

Information Technology Competencies Expected in Undergraduate Accounting Graduates

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Abstract

As information technologies (IT) grow more advanced, current accounting education is challenged by major changes in the environment in which professional accountants are operating. One of the major factors that affect this environment is the impact of IT on the accounting profession. Our survey of recruiters indicates that new accounting graduates are expected to be able to use financial spreadsheets, business graphics, word processing, presentation, audit, tax preparation, small business systems, database management systems, accounting, and communication software at the expert level. They are also expected to be able to evaluate entity's IT assurance needs, organize and manage own system and organize system resources, as well as safeguard system against unauthorized use, virus, spam, and spyware. As accountants adjust to this evolving information environment, it is essential that we, accounting educators, continuously enhance our own IT knowledge, skills and abilities (KSAs), and integrate the relevant IT topics into the traditional accounting core subjects such that the future professional accountants remain competitive and pertinent in the new and changing environment.

Key words: Information Technologies, Software, IT Assurance, System Resources, Safeguard System

Introduction

As information technologies (IT) grow more advanced, current accounting education is challenged by major changes in the environment in which professional accountants are operating. One of the major factors that affect this environment is the impact of IT on the accounting profession. A recent example is that the SEC has mandated the largest companies to start furnishing XBRL with their Q2 2009 SEC filings, and smaller companies to follow one year later. Mutual funds must begin tagging key information, including risks, fees and performance, by January 2011.

The Institute of Management Accountants and Financial Executives International commissioned a research entitled “What Corporate America Wants in Entry-Level Accountants” in 1994. The findings revealed that information systems design was one of the KSAs considered most important by Corporate America. The research also found that there was a significant gap between the KSAs that corporations expected from entry-level accountants and the accounting curricula provided by business schools.

The Institute of Management Accountants published another study entitled “The Practice Analysis of Management Accounting” in 1996. The study analyzed the work of more than 800 management accountants and found that (1) the use of computerized spreadsheets, and the use of computerized accounting systems were two of the most important KSAs, and (2) computer system operations was one of the activities that are most critical to success on the job.

Chang and Hwang (2002) explored educators’ perceived level of importance of emerging IT issues. Their findings indicated that information security and internal control was the most important topic to be taught in the IT related courses, followed by database management, business processes and documentation, information system design, and e-business.

AICPA Core Competency Framework for Entry into the Accounting Profession (AICPA, 2006) stresses that individuals entering the accounting profession must be able to:

- Accesses appropriate electronic databases to obtain decision-supporting information
- Assesses the risk of technology and automated business processes
- Uses technology assisted tools to assess and control risk and document work performed
- Builds appropriate models and simulations using electronic spreadsheets and other software
- Exchanges information using appropriate communication technologies such as e-mail, discussion boards and video-conferencing
- Recognizes commonly used information architectures
- Recognizes business opportunities and risks associated with electronic commerce
- Mines electronic data sources for business and industry information
- Uses technology to develop and present strategic information

This study investigated the IT competencies desired in new undergraduate accounting graduates by employers in industry. In September 2007, a questionnaire was designed mainly based on International Federation of Accountants’ (IFAC) International Education Guideline 11 (IFAC, 2003). The questionnaire was hand delivered to 150 recruiters in an accounting conference in October 2007. The recruiters were asked to evaluate thirty five (35) information

technology competencies in 5 categories using a five point Likert-type scale with 5 denoting very important, 4 important, 3 neutral, 2 not important, and 1 not important at all. A total of 63 questionnaires were answered and returned by the respondents. This is equivalent to a response rate of 42 percent.

Findings

To determine whether there are significant differences among the recruiter's rankings on the perceived level of importance of the IT competencies investigated in this study, the competencies were sorted in ascending order based on mean of ranks (Table 1), and stepwise F tests for equality of means were conducted. At first, we compared the means of ranks between financial spreadsheets (X_1) and business graphics (X_2), i.e, we tested the hypotheses

$$H_0: \mu_1 = \mu_2$$

$$H_1: \mu_1 \neq \mu_2$$

Since there was no significant difference, we included word processing software (X_3) in the hypotheses, i.e., we tested

$$H_0: \mu_1 = \mu_2 = \mu_3$$

$$H_1: \text{not all } \mu_i \text{ are equal}$$

We continued to add a competency to the hypotheses until the null hypothesis was rejected. When the following hypotheses were tested

$$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7$$

$$H_1: \text{not all } \mu_i \text{ are equal}$$

We rejected the null hypothesis ($F=2.49$, $P=0.02$) and classified the first six competencies as Group 1.

To identify the second group, we started by testing

$$H_0: \mu_7 = \mu_8$$

$$H_1: \mu_7 \neq \mu_8$$

and repeated the same process we used to identify the first group. The 7th through 11th competencies are classified as Group 2. Following the same statistical procedures, the remaining competencies are classified into additional five groups. The results are given in Table 1.

The results reveal that undergraduate accounting graduates must master the six types of software in Group 1:

- Financial Spreadsheets
- Business Graphics
- Word processing
- Presentation
- Audit Software
- Tax Preparation software

Fifty three (84%) to 59 (94%) out of 63 respondents rated them very important. The six types of software in Group 1 are followed by the following five competencies in Group 2:

- Small Business Systems
- Database Management Systems
- Computerized Accounting Packages
- Evaluation of Entity's IT Assurance Needs
- Communication software (e-mail, file transfer, web browser)

The group mean of the second group is a high 4.69 which indicates that in addition to the software in group 1, accounting graduates must also master the four types of software in Group 2. Moreover, they must have the KSAs to “analyze/evaluate and advise on entity’s IT assurance needs based on legal, ethical, professional standards and other requirements and best practices” (IFAC, 2003). All recruiters consider the IT competencies listed in Groups 1 and 2 very important or important.

Group 3 includes:

- Operating and managing own system and organizing system resources
- Safeguarding of system against unauthorized use, software piracy, virus attacks and system failure
- Operating systems

The three items in Group 3 are basic computer operating KSAs. They are normally covered in an IT literacy course. Those who do not possess those KSAs may be considered computer illiterate. It is a surprise to see them not being included in Group 1.

Group 4 contains:

- Decision support software
- Statistical analysis and forecasting packages
- Utility programs

Seventy eight (78) percent to 82 percent of correspondents consider the three competencies in Group 4 very important or important. AICPA expects individuals preparing to enter the accounting profession must be able to use quantitative techniques to determine relative importance and likelihood of alternative scenarios, and employs model-building to quantify problems or test solutions (AICPA, 2008). It is not a surprise to see that accounting graduates are expected to be able to use quantitative analysis software.

The competencies in groups 5 and 6 with the highest and lowest means of ranks are web application development software ($\bar{X}_{18}=3.73$) and system development life cycle ($\bar{X}_{28}=3.18$), respectively. Testing the hypotheses:

$$H_0: \mu_{18} = 4$$

$$H_1: \mu_{18} < 4$$

and

$$H_0: \mu_{28} = 3$$

$$H_1: \mu_{28} > 3$$

we accept $\mu_{18} < 4$ ($t=-3.84$, $P=.0002$) and $\mu_{28} > 3$ ($t=3.021$, $P=.001$). The fact that the means of the ranks of the competencies in groups 5 and 6 are between 3 and 4 indicates that they are desirable but not absolutely required. The competencies in Group 6 deal with systems analysis and design which was one of the KSAs considered most important by Corporate America according to a 1994 study by The Institute of Management Accountants and Financial Executives International. Further research is needed to clarify the contradictory findings.

The competencies in Group 7 are related to the management of IT adoption, implementation, and use. More than 80 percent of the respondents did not consider them important. Possibly it is because that those items are the tasks of the IT department in many organizations or the entry-level accountants are not assigned to those tasks.

Table 1
Information Technology Competencies

| IT Competencies (X_i) | Frequency of Rank | | | | | Total Freq. | Mean of Ranks | F-Value | Ranking in Groups and Group Mean(\bar{X}) |
|---|-------------------|----|----|---|---|-------------|---------------|--|---|
| | 5 | 4 | 3 | 2 | 1 | | | | |
| Financial spreadsheets (X_1) | 59 | 4 | 0 | 0 | 0 | 63 | 4.94 | $H_0: \mu_i = \mu, i=1, \dots, 6$ $F=1.17$ $P=0.32$ | 1 $\bar{X} = 4.90$ |
| Business graphics software (X_2) | 59 | 4 | 0 | 0 | 0 | 63 | 4.94 | | |
| Word processing software (X_3) | 58 | 5 | 0 | 0 | 0 | 63 | 4.92 | | |
| Presentation software (X_4) | 57 | 6 | 0 | 0 | 0 | 63 | 4.90 | | |
| Audit software (X_5) | 54 | 9 | 0 | 0 | 0 | 63 | 4.86 | | |
| Tax preparation software (X_6) | 53 | 10 | 0 | 0 | 0 | 63 | 4.84 | | |
| Small business systems (X_7) | 48 | 15 | 0 | 0 | 0 | 63 | 4.76 | $H_0: \mu_i = \mu, i=7, \dots, 11$ $F=1.98$ $P=0.10$ | 2 $\bar{X} = 4.69$ |
| Database mgmt systems (X_8) | 47 | 16 | 0 | 0 | 0 | 63 | 4.75 | | |
| Computerized accounting packages (X_9) | 45 | 18 | 0 | 0 | 0 | 63 | 4.71 | | |
| Evaluation of entity's IT assurance needs (X_{10}) | 41 | 22 | 0 | 0 | 0 | 63 | 4.65 | | |
| Communication software (e-mail, file transfer, web browser) (X_{11}) | 37 | 24 | 2 | 0 | 0 | 63 | 4.56 | | |
| Operating and managing own system and organizing system resources (X_{12}) | 25 | 34 | 4 | 0 | 0 | 63 | 4.33 | $H_0: \mu_i = \mu, i=12, 13, 14$ $F=0.24$ $P=0.79$ | 3 $\bar{X} = 4.31$ |
| Safeguarding of system against unauthorized use, software piracy, virus attacks and system failure (X_{13}) | 25 | 34 | 4 | 0 | 0 | 63 | 4.33 | | |
| Operating systems (X_{14}) | 26 | 27 | 6 | 2 | 0 | 61 | 4.26 | | |
| Decision support software (X_{15}) | 13 | 36 | 11 | 0 | 0 | 60 | 4.03 | $H_0: \mu_i = \mu, i=15, 16, 17$ $F=0.21$ $P=0.81$ | 4 $\bar{X} = 3.99$ |
| Statistical analysis and forecasting packages (X_{16}) | 11 | 39 | 13 | 0 | 0 | 63 | 3.97 | | |
| Utility programs (text editor, folder manager, file compression, back-up/recovery) (X_{17}) | 11 | 36 | 11 | 1 | 0 | 60 | 3.97 | | |
| | | | | | | | | $H_0: \mu_i = \mu, i=15, \dots, 18$ $F=2.65$ $P=0.049$ | |

| | | | | | | | | | |
|---|---|----|----|----|---|----|------|---|-----------------------|
| Enterprise Resources Planning Software (X_{18}) | 2 | 37 | 17 | 0 | 0 | 56 | 3.73 | $H_0: \mu_i = \mu, i=18,19,20$ $F=0.81$ $P=0.45$ | 5 $\bar{X} = 3.72$ |
| Web application development software (X_{19}) | 2 | 38 | 18 | 0 | 0 | 58 | 3.72 | | |
| Computer Languages (X_{20}) | 7 | 37 | 19 | 0 | 0 | 63 | 3.71 | | |
| Evaluation of Information System Objectives (X_{21}) | 3 | 28 | 26 | 6 | 0 | 63 | 3.44 | $H_0: \mu_i = \mu, i=21,\dots,28$ $F=1.23$ $P=0.28$ | 6 $\bar{X} = 3.32$ |
| System evaluation methods and techniques (X_{22}) | 2 | 28 | 27 | 5 | 0 | 62 | 3.44 | | |
| Communicating results of system evaluations (X_{23}) | 0 | 29 | 26 | 8 | 0 | 63 | 3.33 | | |
| Role of info. in organization design and behavior (X_{24}) | 0 | 22 | 39 | 2 | 0 | 63 | 3.32 | | |
| Specific types of system evaluations (X_{25}) | 1 | 23 | 31 | 7 | 0 | 62 | 3.29 | | |
| System evaluation following up (X_{26}) | 0 | 25 | 30 | 8 | 0 | 63 | 3.27 | | |
| System analysis and design techniques (X_{27}) | 0 | 19 | 42 | 2 | 0 | 63 | 3.27 | | |
| System development life cycle phases, tasks, & practices (X_{28}) | 0 | 13 | 47 | 2 | 0 | 62 | 3.18 | | |
| Financial control over IT (X_{29}) | 0 | 12 | 37 | 14 | 0 | 63 | 2.97 | | |
| IT Administrative issues (X_{30}) | 0 | 9 | 40 | 14 | 0 | 63 | 2.92 | $H_0: \mu_i = \mu, i=29,\dots,35$ $F=0.33$ $P=0.92$ | 7 $\bar{X} = 2.89$ |
| IT Operational issues (X_{31}) | 0 | 10 | 38 | 14 | 1 | 63 | 2.90 | | |
| Mgmt of system maintenance and change (X_{32}) | 0 | 10 | 35 | 15 | 1 | 61 | 2.89 | | |
| Mgmt of end-user computing (X_{33}) | 0 | 9 | 36 | 15 | 1 | 61 | 2.87 | | |
| Security, back-up and recovery (X_{34}) | 0 | 7 | 41 | 14 | 1 | 63 | 2.86 | | |
| Mgmt of system acquisition, development and implementation (X_{35}) | 0 | 7 | 39 | 16 | 1 | 63 | 2.83 | | |

Conclusion

IT has been changing the way organizations operate. Wide use of IT in the business world creates new demand for skills and knowledge that accounting students are expected to have. Our findings indicate that new accounting graduates are expected by their employers to be able to:

1. Use the following types of software at the expert level:
 - Financial spreadsheets
 - Business graphics
 - Word processing
 - Presentation
 - Audit
 - Tax preparation
 - Small business systems
 - Database management systems
 - Computerized accounting packages
 - Communication software (e-mail, file transfer, web browser)
2. Evaluate entity's IT assurance needs
3. Organize and manage own system and organize system resources,
4. Safeguard system against unauthorized use, virus, spam, and spyware,
5. Be familiar with the following types of software:
 - Operating systems
 - Decision support software
 - Statistical analysis and forecasting packages
 - Utility programs (text editor, folder manager, file compression, back-up/recovery)

As potential employers demand more IT KSAs, accounting curriculum needs to be changed to meet such expectations. Teaching accounting students only on traditional accounting topics may put them at a competitive disadvantage in the job market. Adding additional IT courses to the accounting curriculum may not be feasible in the campus climate of nowadays. A more practical approach is to integrate IT into existing accounting courses. Some Accounting instructors may not feel comfortable with IT. A workshop may encourage them to grow in IT KSAs and confidence. Adding one or two faculty in accounting information systems may also speed up the integration process.

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