Accounting Information Systems is Losing Ground in the Accounting Program: Impact on the Microsoft Dynamics Student Certificate

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Abstract: Business schools and accounting associations are faced with the challenge of providing accounting students with adequate training in accounting information systems (AIS) and information technology (IT). AIS and IT cover topics such as enterprise resource planning systems (ERP) and customer relationship management (CRM). In the present study, with an accounting education perspective, we examine the following: What place does AIS occupy in the new Canadian CPA program? How have the challenges to develop AIS courses impacted the CPA education program? Here, the term AIS is defined broadly, including IT, ERP, and CRM. To answer these questions, we compare the coverage of AIS in the new CPA, with that of the three former Canadian accounting associations (CA, CGA and CMA), say prior to their unification. We examine how AIS is now integrated in university accounting programs. As a reminder, Canada is an important player in the worldwide accounting profession. Consequently, the importance CPA Canada allocates to AIS topics in its education program sends a significant signal to business schools, educators, and curriculum developers. Results indicate that the emphasis on AIS was greater before the unification of the accounting profession, when the courses offered, and required, were greater. In many cases, students cannot anymore study AIS per se, but related topics through the management information systems field. Overall, the new CPA program places greater emphasis on finance, strategy and governance, and less on IT, ERP, and CRM, and the application of IS to accounting. With less AIS/IT courses offered in business schools, and required in accounting programs, this will have an impact on AIS certification programs, such as the Microsoft Dynamics Student Certificate Program (MDSCP), providing universities ERP and CRM software. To earn the certificate, students have to successfully complete a minimum of activity hours among a minimum of two different courses. With the advent of the CPA program, this may significantly jeopardize the MDSCP growing.

Keywords: Accounting information systems; Accounting education; Accounting association merger; Information technology; Enterprise resource planning systems; Customer relationship management.

INTRODUCTION

In January 2012, the Canadian Institute of Chartered Accountants (CICA), the Society of Management Accountants of Canada (CMA Canada) and the Certified General Accountants of Canada (CGA-Canada) issued a unifying framework for guiding the unification of the three Canadian accounting designations. The unification was intended to allow them to better meet the changing needs of both Canadian accountants and the national and international business community. As a reminder, Canada is an important player in the worldwide accounting profession. The unifying framework included the creation of a new designation, namely Chartered Professional Accountant (CPA), as well as the development of a new competency map, education program and exams. The province of Quebec was the first, in May 2012, to fully achieve the unification of the three accounting bodies (CA, CMA and CGA) at the provincial level. Now, the remaining provincial Canadian professional accountants joined the unification under CPA Canada.

For managers of accounting associations and accounting professors of business schools, a recurrent question that remains to be answered is: What type of education program and professional exams are needed in order to train competent professional accountants? To answer this question, a number of working groups and committees have been set up to discuss and issue reports on the future of accounting education. All of these initiatives agree on the importance

of accounting information systems (AIS) and information technology (IT) in education programs.[1] For instance, Albrecht and Sack (2000) maintain that accountants who have obtained enhanced AIS/IT knowledge through their education program will be able to deliver a better performance for clients, customers and employers. More recently, the Pathways Commission (2012) calls for the integration of new AIS/IT courses into curricula to improve technological skills of future accountants.

These reports on accounting education, which gained broad coverage, echoed and stimulated the discourses of various stakeholders on the importance of advanced-level AIS/IT education. However, despite the growing consensus on this matter, the actual step of adding AIS content to accounting curricula poses a significant challenge in terms of course material to develop, teach and update (Sveum & Schlough, 2013; Fulford, 2011). More specifically, the development of relevant courses for hands-on problems is demanding on resources and educators (Banham, 2010).Just think about required preparation for projects and simulations using Enterprise resource planning systems (ERP).

An additional difficulty of including AIS in curricula is the lack of recognition and incentives for developing and improving the courses and learning resources. The current strong focus on research as a sole key criterion for the recruitment, tenure and advancement of professors does not work to spur the development of AIS courses and related materials. Many professors simply lack the knowledge to invest in AIS courses, and of those who do have the knowledge, most have no tangible motivation to engage in the effort.

The main objective of this paper is to examine to what extent the new Canadian CPA education program covers the AIS components. The two main research questions are: Has AIS gained or lost ground in the CPA professional education program? And have the challenges to develop courses and materials to teach and test AIS topics impacted the structure of the CPA education program? To answer these questions, we compare the AIS requirements made by the three former Canadian accounting associations (CA, CGA, CMA) before the unification of the Canadian accounting professionals, with those of the new Canadian CPA program, thus after the unification.

The paper proceeds as follows: Section 2 positions the importance of advanced-level AIS competency; Section 3 develops the research questions; Section 4 describes data collection, analysis and results; and the last section offers a discussion and conclusion.

THE IMPORTANCE OF ADVANCED-LEVEL AIS COMPETENCY FOR PROFESSIONAL ACCOUNTANTS

Several stakeholders emphasize the importance for future professional accountants to be equipped with advanced-level competency in AIS and IT.

The Big 4 Accounting Firms and the Importance of AIS

The Big 4 accounting firms (KPMG, PWC, Ernst & Young, and Deloitte) approach AIS from a business perspective and have been offering IS and IT consulting services for years. In fact, this constitutes one of their most important, growing and lucrative division.

KPMG's IT services are numerous and consist of application rationalization, business alignment, cloud strategy and deployment, data center strategy and optimization, management infrastructure, IT governance, IT integration, IT optimization, IT organization design, IT outsourcing and IT strategy. In 2012, KPMG's revenue from advisory services amounted to $7.9 billion, with an estimated $1.1 billion coming from IT consulting services.

Price Waterhouse Coopers (PWC) focuses on IT strategy, process, enterprise systems (ERP) and business analysis. Their multi-disciplinary professionals aim to understand business technology. PWC offer services such as IT strategy,

[1]In the present text, AIS and IT are used interchangeably, and include topics such as enterprise resource planning systems (ERP) and customer relationship management (CRM).

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IT governance, enterprise architecture, IT merger integration, IT project management and IT operations management. They also help firms in systems selection, RFP development and contract negotiation. In 2012, PWC's revenue from advisory services amounted to $8.7 billion, of which $1.2 billion is estimated to come from IT advising.

Ernst & Young's (E&Y) IT Advisory Services assist organizations by working closely with the CIO and senior management to create a more effective IT strategy. The objective is to stimulate process efficiencies through IT transformation and IT risk and assurance services. E&Y aims to increase firms' IT return on investment in supporting the implementation of industry software packages, supply chain (SCM), CRM, HR and risk management. In 2012, Ernst & Young's revenue from advisory services amounted to $4.96 billion, of which $694 million is estimated to come from IT advisory.

Finally, Deloitte's technology consultants work on how to design, build and manage sophisticated IT solutions. The company's IT consulting services are primarily focused on the implementation of ERP solutions, IS integration and new technology strategy aiming to improve a firm's overall business operations. In 2012, Deloitte's revenue from advisory services amounted to $8.6 billion in 2012, of which $1.2 billion is estimated to come from IT consulting.

PWC's CEO points out that businesses will increasingly interact with each other electronically, that cloud computing will support many IT developments and that big data analytics will assist governments and businesses in making more informed decisions (Colapinto, 2013). In order to remain competitive in this new business environment, Big 4 firms are either partnering with or hiring IT specialists with the needed expertise in these areas (Colapinto, 2013).

This emphasis of the Big 4s on IT consulting services has increased steadily each year, and with an expanded portfolio, these firms now offer their clients comprehensive AIS and IT packages. Revenue from IT consulting services represents around 14% of the overall consulting services, a fraction that is expected to grow with the development of new technologies aiming to improve business operations. To support clients' demands on IT consulting services, the Big4 favor accountants equipped with more training, literacy and competency in IT. Billions of dollars billed in IT consulting fees is a good proxy that the job market recognized the importance of IT skills.

IT Specializations Developed by Professional Accounting Associations

Over the years, associations of Canadian CAs and US CPAs have developed specializations that their members can acquire. In other words, holders of these accounting designations may expand their knowledge and specialize in a specific area of expertise. The AICPA developed specializations in the fields of Financial Forensics, Personal Financial Planning, Business Valuation, Taxation, and Information Technology. For the latter specialization, US-CPA holders can add, upon completing the related IT training and exams, the letters CITP, standing for "Certified Information Technology Professional," to their professional designation. In Canada, the Canadian Institute of Chartered Accountants (CICA) developed six specializations, namely Investigative and Forensic Accounting, Business Valuation, Internal Auditing, Insolvency and Restructuring, Information Systems Auditing, and Information Technology. The two latter specializations have a direct connection with the IS/IT field.

At present, the CPA-Canada website offers information on only two specializations, that of Investigative & Forensic Accounting (CA•IFA) and Information Technology (CA•IT). The CA•IT designation is granted to chartered accountants who satisfy a number of requirements in information technology, the main one being work experience in IT. To become a CA•IT, candidates must have been working in one or more of the six major competency areas described in the IT Competency Map.[2]

Initiatives undertaken by the CICA and the AICPA to develop specializations confirm that Canadian and American professional accounting associations regard AIS/IT as very important. In view of that, one would expect that the

[2]The six IT competency areas are 1) Business Information Technology Strategic Planning, 2) Enterprise Information Technology Architecture, 3) Business Process Enablement, 4) System Development, Acquisition, Implementation, and Project Management, 5) Information Systems Management, and 6) System Reliability.

education program developed by these professional accounting associations emphasizes advanced-level AIS, IT, and ERP systems.

In short, key stakeholders in the accounting field, such as the Big 4andCanadian and US professional accountants associations, agreed that advanced education in AIS/IT is essential for future professional accountants.

DEVELOPMENT OF RESEARCH QUESTIONS

To most stakeholders, professional accountants must possess AIS/IT competencies if they are to perform their jobs efficiently. Accordingly, these stakeholders advocate that a set of courses covering key AIS/IT topics should be included in accounting curricula.

The fact that AIS may have not occupied the place it would could most often attributed to the challenges to develop courses and materials to properly teach and test AIS topics. In a business/accounting program, some courses and subjects can be more easily taught than others, with some representing a real challenge. For example, courses related to computer-based AIS have been reported to be among the most challenging ones to teach (Banham, 2010; Fulford, 2011; Sveum & Schlough, 2013). Continual changes in AIS/IT, such as software sophistication and updates, architecture design, hardware components, ERP systems, supply chain management, CRM, networks and security issues, just to name a few, render education in this field of expertise more demanding. The ideal instructor profile would be a professional having both accounting and information systems education, training and experience—a rather rare combination. Thus, when given the choice, most professors may shy away from taking on this subject, preferring instead to teach the more traditional courses in financial accounting or management accounting areas. This in turn makes accounting departments more inclined to reduce the offer of AIS/IT courses to a minimum or even to let these courses be taught by other departments, such as the MIS or SCM departments, in which case there is no specific focus on the application of IS/IT for accounting/accountants purposes.

Difficulties to teach and test AIS/IT may explain the inadequate and insufficient inclusion of AIS/IT topics in the competency maps, education programs and exams of professional accounting associations.

Our main research objective is to examine how the new Canadian CPA education program covers the AIS components. Research questions are: Have the challenges to develop courses and materials to teach and test AIS topics impacted the accounting education program design? Has AIS gained or lost ground since the unification of the Canadian professional accountants associations?

To answer these questions, we compare the AIS/IT requirements set forth by the three Canadian accounting associations (CA, CGA, CMA) before the unification, with those of the new Canadian CPA program, thus after the unification.

DATA COLLECTION, ANALYSIS AND RESULTS

The method used is content analysis approach, in which documentation is examined to infer the meaning of changes (Krippendorff, 2013). The approach has roots in *exegesis*, which is the interpretation of a text for an understanding of its meaning and the identification of specified characteristics of messages. A basic assumption of exegesis is that the words emphasized and mentioned most often are those bearing the most significance. Applied to content analysis, this approach examines word frequencies, the occupancy of space, and presentation format to infer meaning.

We start this section with background information on the three Canadian accounting associations before their unification and explain how the CMA, CGA and CA used to cover AIS/IT in their respective education program and exam.

How the Canadian CMA Program Covered AIS

The Certified Management Accountants (CMA) Association of Canada was formed in 1920 and represents professionals charged with the efficient utilization of organizational resources. CMAs have to possess a blend of core competencies in accounting, management and strategy—the three pillars of the CMA profession. Integration across these three dimensions defines the differentiated territory of CMAs as so-called strategic management accountants.

In the CMA program, IT/AIS topics are cover through university programs and not specifically and predominantly tested in CMA exams. To identify the program's degree of IT/AIS coverage, we had to refer to the "University Courses Requirement" document. Mandatory courses cover various fields related to business and accounting,[3] including information technology. IT is documented as playing a vital role in supporting the activities of all organizations. CMAs are expected to use various types of information technologies and to create value through IT-oriented management. For CMAs, IT is an important competency, but given the difficulty to test IT topics, IT is not a major component in CMA exams. However, the CMA does require candidates to their program to have completed advanced-level IT courses at the university level. Overall, the CMA recognizes the increasing demand for professionals who possess both business and IT skills.

How the CGA Program Covered AIS

The Certified General Accountants (CGA) Association of Canada was founded in 1908. CGA-Canada developed a set of professional competencies, skills and abilities which a CGA candidate for certification must demonstrate and which comprises the foundation of the CGA designation. The established competency framework is used by the academic community to prepare students for successful completion of the CGA program, as well as by CGA course developers and examiners.

The CGA program gives candidates the opportunity to focus on an area of expertise, or "career option." The four options are Corporate and Small-Medium Enterprise, Government and Not-for-Profit, Public Practice, and Information Technology. The latter option is for candidates pursuing careers in the analysis, design and implementation of computer-based information systems from a management end-user perspective, or in management auditing, including IT auditing, and systems development activities. Candidates pursuing the Information Technology option must have completed the advanced-level IT/AIS course *Information Systems Strategy* (MS2).

The CGA covers IT/AIS specifically through courses and exams, namely MS1, MS2, PA1 and PA2. The *Issues in Professional Practice* (PA1) and *Strategic Financial Management* (PA2) exams are the final requirements in the certification process leading to the CGA designation. They assess the candidate's competencies on IT, among other topics. Thus, before the unification of the associations, candidates for the CGA designation had the opportunity to focus on *information technology* as a specific area of expertise.

How the Canadian CA Program Covered AIS

The Canadian Institute of Chartered Accountants (CA) was incorporated in 1902. It was the oldest and the largest, in term of members, of the three Canadian accounting associations. CAs performed a variety of roles, including business leader, consultant, as well as internal and external auditor. They were recognized as setting the accounting, auditing and assurance standards.

The CA education program consisted of a university bachelor's degree in accounting and a 30-credit graduate-level accounting program. Based on the course list, only one basic IT course was required in the undergraduate business program. As indicated earlier, the CA offers their members the opportunity to pursue a specialization in IT after having obtained the CA designation. The granting of this specialization is almost solely based on work experience, not education. Interested CAs must have 1) worked for at least the last five years in one or more of the six major IT competency areas[4] and 2) a minimum of 5,000 hours in qualifying work experience and 200 hours in continuing professional development during the last five years.

[3]These fields are Business Law, Corporate Finance, Economics, Financial Accounting, Internal Control, Management Accounting, Marketing, Operations Management, Organizational Behavior, Statistics, Strategic Management, Taxation, and Information Technology.

[4] These six IT competency areas are 1) Business Information Technology Strategic Planning, 2) Enterprise Information Technology Architecture, 3) Business Process Enablement, 4) System Development, Acquisition, Implementation, and Project Management, 5) Information Systems Management, and 6) System Reliability.

In short, before the unification of the accounting associations, the CA education program asked only for minimum IT/AIS knowledge, namely one introductory course to be completed as part of the undergraduate degree. Accordingly, more advanced important topics such as ERP, CRM and SCM are basically not covered. Instead, CAs wishing to become specialized in IT/IS could do so by demonstrating that they have extensive IT/IS-related work experience (5,000 hours in the last five years).

After having discussed how the three Canadian associations covered AIS before their unification, we now turn to how the new Canadian CPA education program covers AIS, in other words, how AIS is covered since the unification of these associations.

How the Canadian CPA Education Program Covers AIS

An examination of the CPA Competency Map reveals that specific references to AIS/IT competencies are very few and often fall under the Management Accounting module. Instead, the Map speaks in broad and general terms, such as "understands management and strategic uses of information and technology," "identifies ethical and privacy issues related to IT" and "evaluates ability of suggested IT solutions to address management information requirements." Content analysis of the CPA Competency Map, which has 100 pages and 22,619 words, reveals that the word *information technology* is used 7 times and *information systems* 8 times, while *financial* occurs 218 times, which clearly demonstrates the limited importance of IT/IS. More specific to CRM, SCM, and ERP, there is no mention to CRM, nor customer relationship management, and combination of these words (for example customer relationship, customer management, relationship management); same for SCM, and supply chain management, and combination of these words, with no mention. For ERP, there is one mention in the CPA Competency Map as follow: in the Elective module (not the common core module) under Performance management/Management accounting/Cost management, it is suggested to "develop recommendations for process improvements, e.g., ERP". As a result, ERP is only refers as an example of process improvement, not as an integration of data and processes of an entire organization into a unified system. In short CRM, SCM, and ERP are not emphasized in the CPA education program. As a reminder, previous analysis showed that AIS receives less coverage in the CA map than it did in the CGA and CMA maps respectively.

In the province of Quebec, the education of professional accountants is provided by business schools based in universities.[5] When the Canadian CPA Competency Map was issued, accounting departments of each business school were asked to revise and align their bachelor's degree programs and accounting options to match the new CPA competencies. In the past, the bachelor's programs of university-based business school had to meet the education requirements of all three Canadian accounting designations (CA, CGA and CMA). This resulted in a greater overall course offer, since each designation called for specific courses in the two last semesters of the bachelor program, which represented around 6 courses out of 30. For example, the CMA asked schools to provide *strategic management accounting* courses, while the CGA asked for *advanced taxation* courses. However, while setting up a curriculum to meet the new CPA requirements, several courses were eliminated and only few new courses were created. Many of the remaining courses were also modified or changed from mandatory to elective. Further, some competencies that are no longer covered through the bachelor's degree program-accounting option are intended to be covered with the CPA graduate diploma program.

Table 1 lists the number of mandatory courses which students at Quebec universities have to complete in the bachelor's degree program, per topic and per university, in order to meet the requirements of the Canadian CPA Competency Map. The Map categorizes the topics into either *specific competencies* or *other knowledge*, which is a first indicator of the prioritization of the new CPA program. It features six *specific competencies*—Financial Accounting, Managerial Accounting, Audit/Assurance, Taxation, Finance and Strategy/Governance—of which the first four are dominant in terms of the number of courses required. The category *other knowledge* includes Economics, IT, Statistics and Business Law, with Economics being the topic for which the most courses are required. Thus, IT/AIS has a relatively low priority in the CPA program. The Competency Map reflects the number of mandatory courses that an institution must offer and that, as a driver of the education content, influences the resources allocated by the accounting

[5]In some other Canadian provinces, candidates may have the choice to get their education through either courses/degrees from universities or directly from professional accounting associations, or a combination of both. For example, for CA candidates in the western provinces there was the CA Business School-CASB and for CGA candidates, CGA-Canada provided online courses.

department. Our content analysis shows that the dominant space is occupied by Financial Accounting and that IT is classified as other knowledge, suggesting that IT is given less importance with the present CPA than by the three former accounting associations prior to their unification. Of the twelve universities included in the Map, five make due with two mandatory IT/AIS courses and seven with only one.

Table 1: Number of mandatory courses in the bachelor's degree program, per topic and per university, to meet the requirements of the new CPA Competency Map; Quebec universities

University	Specific competencies						Other knowledge			
	Financial Accounting	Managerial Accounting	Audit/ Assurance	Taxation	Finance	Strategy/ Governance	Economics	**Information Technology**	Statistics	Business Law
Bishop's	5	2	2	2	2	1	2	**1**	2	1
Concordia	6	3	2	2	1	2	2	**1**	1	1
HEC-MTL	6	3	2	2	1	1	2	**2**	2	1
Laval	5	3	2	3	2	1	1	**1**	1	1
McGill	4	3	1	2	2	1	2	**1**	1	1
Sherbrooke	7	2	2	3	2	1	1	**2**	2	1
UQAC	8	2	3	3	3	2	2	**2**	1	1
UQAM	6	3	2	3	2	2	2	**2**	1	1
UQAR	6	2	3	3	2	1	1	**1**	1	1
UQAT	7	2	3	3	2	1	1	**1**	1	1
UQO	6	2	3	3	2	2	2	**1**	1	1
UQTR	7	2	3	3	2	1	1	**2**	1	1

Note : Full Name of universités: Bishop's University; Concordia University; HEC-MTL: Hautes Études Commerciales à Montreal; Université Laval; McGill University; Université de Sherbrooke; UQAC: Université du Québec à Chicoutimi; UQAM: Université du Québec à Montréal; UQAR: Université du Québec à Rimouski; UQAT: Université du Québec en Abitibi-Témiscaminque; UQO: Université du Québec en Outaouais; and UQTR: Université du Quebec à Trois-Rivière. Bold has been added to the Information Technology column. Data are from July 2013.

In order to document the degree to which AIS/IT topics is losing ground, Table 2 list for each Quebec university the mandatory AIS/IT courses offered before and after the unification of the accounting associations. The first column lists all mandatory AIS/IT courses, by code, that have been taught at each university. The second column shows which of these courses were mandatory at which university for each of the three professional accounting associations (CA, CGA and CMA) prior to their unification. The third column shows which of these courses were mandatory after the unification, in other words, for the new Canadian CPA program. This data permits us to compare for each university the required AIS/IT courses before and after the unification.

Based on content analysis, the unification had no impact on 5 of the 12 studied universities. University de Sherbrooke, UQAC and UQAM still required the two mandatory AIS/IT courses they already had, and UQAT and UQO the one. But for the other 7 universities, there is an impact. At Bishop's and UQTR, the number of courses required is still the same. However, the courses are now taught by the MIS and not the Accounting department, whereby the specific focus on accounting is lost. HEC passed from three mandatory AIS/IT courses to two, and Concordia, Laval, McGill and UQAR from two mandatory AIS/IT courses to only one. In addition, at Concordia, Laval, McGill and UQAR, the

only mandatory AIS/IT course now has an MIS-dominant content, and is taught by the MIS department. In short, when we examine the 12 universities in Quebec, the AIS/IT component has lost significant ground with the establishment of the CPA program.

Table 2: Mandatory AIS/IT courses, per university, before and after the unification of the three Canadian professional accounting associations

University	Mandatory AIS/IT before the unification			Mandatory after the unification
	CA	**CGA**	**CMA**	**CPA**
Bishop				
BAC 241	X	X	X	
BCS 220				X
Concordia				
COMM 226	X	X	X	X
ACCO 350		X	X	
HEC-MTL				
2-700	X	X	X	X
2-710	X	X	X	
3-735	X	X	X	X
Laval				
CTB 2105	X	X	X	
SIO 1000	X	X	X	X
McGill				
INSY 332		X	X	
MGCR 331	X	X	X	X
Sherbrooke				
CTB 304	X	X	X	X
GIS 113	X	X	X	X
UQAC				
IFG 100	X	X	X	X
SYS 208	X	X	X	X

Note: CA: Chartered Accountant; CGA: Certified General Accountant; CMA: Certified Management Accountant; CPA: Chartered Professional Accountant. Information as of July 2013; Ccorresponding course code to course title is provided in Appendix A.

Table 2 (cont'd): Mandatory AIS/IT courses, per university, before and after the unification of the three Canadian professional accounting associations

University	Mandatory AIS/IT before the unification			Mandatory after the unification
	CA	**CGA**	**CMA**	**CPA**
UQAM				
SCO 3514	X	X	X	
SCO 4425	X	X	X	
SCO 3006				X
SCO 6006				X
UQAR				
SIO 101-10	X	X	X	X
SIO 201-97			X	
UQAT				
ADM 2020	X	X	X	X
UQO				
CTB 1783	X	X	X	X
UQTR				
CTB 1067	X	X	X	
IFI 1006	X	X	X	X
IFI 1007				X

DISCUSSION AND CONCLUSION

Our main research objective was to examine how the current Canadian CPA education program covers the AIS/IT component following the unification of the three Canadian accounting associations. In other words, despite stakeholders' emphasis on the importance of more advanced-level IS/IT education, what place does this field occupy in the current education program? Has it gained or lost ground? To answer these questions, we compared the AIS/IT requirements by the Canadian accounting associations (CA, CGA, CMA) before their unification, with the CPA requirements, so after the unification.

Results indicate not only that AIS/IT is not a priority topic in the new program, but also that it is even less important now than before the unification. The number of AIS/IT courses required in the CPA program dropped, namely from three to two, or from two to one, depending on the business school. Some courses that were formerly mandatory are now either electives or eliminated entirely from the course offer. We also observed that prior to the unification, many AIS/IT courses were developed and offered directly by the accounting departments, hence ensuring the focus on accounting that qualified them as "AIS" courses. Now, by contrast, IT/IS is offered through the MIS departments, with an MIS focus. When we examine the twelve universities in Quebec, the AIS/IT component lost ground with the establishment of the new CPA program. This loss is mainly due to increasing course requirements in the fields of Finance, Strategy and Governance. To meet these new requirements, new courses were created, existing courses revamped and, to free up resources, some existing AIS/IT courses were eliminated. Challenges to develop courses and materials to properly teach AIS/IT is without a doubt a significant factor in the decreased mandatory courses in this area.

With less AIS/IT courses offer in business school, and required in accounting programs, this will have no doubt an impact on AIS certification and accreditation programs. For example, Microsoft recently launched the Microsoft Dynamics Student Certificate Program (MDSCP), providing free software and support to universities to use their ERP and CRM software in the classroom. Experiencing the latest IT can give students a competitive advantage in the job market. But to earn the MDSC, students have to successfully complete a minimum of 100 activity hours, divided among a minimum of two different approved courses. With the advent of the CPA program, resulting in less AIS/IT courses offer, this may significantly jeopardize the MDSCP growing[6].

Future research should monitor the evolution of AIS/IT coverage in the CPA education program. CPA Canada is a very young association and its education program is still in the making. For example, more advanced-level IT competencies may be required in the future. A natural extension of the current study would be to conduct interviews with CPA Canada decision-makers in order to understand their rationale and justification for their selection and prioritization of competencies. As well, interviews with professional accountants working in the AIS/IT field could feed us on the proper match between the education program coverage in IT, and the IT competency needs on the job market. Another extension would be to examine the evolution of AIS/IT coverage in the US CPA education program.

For years, professional accountants associations and accounting departments have had to deal with an important question: Which competencies, education program and professional exams are required in order to train skilled accountants? The present research, in identifying the IT coverage of the current education program, could serve as a starting point for a discussion on what might be the appropriate minimum level of AIS/IT training to be included in accounting education programs, as well as for addressing the challenges of developing AIS/IT relevant courses.

[6]Current Microsoft Dynamics Student Certificate Program member institutions are: FH JoanneumGesellschaftm.b.H., Graz, Austria; University of Applied Sciences Technikum, Wien, Vienna, Austria; University of Split-Faculty of Economics, Split, Croatia; Landesinstitutfür Schulentwicklung, Stuttgart, Germany; Fachhochschule Dortmund, Dortmund, Germany; B.V.B College of Engineering & Technologies - Dept. of Management Studies, Hubli, India; Vilnius University - Faculty of Economics, Vilnius, Lithuania; AvansHogeschool, Breda, Netherlands; The Russian Presidential Academy of National Economy and Public Administration, Moscow, Russia; Republic Polytechnic, Singapore; University of Maribor - School of Business and Economics, Maribor, Slovenia; Shih-Hsin University, Taipei, Taiwan; Eastern Michigan University, Ypsilanti, USA; University of Wisconsin - Stout - Apparel and Communication Technologies Department, Menomonie, USA; Utah Valley University - Information Systems & Technology, Orem, USA.

Appendix A: In Table 2, corresponding course code to course title, per university

University	Course title
Bishop	
BAC 241	Systems and Control
BCS 220	Management Information Systems
Concordia	
COMM 226	Business Technology Management
ACCO 350	Accounting and Information Technology
HEC-MTL	
2-700	IT in Organizations (Technologie de l'Information dans les Organisations)
2-710	IS Analysis and Design (Analyse et Conception de Systèmes d'Information)
3-735	Organization and IT for Accountants (Organisation et Technologie de l'Information pour l'Expertise Comptable)
Laval	
CTB 2105	Accounting Information Systems (Systèmes d'Information Comptable)
SIO 1000	Systems and IT (Systèmes et Technologie de l'Information)
McGill	
INSY 332	Accounting Information Systems
MGCR 331	Information Systems
Sherbrooke	
CTB 304	Financial Information Management (Gestion de l'Information Financière)
GIS 113	Introduction to IS (Introduction aux Systèmes d'Information)
UQAC	
IFG 100	Software and IT Management (Logiciels et Technologie de l'Information de Gestion)
SYS 208	IS: Design and Management (Systèmes d'Information : Conception et gestion)
UQAM	
SCO 3514	AIS and IT (Systèmes d'Information Comptable et Technologie de l'Information)
SCO 4425	Accounting Information Technology : Strategic Management and Consulting (Technologie de l'information comptable: gestion stratégique et consultation)
SCO 3006	Accounting Information Systems(Systèmes d'Information Comptable)
SCO 6006	Accounting Information Technology (Technologie de l'Information Comptable)
UQAR	
SIO 101-10	Introduction to Organizational Information Systems (Introduction aux Systèmes d'Information Organisationnels)
SIO 201-97	Database and IS Design (Bases de Données et Conception de Systèmes d'Information)
UQAT	
ADM 2020	IT Management (Gestion des Technologie de l'Information)
UQO	
CTB 1783	Accounting Information Systems(Systèmes d'Information Comptable)
UQTR	
CTB 1067	IT: Advanced Competencies and Control (Technologies de l'Information : Compétences Avancées et Contrôle)
IFI 1006	IT : Software and Systems (Technologies de l'Information : Logiciels Courants et Systèmes)
IFI 1007	IT : Fundations and Software (Technologies de l'Information : Notions de base et Logiciels Courants)

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