ACCREDITATION:		
Undergraduate—School	83	82.13%
Graduate—School	82	81.19%
Undergraduate—Accounting	45	44.55%
Graduate—Accounting	38	37.62%
Federation of Schools of Accountancy	33	32.67%
TYPES OF AIS DEGREES OFFERED:		
Ph.D.	12	11.88%
Master	39	38.61%
Bachelor	52	51.49%
Other	12	11.88%

IT Coverage in Management Accounting Courses

Survey respondents were asked to look at a list of 19 different types of information technology widely used in the accounting industry and rate on a scale of 1 to 7 how much each item was covered in their management accounting classrooms (with 1 = low coverage and 7 = high coverage). The list was divided into groups of stand-alone application systems, programming languages, and networked application systems. Table 2 shows the coverage for undergraduate programs, and

Table 2: IT Coverage in Undergraduate Programs

	Rank	Mean
STAND-ALONE APPLICATION SYSTEMS:		
Excel	1	5.31
Access	5	4.72
Great Plains Dynamics	2	5.13
Visual Basic for Excel	3	4.97
Visual Basic for Access	4	4.75
PROGRAMMING LANGUAGES:		
C	5	4.92
C++	4	4.93
Java	2	5.08
HTML	3	5.07
XML	1	5.20
NETWORKED APPLICATIONS SYSTEMS:		
Oracle 8i	2	5.18
Oracle 11i	7	5.01
SAP	3	5.15
ABAP	3	5.15
Data mining	6	5.07
Data warehousing	5	5.12
REA	1	5.25
ERP	8	4.65
Supply chain management	9	4.13
Average IT coverage		**4.98**

1 = low support; 7 = high support

Table 3: IT Coverage in Graduate Programs

	Rank	Mean
STAND-ALONE APPLICATION SYSTEMS:		
Excel	1	5.02
Access	5	4.46
Great Plains Dynamics	3	4.75
Visual Basic for Excel	4	4.63
Visual Basic for Access	2	4.76
PROGRAMMING LANGUAGES:		
C	4	4.84
C++	4	4.84
Java	3	4.86
HTML	2	4.88
XML	1	5.13
NETWORKED APPLICATIONS SYSTEMS:		
Oracle 8i	4	4.94
Oracle 11i	6	4.81
SAP	5	4.93
ABAP	3	4.98
Data mining	7	4.70
Data warehousing	8	4.60
REA	1	5.14
ERP	2	5.09
Supply chain management	9	4.40
Average IT coverage		**4.82**

1 = low support; 7 = high support

Table 3 represents the results for graduate programs. The means for both undergraduate and graduate programs (4.98 and 4.82, respectively) are marginally above the average score.

Within the stand-alone application systems, Excel was ranked among the top for both undergraduate (mean score = 5.31) and graduate (mean score = 5.02) programs. Excel provides a robust environment to perform computations and simulate various decision-making scenarios in management accounting. The lowest ranking was received by Access (undergraduate mean = 4.72 and graduate = 4.46). Even though Access is widely used in industry, most management accounting textbooks predominantly use Excel-based support for exercises and problems. This illustrates the disconnect between actual business practice and the class-

room. The coverage of Great Plains Dynamics was lower in graduate programs (4.75) than in undergraduate programs (5.13).

In the programming group, XML is covered the most in undergraduate (5.20) and graduate (5.13) programs. This is significant because it highlights the importance of XML's independent nature of technology as a tool for data extraction. Thanks to growing support for accounting-oriented XML standards (such as XBRL and eBXML), the coverage of XML technology in accounting classrooms is likely to grow in the future.

As would be expected, the three programming languages (C, C++, and Java) are covered the least in management accounting education. In fact, about 50% of the respondents' schools do not cover these items at the undergraduate level. The proportion stands at around

Table 4: IT Support for Management Accounting Instructors

Issue	Mean	Undergraduate	Graduate
Financial and time support	4.60	4.43	4.76
Computing facilities for students	3.77	3.83	3.72
Computing resources for MA faculty	4.40	4.22	4.58
Students' IT background before MA classes	4.40	4.33	4.48
Mean IT Support and Resources	**4.29**	**4.20**	**4.38**

1 = low support; 7 = high support

30% for the graduate level. The mean scores are only marginally above the indifference mark at both the undergraduate and graduate levels. The lack of coverage of C and C++ programming languages both in the undergraduate and graduate programs is not surprising considering their technical nature and programming focus.

Within the networked application systems group, REA emerged with the most support for classroom coverage in both undergraduate (5.25) and graduate (5.14) programs. This result underscores the wide popularity of REA within academia. REA is primarily an accounting invention and has accounting roots for designing and maintaining accounting systems. The preference for REA over other tools seems to stem from its origin in accounting discipline and its extensive use in AIS classes.

The supply chain is an integral issue for various management accounting theories and concepts, especially in the emerging e-business environment. Surprisingly, supply chain management is the networked application systems topic covered the least in classrooms—it is ranked last in undergraduate programs and next to last in graduate programs. A possible explanation for this is the limited availability of the appropriate supply chain management software and tools in the IT market. While the theoretical basis for supply chain management is old, its implementation in leveraging IT is a relatively new phenomenon. As the technology matures, more supply chain management tools should be available, and their coverage in management accounting classrooms is expected to increase.

IT concepts such as data mining, data warehouses, and ERP are more easily amenable to integration in management accounting courses. For example,

activity-based accounting, lean accounting, and Six Sigma quality management can leverage these IT-based concepts to enrich management accounting curricula. The data in Tables 2 and 3, however, shows only a marginal integration of these skills into management accounting education.

The dominance of ERP at the graduate level provides evidence of its maturity. The ERP wave dominated the Y2K issue during the 1990s, when most companies seized the opportunity to reengineer and streamline their information systems. With most implementations now already complete, the next phase in ERP concerns the challenging issues of measuring return on ERP investments, integrating various ERP systems, and applying management accounting concepts.

In summary, analysis of the data shows that undergraduate courses cover more IT topics than graduate courses. This may be explained in part by the relative emphasis of hands-on experience at the undergraduate level. At the graduate level, the common thread is to build expertise on critical thinking using real-life business problems through case studies, research analyses, and the ability to leverage resources for competitive advantage. Thus, there is less emphasis at the graduate level on the multidimensional role of IT for business. These findings reflect the traditional focus of management accounting education, where the progress toward incorporating IT-based skills is slow.

SUPPORT AND RESOURCES

We also asked respondents about their perceptions of the amount of IT support and actual resources provided by their accounting department and/or college. Table 4 shows the responses to four dimensions pertaining to IT support for management accounting instructors. The

overall mean is 4.29, which is lower than the mean of IT coverage in classrooms, as shown in Tables 2 and 3. This suggests that instructors have been integrating more IT into their classes than is supported by the available IT infrastructure.

Note in Table 4 that the overall mean for undergraduate programs (4.20) is lower than the mean for graduate programs (4.38). This implies that instructors teaching undergraduate courses believe that they require more IT support/resources than graduate school instructors. This aligns with the indication that IT is integrated more within undergraduate courses than graduate courses.

Though one would expect that the heightened awareness and increased emphasis on technology in business schools, coupled with declining IT costs, would translate to higher IT support for faculty, the mean scores in Table 4 are only marginal and reflect the need for improvement in this area. Interestingly, respondents ranked computing facilities for students as being the least supported item for both undergraduate and graduate programs. This appears to be a major constraint in an effort to strategically integrate IT into management accounting curricula.

Based on these findings, it appears that both the breadth and depth of IT support for management accounting instructors need expansion. Respondents perceive only marginal IT support in all four dimensions. Work needs to be done to improve computing facilities for students and to make them more accessible.

SCHOOL ENVIRONMENT SUPPORTING IT EDUCATION

Table 5 presents the rank and mean on several dimensions of the school environment's ability to support the incorporation of IT into management accounting curricula at both graduate and undergraduate programs. In undergraduate programs, students on average take more credit hours towards management accounting (10.06 hours) than students in graduate programs (7.95 hours). Higher than average required credit hours for management accounting may be explained by differences in semester and quarter systems across the sample schools. We also measured the environmental support in terms of the school's mission and the accounting program's

Table 5: School Environment's Support of IT Education

PANEL A: UNDERGRADUATE PROGRAMS

	Rank	Mean
Required credit hours		10.06
Employers' feedback	1	4.42
Graduates' feedback	2	4.24
Accounting mission	4	4.16
School mission	3	4.20
Encouragement	1	4.44
P&T consideration	2	4.28
IT instruction resources	2	4.43
Student access	5	3.80
Library resources	1	4.46
Technology support	4	4.20
Required preparatory classes	3	4.35

PANEL B: GRADUATE PROGRAMS

	Rank	Mean
Required credit hours		7.95
Employers' feedback	1	4.76
Graduates' feedback	2	4.29
Accounting mission	4	3.93
School mission	3	3.95
Encouragement	2	4.75
P&T consideration	1	4.89
IT instruction resources	2	4.86
Student access	5	3.73
Library resources	1	4.93
Technology support	3	4.53
Required preparatory classes	4	4.46

1 = low support; 7 = high support

mission. The overall mission-based support is weak to moderate. Support for IT-based management accounting curricula driven by the missions of both the school and accounting program is lower for graduate programs (3.93 for accounting program mission and 3.95 for school mission) than for undergraduate programs (4.16 for accounting program mission and 4.20 for school mission).

The results also indicate that schools fail to make a consistent effort to obtain feedback from employers and alumni in regard to maintaining the relevance of management accounting curricula. The proportion of

schools that do not have any systematic procedure for obtaining feedback is around 20%. These trends are consistent across graduate and undergraduate programs. Lack of systematic and consistent feedback from employers and alumni could be one reason for the gap between the IT skills provided by accounting programs and those needed in business.

Analysis of the data also reveals that innovative teaching efforts of the faculty are not always given due weight at both undergraduate and graduate programs. On a comparative note, however, the mean score for the support of promotion and tenure (P&T) support is higher for graduate programs (4.89) than for undergraduate programs (4.28). Most P&T committees focus on research efforts. IT-based innovations are both time- and effort-intensive and take time away from productive research. Because of this, faculty members have little motivation to invest time in learning and including IT-based skills in courses. P&T committee requirements for promotion and/or tenure can act as either constraints or push factors. In most schools, P&T requirements currently function as a restraint to the integration of IT into management accounting coursework. If explicit considerations were specified in the rules for awarding promotion and tenure decisions, however, they could act as a force of change.

Library resources are perceived as receiving the most support, with mean scores of 4.46 and 4.93 for undergraduate and graduate programs, respectively. Student access was ranked lowest (undergraduate mean score = 3.80, graduate mean score = 3.73). These findings confirm the results in Table 4 that computing facilities for students receive the lowest support. Making technology more widely and easily accessible to students is a major concern.

CLOSING THE GAP

The management accounting skills demanded by corporate America differ substantially from those currently supplied by the academic accounting departments. A strategic effort is needed to close the widening gap between the skills provided by management accounting education and those needed in the ever-evolving IT-based business environment.

Accounting is considered a conservative profession with a bias to the side of caution. It seems that the trend in management accounting practices is consistent with that of accounting in general. In this conservative mold, graduates find themselves poorly served when the skills demanded by corporate America do not align with those they acquired in the classroom. Further, this inadequate preparation imposes a cost on the industry that must retrain their new employees in basic management accounting practices that demand integration with IT skills. ■

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