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Information Systems Content in the CMA Examination

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Abstract

This study examines 12 recent CMA exams administered from June 1987 through December 1992 to determine the extent of information systems (IS) coverage. We evaluated each exam using a definition of IS knowledge and skills from the common body of knowledge developed by the Institute of Management Accountants (IMA). The results of the study indicate that the IMA has recognized the importance of IS knowledge, as evidenced by the extent of exam coverage and the relevance of the items tested. Because information systems courses are included in a model curriculum recommended by the IMA, the results of this study may be useful to accounting faculty in designing accounting systems courses.

The increasing complexity of economic activity, global competition, and technological developments have all contributed to increasing demands on the services of management accountants. To meet these demands,

management accountants must command a wide range of knowledge and skills that extend beyond accounting concepts and principles. As early as 1982, the Institute of Management Accountants (then the National Association of Accountants) recognized the importance of information systems development and technological implementation in enabling management accountants to discharge their responsibilities (NAA, 1982). A more recent statement of the knowledge and skills necessary for success in the practice of management accounting is "NAA Issues SMA 1D: The Common Body of Knowledge for Management Accountants," issued by the NAA in 1986.

The ad hoc committee that prepared this statement identified three major areas of knowledge: (a) information and decision processes, (b) accounting principles and functions, and (c) entity operations. The entity operations area was further divided into a number of subareas, including information systems (IS). With respect to IS, the committee said

All segments of the accounting function have been affected by computer technology, so information systems literacy is a significant part of the management accountant's knowledge. A familiarity with the concepts, processes, and security aspects of information and communications systems is important for management accountants. (NAA, 1986, p. 60)

Subsequent to the identification of the common body of knowledge, the Committee on Education (and its Subcommittee on Management Accounting Curriculum) produced curriculum models for both 120 and 150 semester hours to assist colleges and universities in the development of educational programs to prepare graduates for entry into the management accounting profession (NAA, 1988). Consistent with the common body of knowledge, the model curriculum calls for one or two specific courses in information systems.

In this study, we reviewed the extent of information systems (IS) coverage in 12 recent CMA exams used from June 1987 through December 1992. In view of the inclusion of IS knowledge in the common body of knowledge and the model curriculum, determination of the extent of IS coverage in the CMA exam is useful.

Information Systems Body of Knowledge

To establish a definition of IS knowledge and skills for reviewing the CMA exams for IS content, we used the common body of knowledge report. The report specifically noted the following aspects of information systems knowledge.

- * Systems analysis and design--Familiarity with how systems are designed; systems life cycle; control techniques; security and privacy.
- * Database management--Defining, creating, revising, and maintaining integrated files; database updating and management; access and security.
- * Software applications--Familiarity with generalized software such as spreadsheets, graphics, statistical packages, and decision-support tools.
- * Technological literacy-Knowledge of the principles and levels of programming languages; latest developments in computer technology.
- * Systems evaluation--Testing the efficacy of information systems. systems modification to improve management information.

Although the report included it in another category, we note that internal control is universally regarded as an IS topic. Therefore, we included test items relating to internal control in our tabulations. In order for the tabulation to be consistent with the report, however, internal control items were included in the systems analysis and design category rather than in a separate listing.

Analysis of Information Systems Exam Content

We reviewed the 12 CMA exams for content in the five categories of information systems knowledge cited by the ad hoc committee. Each objective and essay item was carefully considered as to whether it required IS knowledge and skills. In some instances, the suggested solution was also reviewed so that a proper determination could be made.

Overall Analysis

In Table 1, we provide a distribution of multiple-choice, essay-required, and essay-optional items requiring IS knowledge, by exam. (Table 1 omitted) We also show the percentage of the total CMA exam with IS content for multiple-choice, essay-required, and essay-optional items, as well as the total percentage of the exam devoted to IS content both at a minimum (no IS optional items elected) and maximum (all IS optional items elected) level. All percentages were calculated as a ratio of the time allowed for an item to the time allotted for the complete exam.

A total of 104 multiple-choice, 17 essay-required, and 10 essay-optional items appeared on the exams during the period studied. The average number of multiple-choice items was 8.7 per exam, with a standard deviation of 5.5 items. Coverage ranged from a high of 17 multiple-choice items on the December 1987 and June 1989 exams to a low of zero items on the December 1991 exam. Essay-required and essay-optional items ranged from zero to two items per exam. The June 1990 exam was the only exam that did not contain any essay-required items.

The percentage of total exam devoted to IS knowledge over the period studied, assuming no optional items are elected from the IS area, ranged from a low of 3.1% on the December 1991 exam to a high of 8.0% on the June 1989 exam. On the assumption that all optional items are elected from the IS area, the range increased from a low of 6.1% on the December 1987 exam to a high of 10.9% on the June 1989 exam.

Though there was some variation among the kinds of items and also among the extent of IS coverage over this period, there was no discernible trend. Overall, the balance between multiple-choice, essay-required, and essay-optional items has not changed dramatically over the period examined. Similarly, the percentage of the total exam devoted to IS coverage has not changed significantly.

Knowledge Category Analysis

For each of the exams included in the study, the IS items (both required and optional) identified were distributed according to the five categories of IS knowledge cited in the common body of knowledge report. In Figure 1, we show the composite distribution of IS categories for all 12 exams. The majority of IS items (54.3%) were in the systems analysis and design category. We should note that items that focus on internal control are also included in this category in view of the classification determination explained earlier. Systems evaluation formed next largest component, followed by the other categories.

FIGURE 1. Knowledge Category in All 12 Exams, for All Items

Systems evaluation	26.7
Database	4.3%
Software	9.5%
Technology	5.3%
Systems analysis and design	54.3%

The individual exams reveal considerable variation in the distribution of items among the five knowledge categories. The distribution of IS items in the knowledge categories is shown for each individual exam in Table 2.

(Table 2 omitted) The systems analysis and design category had a range of from 13.0% to 97.0%, whereas the systems evaluation category ranged from 0.0% to 54.5%. The variations observed in all five categories arose primarily from the inclusion or exclusion of essay-required or essay-optional items in a category on a particular test.

IS Items Requiring Specific Knowledge of Computerized Systems

In reviewing the exam IS items, the authors noted that some items, though having IS content, did not specifically require knowledge of computerized systems. For example, an item on separation of duties is a suitable IS question even though the statement of the situation is such that computerized knowledge is not required. In order to provide additional insights into exam coverage of IS that involves current technology, only items requiring specific knowledge of computerized information systems were included in a separate tabulation, presented as Table 3. (Table 3 omitted) Using this criterion, we did not include in Table 3 several items previously included in Table 1.

With this more restrictive category of IS test items, the number of multiple-choice items dropped from 104 to 75, a reduction of 28.0%. The average number of multiple-choice items dropped from 8.7 to 6.3 per test, and the standard deviation rose slightly from 5.5 to 5.7 items. A high of 16 multiple-choice items occurred on the two 1987 exams, and a low of zero items was found on three exams: December 1988, June 1990, and December 1991.

The number of essay-required items fell from 17 to 13, and the number of essay-optional items also fell from 10 to 9 items. Essay-required and essay-optional still ranged from zero to two items per exam. Four of the exams did not have any essay-required items, and five did not have any essay-optional items that specifically required knowledge of computerized systems.

The percentages of the total exam devoted to IS knowledge also changed in view of the more restrictive criterion. Assuming no optional items are elected from the IS area, the percentage of total exam coverage now ranged from a low of 0.040 on the June 1990 exam to a high of 7.5% on the December 1992 exam. When all optional items are elected, the range was 2.9% to 10.3%, as compared with a range of 5% to 10.9% in Table 1. The data in Table 3 reveal a variation similar to those in Table 1 in the mix and number of items from exam to exam. There was no apparent specific trend, however, in the exams for the period of time studied.

Knowledge Category Analysis-Computerized IS

In Figure 2, we show the percentage distribution of items in IS knowledge categories only for those items that require a specific knowledge of computerized systems. Comparison of the percentages in Figure 1 with those in Figure 2 reveals an overall change in the composite of the 12 exams. The observable movement in the percentages is largely explained by the exclusion of manual systems items, which do not require computerized knowledge, in the categories of systems analysis and design and systems evaluations. This results in a somewhat higher percentage in the other three categories, in which all of the items, by the nature of the category, tend to require computerized systems knowledge.

FIGURE 2. Knowledge Category Coverage in All 12 Exams, for Computerized Knowledge Items Only

Systems evaluation	22.3%
Technology	6.7%
Software	12.1%
Database	5.4%
Systems analysis and design	53.6%

Current Technology Analysis

In addition to tabulating the items, we evaluated items to ascertain whether the exam items were current and changing to keep abreast of the changing technology. In our opinion, there were no items judged to be dated. The emphasis on systems development and design, in particular, reflected an effort to assess systems development knowledge in light of emerging design approaches and technology.

Conclusion

The Institute of Management Accountants has recognized the importance of IS knowledge to both aspiring and practicing management accountants. Information systems is a knowledge category in the common body of knowledge for management accountants and is represented among the suggested courses in an approved model curriculum. The importance of IS knowledge is also recognized through coverage in the CMA examination, which has emerged as an important tool in assessing the knowledge of management accountants who seek recognition through certification

The December 1992 exam contained 6 multiple-choice and 2 required-essay items requiring IS knowledge, which comprised 7.5% of the total exam. This percentage was exceeded in six of the other exams if the candidate elects alternative items having an IS content. The mix of items and the extent of coverage has been relatively constant in the exams over the period studied. When one considers the breadth of knowledge covered in the CMA exam compared with that of the CPA and CIA exams, a range of IS coverage of from 2.1% (essay-required only) to 10.9% (essay-optional included) is strong recognition of the importance of IS to management accountants.⁽¹⁾ This importance is further evidenced by the fact that IS items in the CMA exams involve current IS practices.

The Institute of Management Accountants appears to have supported its position regarding the importance of IS knowledge and skills by attempting to assess the level of performance in this area on the exam. Those who seek certification as certified management accountants must have an adequate understanding of information systems.

NOTE

1. For an analysis of IS coverage in the CIA and CPA exams, see Akers, Doney, and Wick (1993) and Doney and Akers (1993). For the exams from May 1987 through November 1991, the percentage of IS coverage ranged from 8.8 to 19.5 on the CIA exam. The range on CPA exams for the period May 1986 through November 1991 for the period May 1986 through November 1991 was 1.8% to 6.8%.

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