

A FACTOR ANALYSIS OF THE SKILLS NECESSARY IN ACCOUNTING GRADUATES

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ABSTRACT

This study obtains the opinions of two important constituent groups for higher education accounting programs: (1) public accountants and (2) non-public accountants, regarding the importance of accounting-related skills and topics to be covered in undergraduate curricula. Factor analysis was used to determine common factors for each group. The level of importance of factors was then compared within each group.

INTRODUCTION

Dissatisfaction with the level of accounting knowledge and skills exhibited by new hires has been of concern by employers for a number of years. According to Nelson (1995) impassioned cries for changes in accounting education have come from the accounting profession since the "inception of university programs." As accounting has moved beyond the use of pencils, erasers, and 12-column worksheet paper toward embracing today's technology, these concerns have become more apparent. In short, accounting graduates need to understand and master accounting-related skills and topics associated with technological innovations including hardware and software in order to be productive starting with their first day on the job. Further, in order to function in today's diverse business environment, other accounting-related skills and topics may be essential, such as proficiency in a second language, creativity in problem solving and internet research.

In order to address these issues, accounting curricula may now incorporate business classes that help students obtain skills in software such as Excel, Word, and Access, and learn about technology such as telecommunication software, intranets, and client/server management. Other business courses help students become aware of the impact of diverse workplaces, as well as global, ethical, and environmental issues. Even so, accounting programs have been especially inundated in the past two and a half decades with studies and position papers addressing the quality of education available for accounting students and recommending changes in educators' approach to providing a more comprehensive knowledge of accounting. As recently as 1998 the AICPA issued their top five issues for the public accounting profession in their Vision Project, also offering guidance for changes in higher education for aspiring CPAs.

Some practitioners and academicians seem to feel that academic accountants have addressed only some of the issues raised with only a limited amount of success. The 2000 Albrecht and Sack (A&S) seminal study reporting that, in general, accounting education had not changed substantively in response to the demands of accounting practitioners which expresses concern about the future of accounting programs provided further food for discussion. Albrecht (2002) also took his concerns to the American Association of Collegiate Schools of Business (AACSB), causing substantial upheaval in accredited

institutions. To illustrate the impact of Albrecht and Sack's research, Johnson and Halabi (2009) determined that A&S was cited in over 29% of published research papers during the seven-year period between the beginning of 2001 and the end of 2007, which is certainly evidence of a strong reaction to their concerns on the part of the professoriate.

Others have expressed concern that accounting programs in general have geared their accounting curricula solely for students interested in public accounting, excluding students who are more interested in the non-public accounting arena (Ahadiat, 2008). However, there does not seem to be a consensus about the courses that should be completed in order to ensure success in the non-public accounting arena (see, for example, Hurt, 2007). The purpose of this paper is to report the findings of a study examining the viewpoints of public accounting and non-public accounting professionals regarding accounting-related skills and topics they feel students should have prior to employment. Perspectives of practicing accountants, both in public accounting and in other areas of accounting, were gathered in order to gain insight into this question.

METHOD

Currently practicing accountants should be well-informed about the skills that are critical for new hires to possess in order to ensure success in their respective fields and topics that should be part of an accounting program. Lending further support to this methodology, A&S indicate that each accounting program has the responsibility of determining the needs of its own key stakeholders, incorporating internal and external environments that are unique to each. Finally, AACSB accreditation standards reinforce the concept that curricula must consider constraints and opportunities that may be specific to a particular business program based on its mission.

Surveying local accounting professionals regarding perceptions as to the importance of accounting-related skills and topics needed by their new-hires should provide valuable insight into the curriculum required of accounting programs in the local area. Cory (2009) reported results of her study about course topics and degree preference but limited the analysis of responses from her survey participants to only those currently practicing public accounting. Similarly, Cory and Huttenhoff (2011) based their analysis solely on responses from non-public accountants. This study compares perspectives of both groups of external stakeholders and focuses on accounting-related skills and topics which may also lend support to a successful accounting career.

The survey was distributed to 2,300 individuals who were either members of a large, regional CPA society in south Texas, members of the Institute of Management Accountants in the same area, or employers who had interviewed on a South Texas university campus during the previous three years. A total of 464 usable surveys were returned which is a response rate of approximately 19%. This rate is comparable to that reported in similar studies. Approximately 46% of the surveys were completed by individuals currently practicing public accounting and 54% by individuals who were employed in the non-public accounting arena.

Respondents were asked to indicate, from the standpoint of their organization's business, how important it was for accounting students to have obtained certain accounting-related skills prior to graduation. Respondents were provided with a list of 34 skills and

asked to rank each one on a three-point scale, with one indicating “not important,” two indicating “important, but not critical” and three indicating “critical.” If the respondent did not know how critical a skill was, they chose “4” as the answer. The responses were coded according to the number chosen for each skill and any response in the “Do Not Know” column was eliminated from analysis.

RESULTS

Given the amount of information collected (34 skills), principal components factor analysis was used to determine common factors for each group. This made the analysis more manageable (Pedhazur and Schmelkin, 1991) and resulted in ten factors for each group. For the CPAs, six factors consisted of multiple skills, each loading at .45 or above. For the Non-CPAs, eight factors consisted of multiple skills, each loading at .45 or above. No skills cross loaded for either group. The next step in the analysis was to compute the average for each factor. The factors for each group were then compared from one to the next, starting with the most important factor (e.g. the factor with the highest average). Keeping in mind that a rating of “2” indicates that the skill is “important, but not critical,” four factors for CPAs averaged in excess of 2 and four factors for the non-CPAs averaged more than 2. The lowest mean for CPAs was 1.45883 and the lowest mean for non-CPAs was 1.36618.

The 34 skills are listed in Table 1 and the factor on which each skill loaded is indicated for each group of respondents. Four skills (Operating Systems other than Windows, Collaboration Software (e.g. Lotus notes), Process/Operational Improvement and Sales/Marketing) did not load on any factor for the CPAs. Two skills (Telecommunication software and Programming Languages) did not load on any factor for the non-CPAs.

As indicated in Table 1, means were then computed for each factor and are shown in Table 2 for CPAs and in Table 3 for non-CPAs. Finally, t-tests were computed to determine significant differences between factors, from highest to lowest ranked from one to the next for each group. The results are shown for the factors for CPAs and for non-CPAs in Tables 4 and 5, respectively.

As Table 2 indicates, CPAs ranked Factor 9 (Problem Solving), as the highest, followed by Factor 10 (Ethics), Factor 6 (Software), Factor 7 (Technology), Factor 5 (Audit), Factor 3 (Computers), Factor 2 (Softer Skills), Factor 8 (Language), Factor 4 (Nets) and finally Factor 1 (Information Systems). Non-CPAs, as shown in Table 3, listed Factor 6 (Software 1) as having the highest importance, followed by Factor 5 (Software 2), then Factor 8 (Technology), Factor 7 (Projects/Problem Solving), Factor 2 (Softer Skills), Factor 3 (Computer/Nets), Factor 9 (Audit/Language/Sales), Factor 1 (Systems), Factor 10 (Collaboration), and finally, Factor 4 (Web).

TABLE 1
Skills and Factor Loadings

Skill/Topic	Factor, CPAs	Factor, Non-CPAs
Auditing through the computer	5	9
Telecommunication software	3	
Computer hardware	3	3
Database software (e.g. Access)	3	5
Data analysis/use of Audit Command Language	3	5
Web design	1	4
Graphics software (e.g. Adobe)	3	4
Intranets	4	3
Extranets	4	3
Windows	6	6
Presentation Software (e.g. PowerPoint)	6	5
Programming languages	1	
Spreadsheet software (e.g. Excel)	6	6
Technology security and controls	7	8
Technology terminology	7	8
Operating systems other than Windows.	1	1
Word processing software (e.g. Word)	6	6
Internet research	6	8
Client/Server management	1	1
Information systems planning	1	1
Information systems auditing	5	1
Project management	1	7
Systems analysis	1	1
Technology management and budgeting	1	1
Collaboration software (e.g. Lotus notes)		10
Process/Operational Improvement		1
Foreign language	8	9
Awareness of global issues	2	2
Sensitivity to cultural diversity	2	2
Awareness of changing demographics	2	2
Awareness of ethical issues	10	7
Sensitivity to environmental issues	2	2
Creativity in problem solving	9	7
Sales/Marketing		9

TABLE 2
Factors: CPAs
In order of importance

Factor	Mean	Description
9	2.67005	Problem Solving
10	2.64975	Ethics
6	2.46276	Software
7	2.04381	Technology
5	1.92204	Audit
3	1.85143	Computers
2	1.82219	Softer Skills
8	1.53030	Language
4	1.50843	Nets
1	1.45883	Information Systems

In order to determine whether these factors were statistically significantly different from one to the next rank for each group, t-scores were determined. As shown in Table 4, CPAs ranked Problem Solving and Ethics in that order, but there was no statistical difference between the two factors. However, there were significant differences when comparing Ethics with Software factors, Software with Technology factors, Technology and Audit factors, Audit and Computers factors, and Softer Skills with Language factors. There were no significant differences between Computers and Softer Skills factors, Language and Nets factors or Nets and Information Systems factors, which was rated the least of the ten factors by the CPAs. As shown in Table 5, non-CPAs ranked the Software 1 factor, which consists of Windows, Spreadsheet Software (Excel) and Word Processing (Word), the highest. This ranking is statistically higher than the Software 2 factor, which consists of Database Software (Access), Data Analysis/Use of ACL, and Presentation Software (Powerpoint). No significant differences were found in the rankings of Software 2 and Technology factors, Technology and Projects/Problem Solving factors, Audit/Language/Sales and Systems factors, or Systems and Collaboration factors. However, in addition to the significant difference found between the two highest ranked factors, significant differences were found between the Projects/Problem Solving and Softer Skills factors, the Softer Skills and Computer/Nets factors, the Computer/Nets and Audit/Language/Sales factors and the Collaboration and Web factors, which were ranked the lowest of the ten by the non-CPAs.

There may be several reasons for these differences in factor loadings between the two groups and the related perception of how critical these accounting-related skills and topics are for new hires in accounting. This outcome is not surprising, given that previous research (Cory & Pruske, 2012) determined that public accountants and non-public accountants ranked individual skills required of recent accounting graduates differently. For example, CPAs ranked Creativity in Problem Solving highest, but the non-CPAs ranked it fourth highest. The second highest ranked skill for CPAs was ethics, but for non-CPAs, that skill was included in their fourth highest ranked factor. However, in both of the aforementioned cases, the factor for CPAs had only one skill loaded on it, and the related factor for the non-CPAs included a total of three skills. Both groups rated software skills highly, with CPAs ranking them third and non-CPAs ranking them first and second. This is a clear indication

that both groups perceive the need for new accounting graduates to have mastered certain software packages. The technology factor and the computer factors are ranked in similar positions in the two groups, although certain skills associated with factor 1 (ranked tenth) for the CPAs are ranked lower than for the non-CPAs' factor 1 (ranked eighth). It is logical that CPAs would value their Factor 5, Audit, ranked fifth, more than the non-CPAs. The non-CPAs included auditing skills in their Factor 9, ranked seventh. The factor associated with Softer Skills is ranked lower for CPAs (seventh) than non-CPAs (fifth).

TABLE 3
Factors: Non-CPAs
In Order of Importance

Factor	Mean	Description
6	2.79549	Software 1
5	2.26876	Software 2
8	2.18611	Technology
7	2.17969	Projects/Problem Solving
2	1.92946	Softer Skills
3	1.77976	Computer/Nets
9	1.69198	Audit/Language/Sales
1	1.69089	Systems
10	1.65702	Collaboration
4	1.36618	Web

TABLE 4
Differences in Factors
CPAs

Factors	T-Test	Significance
Factors 9 and 10	0.35	n/a
Factors 10 and 6	4.49	<.0001
Factors 6 and 7	12.93	<.0001
Factors 7 and 5	2.31	.0221
Factors 5 and 3	2.18	.0308
Factors 3 and 2	0.90	n/a
Factors 2 and 8	6.96	<.0001
Factors 8 and 4	0.15	n/a
Factors 4 and 1	-0.14	n/a

TABLE 5
Differences in Factors
Non-CPAs

Factors	T-Test	Significance
Factors 6 and 5	16.60	<.0001
Factors 5 and 8	1.86	n/a
Factors 8 and 7	0.21	n/a
Factors 7 and 2	10.35	<.0001
Factors 2 and 3	3.50	.0006
Factors 3 and 9	2.04	.0430
Factors 9 and 1	-0.14	n/a
Factors 1 and 10	0.54	n/a
Factors 10 and 4	5.93	<.0001

CONCLUSION

Implications for accounting educators are interesting. The statistical differences between factors also provide interesting results. CPAs basically ranked Creativity in Problem Solving and Awareness of Ethical Issues equally (first and second, respectively, no statistical difference between them). Therefore, these would seem to be the top two skills on which accounting educators should focus when working with students headed for a career in public accounting. Yet these two are probably the most difficult to convey to students and also the learning outcomes related to each the most difficult to measure. The non-CPAs' top two ranked skills are associated with software, which do not have the same difficulties of conveyance and learning outcome measurement. Further, CPA candidates are expected to pass the CPA exam, and creativity in problem solving is not tested on it. Should educators focus on teaching software aspects, to the exclusion of creativity in problem solving or ethics when working with students destined for a non-public accounting career? Most would reply in the negative.

Finally, this study has some limitations that should be addressed. Responses were obtained from individuals in only one geographical area, which may make findings difficult to generalize to a wider population. Only 34 skills were listed on the survey, but additional information could have been gathered with the research instrument. Further, information about the viewpoints of recently hired accounting graduates regarding the skills they feel are necessary for a successful career in accounting and whether they had those skills upon arrival to their first accounting position could be gathered. These can certainly be the seeds for future research.

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