

INFORMATION TECHNOLOGY “KNOWLEDGE AND SKILLS” COVERAGE IN THE TOP ACCOUNTING PROGRAMS: A COMPARISON BETWEEN CHINA AND USA

Bernard Han, Western Michigan University, Kalamazoo, MI, (269) 387-5409, bernard.han@wmich.edu

Liangwen Sun, ¹Wuhan University of Technology, ²Inner Mongolia Finance and Economics College
47 Hailaer Street, Hohhot, Inner Mongolia, China, sunliangwen@gmail.com

J. Michael Tarn, Western Michigan University, Kalamazoo, MI, (269) 387-5428, mike.tarn@wmich.edu

Abstract: Over the past two decades, IT knowledge/skills have been increasingly emphasized and studied in accounting education by the academics and practitioners. This paper is to verify the differences of IT education provided by the top 10 accounting programs of higher education institutes in China and the United States. Results of our study indicate that the top accounting programs in China offer more better-designed IT curriculum for their students than the top programs in USA. In addition, our detailed analysis shows that, on average, Chinese universities are better than American universities in providing a balanced IT education with respect to both hands-on skills and conceptual knowledge.

INTRODUCTION AND LITERATURE REVIEW

Since late 1950s, computers have been put into commercial use for data processing to expedite the derivation of information. Subsequently, many business applications were developed in support of transaction processing and financial report generation for internal control and performance monitoring in the accounting field. Indeed, for more than fifty years accountants and accounting professions have always been active users of information technology (IT) in producing information (Ahmed 2003), from which performance measures are derived in guiding resource allocations and redistribution, if necessary, for maximizing profits to meet interests of corporate stakeholders. Nevertheless, it was not until recently IT knowledge and skills, in particular in areas of *information compliance*, *ethics*, and *security*, received extra attention by the accounting educators to prevent accounting frauds such as *the Enron Event* (Blair *et. al* 2007; Fu 2003) and to meet the regulation of the Sarbane-Oxley (SOX) Act passed in 2002 (Mehta *et. al* 2007; Dhillon and Mishra 2006). A review on IT knowledge/skills and their criticalness in accounting profession and education is given in the next section.

As found out by Dillon and Kruck (2004), most organizations today do require entry-level accountants (i.e., new hires) be familiar with necessary IT knowledge and skills needed to fill the employment trends. In specific, accounting graduates must have sufficient technical skills and conceptual knowledge of accounting information systems, and know how information technology could be integrated into the accounting process. To meet these growing needs for technologically savvy accountants, many colleges and universities started to offer a concentration, a minor, or even a major in Accounting Information Systems (Fordham 2005).

Over the past few years, research on IT's role and its coverage in accounting education has gained more and more attention. A thorough research on the level of IT/IS skills in Accounting Programs in British universities was conducted by Ahmed (2003). His findings show both academics and practitioners have recognized the value and importance of IT knowledge/skills for accountants to achieve successfully in the competitive business world. Another real-world case study conducted by Gelinis and Gogan (2006) also indicates that accounting professionals play critical roles at multiple stages in pilot testing of a new information system that involves an e-procurement system for the United States Department of Treasury Bureau. In the meantime, numerous studies were conducted on the issues such as the coverage of IT and its role in Accounting and the delivery of Accounting Information Systems course such as studies by Cheng (2007), David *et. al* (2003), Bain *et. al* (2002), Doost (2002), and de Wet and van Niekerk (2001), just to name a few.

Over the past decade, many studies (in Chinese) have been conducted focusing on the topics and extent of IT knowledge/skills to be covered in the accounting program. Among them, a seminal research was conducted by Lin *et. al* (2004). They surveyed three

groups of people (i.e., accounting practitioners, educators, and students) by asking respondents to provide a “sequential index” (i.e., a ranking) for each of a defined set of knowledge/skills. Their study results are compared to those of an early study by Albrecht and Sack (2000). One interesting finding, with respect to IT knowledge/skills, shows that Chinese practitioners/educators emphasize more on IT skills than conceptual knowledge, whereas U.S. practitioners/educators focused more on IT conceptual knowledge than skills. Overall, Lin *et. al* (2004) concluded that China needs to strengthen the breadth of her accounting education by covering more interdisciplinary knowledge/skills, and specifically, emphasize more on the IT system concepts than technical computing skills. To verify these findings, our research gives a detailed look on the IT courses required for the accounting majors in China and the United States. The next section will detail the data collection method and the source of our data for this research.

DATA SOURCES AND DATA COLLECTION METHOD

The primary objective of our research is to verify the differences of IT education provided for the accounting majors by higher education institutes (HEI) in China and the United States. Due to the large number of HEI in China and in the US, collecting primary data through a questionnaire may not be easy and, in fact, not realistic since not all HEI offer the accounting program, let alone there is a high degree of quality difference among the respondents (i.e., research subjects).

Data Sources

Data sources are confined to the top ten (10) accounting programs in China and the United States based on two most popular ranking indexes, the former developed by Wu *et. al* (2008) and the latter, by *U.S. News and World Report* (available at <http://colleges.usnews.rankingsandreviews.com/college/spec-accounting>). The top ten undergraduate accounting programs in China and the United States are listed in Table 1 and Table 2 respectively.

Table 1: Top 10 Undergraduate Accounting Programs in China

| Ranking | University Name | Code |
|---------|---|------|
| 1 | Xiamen University (廈門大學) | XMU |
| 2 | Shanghai University of Finance and Economics (上海財大) | SHU |
| 3 | Renmin University of China (中國人民大學) | RMU |
| 4 | Peking University (北京大學) | PKU |
| 5 | Tsinghua University (清華大學) | THU |
| 6 | Dongbei University of Finance and Economics (東北財大) | DBU |
| 7 | Xi'an JiaoTong University (西安交大) | JTU |
| 8 | Zhongnan University of Economics and Law (中南財經政法) | ZNU |
| 9 | Zhejiang University (浙江大學) | ZJU |
| 10 | Southwestern University of Finance and Economics (西南財大) | SWU |

As shown in Table 1, four of the top ten accounting programs (i.e., #2, 6, 8, and 10) are offered by universities with a special focus on “finance and economics” and the remaining six are offered by regular comprehensive universities.

Table 2: Top 10 Undergraduate Accounting Programs in the United States

| Ranking | University Name | Code |
|---------|--|------|
| 1 | University of Texas – Austin | UTA |
| 2 | University of Illinois--Urbana-Champaign Champaign, IL | UIU |
| 3 | University of Pennsylvania | UPE |
| 4 | Brigham Young University--Provo, UT | BYU |

| | | |
|----|---|-----|
| 5 | University of Southern California | USC |
| 6 | University of Michigan – Ann Arbor, MI | UOM |
| 7 | University of Notre Dame, IN | UND |
| 8 | Indiana University--Bloomington, IN | IUB |
| 9 | New York University, New York, NY | NYU |
| 10 | Michigan State University, East Lansing, MI | MSU |

Unlike China, all the top ten accounting programs are offered by regular comprehensive universities – five are private (i.e., #3, 4, 5, 7, and 9) and the remaining are public universities. For later reference, a three character code is defined for each university. A brief description is given below about our data collection method.

Data Collection Method

A secondary data collection method is used in this research. The detailed course requirements for each accounting program are first located via an Internet search on the university's website. If multiple versions or dated curriculum requirements were posted, then the contents were verified by a follow-up phone call to the university to ensure their currency. For some universities (e.g., University of Michigan), either a two-year or a three-year upper undergraduate program is offered for the accounting major, then extra efforts were made to search the comprehensive curriculum requirements by retrieving the university catalog to identify all IT-related courses (e.g., computer literacy, introduction to IT, etc.) from the university general education requirements to the common college core courses for all business majors. Our intent is to provide a fair assessment on all IT knowledge and skills required for an undergraduate student before he/she completes a major in accounting. Detailed results of collected data are presented in the next section.

IT KNOWLEDGE/SKILLS REQUIRED FOR THE ACCOUNTING PROGRAMS

In contrast to existing studies that have been focused on the topics and specific skill sets to be covered for the first Accounting Information Systems course (Bain et. al 2002, Doost 2002) or accounting education (Badua 2008, Robson *et. al* 2003), our study are categorized into the following two major components – Aggregate Data Summary and Detailed Data Summary.

Aggregate Data Summary

In this component, all IT courses, in terms of credit hours, required by the university and college curricula for pre-accounting major are recorded. Furthermore, the credit hours of all IT courses offered by the accounting program, both the required ones and the elective ones, are also recorded. With these data, aggregate measures (in %) can be derived to reflect the extent of IT education provided by the *undergraduate common cores* and the *accounting program* of each HEI.

Results on the Extent of IT Education.

Table 3 summarizes the total IT education (in credit hours) required before and after an undergraduate student gets into the accounting program in China. As shown, on average, 7.25 credit hours of IT-related courses have to be taken by a student before entering the accounting program. Once admitted to the accounting program, each student will take an average of 2.8 hours of required and 3.3 hours of elective IT courses to complete his/her accounting major. Table 4 presents the statistics for the top ten universities in the United States. As shown, an average of 4.3 credit hours of IT education is required before a student enters the

accounting program, and it is almost 3 hours less than the students in China. Furthermore, the average required and elective IT credit hours for the US accounting majors are 1.6 and 1.3 respectively. Again, China's top ten offers 1.2 more required and 2.0 more elective credit hours for their accounting programs. Note that, on average, the total credit hours for the accounting program and the bachelor degree in China are much larger than those of the USA.

Table 3: IT and AIS Courses in Top 10 Accounting Programs in China

| University Code | Pre-Major IT Courses | | | Accounting Major Courses | | | | | | Total BA Degree Hrs TBDH | TITH/TBDH (%) | TAIH/TAMH (%) |
|-----------------|----------------------|---------------|---------------------|--------------------------|------------|--------------|----------------------|----------------------|------------------------------|--------------------------|---------------|---------------|
| | University Level | College Level | Total IT Hours TITH | Required | | Elective | | Total AIS Hours TAIH | Total Accting Major Hrs TAMH | | | |
| | | | | Accting courses | AIS Course | Elective Hrs | Potential AIS Course | | | | | |
| XMU | 5 | 3 | 8 | 43 | 2 | 16 | 8 | 10 | 61 | 165 | 4.8% | 16.4% |
| SHU | 2 | 2 | 4 | 30 | 4 | 21 | 2 | 6 | 55 | 169 | 2.4% | 10.9% |
| RMU | 6 | 0 | 6 | 18 | 3 | 18 | 0 | 3 | 39 | 168 | 3.6% | 7.7% |
| PKU | 6 | 3 | 9 | 13 | 2 | 45 | 2 | 4 | 60 | 137 | 6.6% | 6.7% |
| THU | 6 | 2 | 8 | 23 | 0 | 24 | 8 | 8 | 47 | 170 | 4.7% | 17.0% |
| DBU | 3 | 3 | 6 | 18 | 0 | 17 | 7 | 7 | 35 | 186 | 3.2% | 20.0% |
| JTU | 3 | 4.5 | 7.5 | 12 | 4 | 16 | 0 | 4 | 32 | 166.5 | 4.5% | 12.5% |
| ZNU | 6 | 3 | 9 | 23 | 3 | 19 | 3 | 6 | 45 | 162 | 5.6% | 13.3% |
| ZJU | 5 | 0 | 5 | 34 | 7 | 15 | 2 | 9 | 56 | 169 | 3.0% | 16.1% |
| SWU | 6 | 4 | 10 | 15 | 3 | 29 | 1 | 4 | 47 | 180 | 5.6% | 8.5% |
| AVG | 4.8 | 2.45 | 7.25 | 22.9 | 2.8 | 22 | 3.3 | 6.1 | 47.7 | 167.25 | 4.3% | 12.8% |

Table 4: IT and AIS Courses in Top 10 Accounting Programs in USA

| University Code | Pre-Major IT Courses | | | Accounting Major Courses | | | | Total BA Degree Hrs (TBDH) | TITH/TBDH (%) | TAIH/TAMH (%) | | |
|-----------------|----------------------|---------------|-----------------------|--------------------------|-------------|--------------|-----------------------|----------------------------|---------------|---------------|------|-------|
| | University Level | College Level | Total IT Hours (TITH) | Required | | Elective | | | | | | |
| | | | | Accting courses | AIS Courses | Elective Hrs | Potential AIS Courses | | | | | |
| UTA | 0 | 3 | 3 | 12 | 0 | 6 | 3 | 3 | 18 | 121 | 2.5% | 16.7% |

| | | | | | | | | | | | | % |
|------------|----------|------------|------------|-------------|------------|------------|------------|------------|-------------|--------------|-------------|--------------|
| UIU | 6 | 0 | 6 | 26 | 0 | 7 | 6 | 6 | 33 | 124 | 4.8% | 18.2% |
| UPE | 0 | 3 | 3 | 12 | 0 | 6 | 0 | 0 | 18 | 120 | 2.5% | 0.0% |
| BYU | 0 | 9 | 9 | 27 | 3 | 0 | 0 | 3 | 30 | 120 | 7.5% | 10.0% |
| USC | 0 | 0 | 0 | 22 | 4 | 8 | 4 | 8 | 34 | 128 | 0.0% | 23.5% |
| UOM | 0 | 3 | 3 | 21 | 0 | 0 | 0 | 0 | 21 | 120 | 2.5% | 0.0% |
| UND | 0 | 3 | 3 | 21 | 3 | 0 | 0 | 3 | 33 | 126 | 2.4% | 9.1% |
| IUB | 0 | 6 | 6 | 24 | 3 | 3 | 0 | 3 | 30 | 124 | 4.8% | 10.0% |
| NYU | 0 | 4 | 4 | 18 | 0 | 0 | 0 | 0 | 18 | 128 | 3.1% | 0.0% |
| MSU | 3 | 3 | 6 | 17 | 3 | 9 | 0 | 3 | 29 | 120 | 5.0% | 10.3% |
| AVG | 1 | 3.4 | 4.3 | 20.0 | 1.6 | 4.8 | 1.3 | 2.9 | 26.4 | 123.1 | 3.5% | 11.0% |

Detailed Data Summary

To verify the nature and the content of IT education, i.e., *conceptual vs. basic skills* and *conceptual vs. application skills*, collected data are further classified into the aforementioned category. Conducting this detailed classification is to identify whether there are some fundamental differences in IT education, with respect to its content and foci, between China and the United States. Detailed results are given below.

Results on the Content of IT Education. Table 5 provides a detailed breakdown of IT-related courses that are required for each student or be taken as electives before he/she can accomplish his/her accounting major. For example, column one in Table 5 indicates that a student in XMU (i.e., Xiamen University) will need to take five (5) credit hours of IT basic skills courses (i.e., *Computer Fundamentals* and *Introduction to Database Language*) and five (5) credit hours of IT conceptual knowledge courses (i.e., *Introduction to MIS* and *Accounting Information Systems*) to fulfill both the university and the accounting major requirements. However, XMU also offers three more IT-related electives (i.e., *AIS & Lab*, *AIS Auditing & Lab*, and *AIS Software Evaluation*) of a total 6 credit hours that may be taken by an accounting student. In brief, the top 10 Chinese accounting programs requires an average of 5 credit hours of basic skills and 4.85 conceptual knowledge courses in IT education. In addition, eight (8) different accounting electives using IT are offered across these campuses, and only two universities do not offer any elective.

Similar detailed data for the top 10 accounting programs of the United States is also prepared in Table 6. As seen, the average number of credit hours required for the “basic skills” component is 2.95 and the “conceptual knowledge” component is 2.95. In total, there is a 3.65 credit hours shortage as compared to what is required in China. In other words, the top 10 accounting programs require at least one more basic skills course for their students. In terms of the elective courses, surprisingly, seven (7) out of the top 10 American accounting programs do not offer any other AIS elective courses, and altogether five (5) different AIS electives are offered by the remaining three (3) campuses.

Table 5: Detailed IT Education in Top 10 Accounting Programs in China

| | Course Title | XMU | SHU | RMU | PKU | THU | DBU | JTU | ZNU | ZJU | SWU | Average |
|----------|---|-----------|----------|----------|-----------|----------|----------|-------------|-----------|-----------|-----------|-------------|
| A | Required IT/AIS Courses | | | | | | | | | | | |
| | a. Hands-on Skills | | | | | | | | | | | |
| | Computer Fundamentals | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2.9 |
| | Intro to Database Language | 2 | 0 | 3 | 3 | 3 | 0 | 2 | 3 | 2 | 3 | 2.1 |
| | Total Hands-on Hours (THOH): | 5 | 2 | 6 | 6 | 6 | 3 | 5 | 6 | 5 | 6 | 5 |
| | b. Conceptual Knowledge | | | | | | | | | | | |
| | Introduction to MIS | 3 | 2 | 0 | 3 | 2 | 3 | 2.5 | 3 | 2 | 4 | 2.15 |
| | Accounting Info Systems | 2 | 4 | 3 | 2 | 0 | 0 | 4 | 3 | 3 | 3 | 2.7 |
| | Total Conceptual Knowledge Hours (TCKH): | 5 | 6 | 3 | 5 | 2 | 3 | 6.5 | 6 | 5 | 7 | 4.85 |
| | Total required credit hours: | 10 | 8 | 9 | 11 | 8 | 6 | 11.5 | 12 | 10 | 13 | 9.85 |
| B | Elective AIS Courses | | | | | | | | | | | |
| | a. Applications Skills | | | | | | | | | | | |
| | AIS & Lab | 2 | | | | 4 | 2 | | 3 | | 1 | 1.2 |
| | AIS Auditing & Lab | 4 | | | | | | | | | | 0.4 |
| | IT Skills Testing | | 2 | | | | | | | | | 0.2 |
| | Database Applications | | | | | | | | | 2 | | 0.2 |
| | b. Conceptual knowledge | | | | | | | | | | | |
| | AIS Software Evaluation | 2 | | | | | | | | | | 0.2 |
| | AIS analysis and design | | | | | | 3 | | | | | 0.3 |
| | e-Commerce | | | | 2 | | 2 | | | 2 | | 0.6 |
| | IS/IT Ethics | | | | | 4 | | | | | | 0.4 |
| | Total elective credit hours: | 8 | 2 | 0 | 2 | 8 | 7 | 0 | 3 | 4 | 1 | 3.5 |

Table 6: Detailed IT Education in Top 10 Accounting Programs in USA

| | Course Title | UTA | UIU | UPE | BYU | USC | UOM | UND | IUB | NYU | MSU | Average |
|----------|---|----------|----------|----------|-----------|----------|------------|----------|----------|----------|----------|-------------|
| A | Required IT/AIS | | | | | | | | | | | |
| | a. Hands-on Skills | | | | | | | | | | | |
| | Computer Fundamentals | 3 | 3 | 3 | 6 | 0 | 1.5 | 3 | 0 | 4 | 3 | 2.65 |
| | Intro to Database | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 |
| | Total Hands-on Hours | 3 | 6 | 3 | 6 | 0 | 1.5 | 3 | 0 | 4 | 3 | 2.95 |
| | b. Conceptual | | | | | | | | | | | |
| | Introduction to MIS | 3 | 0 | 0 | 3 | 0 | 1.5 | 0 | 3 | 0 | 3 | 1.35 |
| | Accounting Info | 0 | 0 | 0 | 3 | 4 | 3 | 3 | 0 | 0 | 3 | 1.6 |
| | Total Conceptual Knowledge Hours (TCKH): | 3 | 0 | 0 | 6 | 4 | 4.5 | 3 | 3 | 0 | 6 | 2.95 |
| | Total required credit | 6 | 6 | 6 | 12 | 4 | 6 | 6 | 3 | 4 | 9 | 6.2 |
| B | Elective AIS Courses | | | | | | | | | | | |
| | a. Applications Skills | | | | | | | | | | | |
| | AIS in Finance/Adm | 3 | | | | | | | | | | 0.3 |
| | b. Conceptual | | | | | | | | | | | |
| | Introduction to MIS | | 3 | | | | | | | | | 0.3 |
| | AIS Analysis and | | 3 | | | | | | | | | 0.3 |
| | Accounting Info System | | | | | 2 | | | | | | 0.2 |
| | System Security & | | | | | 2 | | | | | | 0.2 |
| | Total elective credit | 3 | 6 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 2.2 |

FINDINGS AND ANALYSIS

While numeric data are summarized in Tables 5 and 6, generic insight into the key differences in IT education between China and the United States remains to be investigated. A detailed examination is given below.

A Detailed Look at the “Extent” of IT Education

To examine the extent of IT education, two major factors are considered -- the *Total IT hours* (TITH, column 3 of Table 3) required for a pre-accounting major and the *Total AIS hours* (TAIS) that can be taken by an accounting major. A measurement is created by using two derived factors, i.e., TITH and TAIS, for each university listed in Table 1 (China) and Table 2 (USA). As can be easily shown, seven out of the ten Chinese accounting programs have measurements above the centroid (5.8, 4.5). In other words, in terms of total credit hours, the top Chinese accounting programs provide more IT education than the top USA accounting programs.

As pointed earlier, Chinese universities require more credit hours for the accounting program and the undergraduate degree as compared to their counterparts in the United States. As seen on Tables 1 and 2, the average number of credit hours required for the accounting program is 47.7 and the undergraduate degree is 167.25 in China, as compared to their counterparts 26.3 and 123.1 in the United States. To alleviate the potential effect resulted from the different curriculum sizes, further analysis is conducted by using the percentage measurements (i.e., (TITH/TBDH) * 100 and (TAIH/TAMH) * 100). As values presented in the last two columns in Tables 3 & 4, based on the percentage measurements, there is no clear evidence that Chinese universities are superior to American universities in IT education.

A Detailed Look at the “Content” of IT Education

As addressed in the section of literature review, numerous studies have been conducted to identify proper IT topics to be covered for students with an accounting major. Essentially, IT/AIS courses can be classified into two major types: *hands-on skills* and conceptual knowledge (Lin *et. al* 2004). The same typology is employed to pinpoint the IT education content of the top ten accounting programs in China and the United States in order to verify our findings against the early results reported by Lin *et. al* (2004).

Using data presented in Tables 5 and 6, the content of IT education can be further investigated by comparing the *Total Hands-on Skills Credit Hours* (THOH) and *Total Conceptual Knowledge Credit Hours* (TCKH) provided by each accounting program of the top 10 universities listed in Tables 1 & 2. The overall average of these two values for these top 20 universities is (3.975, 3.9). With a little more check, it can be found that six out of the top ten Chinese accounting programs (i.e., SWU, JTU, ZNU, XMU, ZIU and PKU) provide *better-than-the-average* IT education, in both hands-on and conceptual knowledge, for their accounting majors. In contrast, only one American university (BYU) provides *better-than-the-average* IT education in terms of these two measurements. Overall, four out of the top ten American universities (i.e., IUB, UTA, UND, and UPE) are very weak IT education.

Furthermore, to ensure an unbiased analysis that has no curriculum size effect (i.e., the total credit hours required by each university), a percentage measure on each type of IT education (i.e., THOH and TCKH) is derived for further comparison. Our results indicate that there exists a wide variation in the content of IT education among the top 10 American universities. In contrast, nearly all of the top 10 Chinese accounting programs in China provide very balanced and better IT education than their counterparts in the United States.

DISCUSSION AND FURTHER RESEARCH ISSUES

There is little doubt that both academics and practitioners have recognized the value and importance of IT knowledge/skills as being essential to the career needs and success for accountants. Our findings do indicate some differences in the “extent” and “content” of IT education in the top accounting programs between China and USA. Albeit our detailed analysis does not provide a statistical proof (due to small sample size), based on *the simple average of total IT/AIS credit hours* and *the percentage of total credit hours in IT/AIS courses*, it is clear that Chinese universities outweigh the American universities in IT education for the accounting majors. Furthermore, our detailed analysis on the “content” of IT education also indicates that, on average, Chinese universities are better than American universities in providing a balanced IT education with respect to both hands-on skills and conceptual knowledge. Our findings are different from the results reported by Lin *et. al* (2004), in which the authors maintained that American universities focused more on Conceptual knowledge than hands-on skills and Chinese universities placed more emphasis on the learning of hands-on skills. Why does our study produce these findings even though USA is more mature in IT and has more general and specialty applications that can be used for the accounting education?

Our research results do raise some questions: 1) Why the top ten American accounting programs do not show a strong emphasis in IT education? 2) Why the top American accounting programs appear to have less IT/AIS education focus as compared to the top Chinese counterparts? 3) Why there is no clear correlation between the ranking of the accounting programs and their associated IT/AIS education in terms of credit hours and topics required for the accounting majors? Some potential causes are given below.

Potential Causes for the Differences in IT Education

For question 1 addressed above, some potential causes are:

- The top 10 accounting programs in USA programs are all housed within top-tier research-driven universities. As known to academicians, programs ranking is most often rated based on the research productivity of faculty and their accomplishments usually have less connection to subjects that are not a direct reflection of their discipline, i.e., accounting. Therefore, the accounting curriculum offered by the top universities in USA may not be a good representation for subjects such as IT that are still evolving.

- One critical fact that slows down the incorporation of IT education into the accounting program is due to the fact that few accounting faculty have an extensive background or expertise in technology, which was reported in a number of studies (David *et. al* 2003, Doost 2002). The key concerns from the accounting faculty are the immense time and efforts to be involved in learning technology for teaching while maintaining their confidence and success in career development (David *et. al* 2003).

In regard to the second question, why the top American accounting programs appear to have less IT/AIS education as compared to the Chinese ones? Our conjectures are:

- The total credit hours required by Chinese universities is about 33% more than the total hours required by the American Universities (i.e., 167.25 vs. 123.1). This huge difference may give Chinese universities the flexibility and capacity in curriculum design that requires students to take at least two to three basic IT courses at the university level, and at least one to two more conceptual IT/AIS courses after they entered the accounting programs. As data summarized Tables 3 and 4, most of the top 10 Chinese universities required two basic IT courses (from five to eight credit hours) during the first two years, and at least one AIS course to fulfill the accounting majors, whereas most American universities require one at the university/college level and possibly another one for the accounting major.
- While there is no direct evidence provided in this study, IT has been one of the key elements that boosted China's economic development over the past 30 years. Not until recently, business education, especially accounting, has been considered one of the most popular disciplines that have high market demands. Unlike the American universities, accounting is a relatively new discipline in Chinese universities and the curriculum is vibrant and responsive to the employment demands that will recruit new hires with practical knowledge and skills in both accounting and IT and AIS. Therefore, as seen in Table 3 and Table 5, Chinese accounting programs do require more IT courses and only two universities do not require any AIS course as part of the requirements in fulfilling the accounting major. Moreover, eight out of the top 10 Chinese universities offer elective AIS courses as compared to only four out of the top 10 American universities. Of course, more investigations need to be conducted to validate this conjecture.

Finally, why there is no connection between the ranking of the accounting programs and the “extent” and “content” of IT education required by the accounting programs? One possible cause may still be related to the program foci and the expertise associated with the accounting faculty. To our knowledge, there is no explicit assessment criterion on the accounting program evaluation that ties the offering of IT/AIS courses to the overall quality rating of the accounting program, albeit some minimum requirements in IT/AIS are considered during the assessment process. In other words, given the current rating process – both in China and the United States, the best-rated accounting program does not need to be the one that provides a full-range of IT/AIS courses, and the reverse is also true.

Further Study Issues

Our research may have triggered more questions than answers, though our findings do show that there are differences in IT knowledge/skills coverage in the top ten accounting programs between China and USA. To further extend our study and validate the conjectures in our discussion, there are a few issues need to be explored with more examination. Some brief descriptions are given below.

- Extend the size of data sources for a more extensive comparison. This extension may provide more solid statistic analysis on the differences of IT/AIS between China and USA. Results may be different, but with our expectation, they may just further prove that there exist differences in IT/AIS as claimed in this study.
- Identify the best curriculum design for the AIS discipline or course development. There is a constant need to upgrade/revise the curriculum for Accounting Information Systems. The traditional approach in teaching AIS in one or

two courses may not be sufficient to meet the upcoming needs came from both the industry and the globalized economy. A duplication of IT subjects as covered in MIS/CIS program is definitely not the approach to designing the AIS curriculum. Identifying topics to cover may turn out to be piecemeal work, which may not reflect the maturity of IT that has been developed to support business process integration and enterprise information processing in a collaborative environment. How AIS curriculum can be designed to max out the existing software resources using collaborative approach shall be considered.

CONCLUSIONS

The IT knowledge/skills covered by the top ten accounting preprograms in both China and USA are compared using secondary data collected from the website (with phone verifications) of each university. Our study provides analyses on both the aggregate data (i.e., the IT/AIS course credit hours and the percentage of total credit hours in IT/AIS) and the detailed data (i.e., the classified hands-on and conceptual course credit hours and their corresponding percentage of total credit hours). Our findings indicate that there exist differences in both the “extent” and the “content” of IT education of the top accounting programs between China and USA. With the simple mean value analyses, on average, the top Chinese accounting programs provide more credit hours and more balanced IT/AIS education than the USA in teaching IT knowledge and skills. Possible causes leading to these differences are discussed and further study issues are also addressed.

REFERENCES

- Ahmed, A. (2003). “The Level of IT/IS Skills in Accounting Programmers in British Universities,” *Management Research News*, Vol. 26 (12), pp. 20-58.
- Albrecht, W. and Sack, R., (2000). “Accounting Education: Charting the Course Through a Perilous Future” *Accounting Education Series #16*, Sarasota, FL, American Accounting Association.
- Badua, F. (2008). “Pedagogy and the PC: trends in the AIS curriculum,” *Journal of Education for Business*, Vol. 83 (5), pp. 259-264.
- Bain, C.E., Blankley, A., and Smith, I.M. (2002). “An examination of topical coverage for the first accounting information systems course,” *Journal of Information Systems*, Vol. 16 (2), pp. 143-164.
- Blair, B., Boyce, G., Davids, C., and Greer, S. (2007). *Reflecting on Contemporary Accounting: Teaching and Learning Social and Critical Perspectives*. Innovation in Accounting and Corporate Governance Education Conference, January 31 – February 2, Hobart, Tasmania.
- Burnett, S. (2003). “The future of accounting education: a regional perspective,” *Journal of Education of Business*, Vol. 78 (3), pp. 129-134
- Chen, K.W. (2007). “The curriculum design in universities from the perspective of providers in accounting education,” *Education*; Summer Vol. 127 (4), pp. 581-590.
- David, J. S., Maccracken, H, and Reckers, P. M.J. (2003). “Integrating technology and business process analysis into introductory accounting courses,” *Issues in Accounting Education*, Vol. 18(4), pp.417-426.
- Dhillon, G. and Mishra, S. (2006). “The Impact of Sarbanes-Oxley (SOX) Act on Information Security Governance,” Chapter V In

Enterprise Information Systems Assurance and System Security: Managerial and Technical Issues, M. Warkentin & R.B. Vaughn, eds., Idea Group Publishing, pp. 62-79.

Dillon, T.W. and Kruck, S.E. (2004). "The Emergency of Accounting Information Systems Programs," *Management Accounting Quarterly* Spring, Vol. 5 (2), pp. 29-36.

Doost, R.K. (2002). "The need for change in the way we teach accounting information systems," *Managerial Auditing Journal* Vol. 17(5), pp. 277-282.

Fordham, D. R. (2005). "New Roles for AIS Courses: A Surprising Findings from a Case Study," *Journal of Information Systems*, Vol. 19 (1), pp. 113-129.

Fu, D. (2003). "An Event Study of the Impact of Enron's Accounting Fraud on the Financial Industry." Dissertation, Department of Economics, University of Ottawa, Canada.

Gelinas, U., Gogan, J., and Janis L. (2006). "The United States Treasury Bureau of Engraving and Printing tests a new E-Procurement Mechanism," *Journal of Information Systems*, 20 (2).

Lin, Z. J., Xiong, X.Y., and Liu, M. (2004). "Knowledge base and skill development in accounting education: evidence from China," *The Fourth Annual International Conference on Accounting and Financial Issues – the Reform and Development of Accounting Education*, Oct 22-24, pp. 25-40.

Mehta, M. R., Lee, S. and Shah, J.R. (2007). "An IT Compliance Course Emphasizing Information System Design and Software Testing." *Proc ISECON 2007*, Vol. 24 (Pittsburgh), pp. 1-6.

O'Reilly, T. (2005). "What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software," retrieved May 4, 2009, from <http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html>

Robson, G.S., Savage, H.M., and Schffer, R.J. (2003). "Accounting education: changing skill sets to meet modern needs," *Catalyst*, July-August, pp.26-29.

Spathis, C. and Constantinides, S. (2004). "Enterprise resource planning systems' impact on accounting process," *Business Process Management Journal* Vol. 10 (2), pp. 234-247.

Second Life (2009). Retrieved May 18, 2009, from <http://secondlife.com/whatis/>.

Wu, S. (武书连), Lu, J. (吕嘉), and Guo, S. (郭石林) (2008). "The ranking of accounting programs in Chinese universities (2008 中国大学会计学专业排行榜)," *The Science of Science and the Science and Technology Management Journal 《科学学与科学技术管理》*, Published January 7, 2008. Retrieved on Jan 1, 2009 at <http://www.dongao.com/kjzx/jrtj/200806/18421.html>.