
Research Article

An Investigation and Evaluation of Information Systems Combined/Joint Honours Degree into Accounting Programmes - An Evidence from UK Universities.

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Abstract: The Information Systems combined and joint honours degree programmes become more popular in accounting at institutions of higher education in the UK leading to the award of an honours degree which focus on the use of computers rather than on their technical aspects. The intention of these programmes is to provide accounting graduates with the knowledge they need to leverage the latest information technologies to support the use of financial information in management decision-making, and integrate financial information and internal controls into business information systems.

These joint degree emphasise how computers can apply, for instance, to business, commerce and the world wide web. The graduates are more likely to be systems analysts than software engineers. The degree programmes have a large practical element, which means you have to analyse problems and reason logically. However, they do not cover the mathematical aspects of computer science.

With the joint honours degrees, the students combine Computing with accounting. On these degrees, the student spend approximately half their time studying Computing and half their time on accounting topics. The degree titles all include the word 'and' to indicate this equal division, eg Computing and Accounting or Information Systems and accounting. In other courses provided by the accounting departments, the students can also study Computing or Information systems as a minor part of their degree. The title of the degree in these cases uses the words 'with Computing', eg Accounting with Computing. On these degrees, where Computing is the minor subject, the students spend approximately a quarter of their time studying Computing.

The purpose of this paper is, first exploring the different approaches in Accounting programmes in UK Universities toward integrating information systems content into accounting programmes. Secondly, investigating whether all programmes provide something different or all the same but only different names.

Keywords: Accounting, Electronic-Business, Technology, Undergraduate, Curriculum, Joint Degree

1- Introduction and Background

Accounting is generally concerned with the identification, collection, processing, analysis, interpretation and communication of economic information about an organization. So, there is considerable degree of affinity between the accounting and information systems fields. Accountants, as information specialists, must acquire a common body of knowledge relating to information systems if they are to succeed in today's increasingly competitive, computer laden and technologically driven business environment. The degree in Accounting provides introductory and advanced courses in financial and managerial accounting, auditing, taxation and information systems. Accounting is a dynamic field at the heart of every business. Modern accountants are problem-solvers and business advisors and frequently move to the top executive levels.

Information systems are the means by which people and organisations, utilising technologies, gather, process, store, use and disseminate information. The rapid pace of change in the computer industry affects the curricula of information system programs that prepare graduates for this volatile environment.

Designers of undergraduate programs are trying to meet this

change and equip the students with the skills they need. Changes in Information System take three areas have been significant:

- 1- The technologies themselves, the hardware and software, have become cheaper, faster, and smaller.
- 2- The business environment has become more competitive, requiring that IS professionals must find uses of IS that will solve business problems in a cost-effective way.
- 3- The role of IS in organizations has shifted from centralized mainframe processing to the support of distributed end users. This means that not only have the technical skills required of IS personnel been changing, but there is an increasing need for accounting skills and an understanding of the business environment.

Successful students are prepared for staff level positions in management consultancy, accounting, auditing and taxation at business organizations, government and non-profit entities. The firms are losing business and expansion opportunities because of a shortage of people with specialist computer skills. The promise and potential of the new business paradigm labeled "e-business" is the driving force behind the

tremendous demand for accounting professionals with both a technology background and a traditional accounting background. Where will these professionals come from? This paper lays out in detail the foundation for a new undergraduate academic program which is designed to both attract students and to provide them with the skill set necessary to succeed in this new e-business universe – the Joint Accounting/ Computing Systems Technology degree. Course content for this undergraduate major is based on a set of courses designed to integrate concepts and technologies necessary for an understanding of the infrastructure that supports e-business. Students, recruiters, and faculty will appreciate the distinct competitive advantages offered by this unique program.

It should come as no surprise to any accounting or business systems professional that Accounting as a profession is undergoing a not-so-quiet revolution. The catalysts for this dramatic change are found in the recent advancements in computer technology and the advent of e-business. While these changes have been taking place in the practice community for years, they have been accelerated by the advent of the new e-business model and the integrative discipline of Enterprise Resource Planning (ERP) systems. Consulting Services, primarily involving technology, have grown to be the largest part of an accounting firm's practice and in some notable cases have been spun off to become separate consulting firms.

Even in the traditional accounting practice areas, new techniques and approaches are used to audit e-business clients and ERP systems. Internal control assessment now requires new innovative methods (Tucker, 2001). Staff accountants routinely link to centralized client databases via laptops. The e-business model is significantly changing both the way business is done and the accounting and auditing of those businesses. Not surprisingly, the AICPA and NASBA have realized that the CPA exam needs to change in order to more properly reflect the evolving nature of accounting practice. They have performed an extensive practice analysis to determine the basic skills needed by new CPAs and are changing the content of the exam based on this analysis. The exam content will include more in the technology area. Even the approach to the exam itself is being changed to reflect current practice. It is expected that the exam is a computerized exam from 2003 and these require the use of the computer and the Internet to solve exam problems (Holder and Mills 2001).

While technology changes have made accounting practice more technology oriented and more exciting, the number of students coming into the profession continues to decline. The number of students entering systems and technology programs however continues to increase. Many in the current practice community believe the decline in accounting enrollments can be attributed, at least in part, to a lack of awareness by students of the current nature of accounting practice (Albrecht and Sack 2000). Accountants are much more involved in technology and are acting more as business advisors rather than simply business reporters.

Another factor contributing to the decline in accounting enrollments is the 150-hour requirement, in most states, to sit for the CPA exam (Albrecht and Sack 2000). Many students do not see the incremental pay and opportunities as being worth the time and expense of an additional year of education. This opportunity cost is particularly evident when comparing a career in accounting to careers in information systems.

2- Issues and Concerns:

- Our students are products or customer.
- Are we educating them to become accountant or we train them to get the job.
- Integrating IS skills within single accounting degree or Joint/Combined degree.
- Accounting staff should deliver the IS skills which our accountancy student need to do the accounting jobs or computer science staff deliver these skills from the technical view.
- What is the Common Body of Knowledge (CBK) for accounting and Information systems?
- Building Student Skills and Capabilities in Information Technology: A Moving Target.
- Graduate numbers expanding faster than the market for traditional graduate jobs.
- The job market for accounting graduates is becoming increasingly competitive.
- Producing employable graduate is becoming more complex and more important.

Information systems as a field of academic study began in the 1960s, a few years after computers were first used for information processing by organizations. It has had a number of different labels, now considered equivalent, that reflect its historical development: information systems (IS), computer information systems, information management, information technology resources management, information resource management, management information systems (MIS) (Couger 1995).

Information systems, as an academic field, encompasses two broad areas: (1) acquisition, deployment, and management of information technology resources and services (the information systems function), and (2) development and evolution of infrastructure and systems for information use in organization processes (systems development). (Couger, 1995). The context of information systems is an organization and its systems. The field differs from computer science, whose emphasis is on algorithms and system software, and from management science, which focuses on problems, models, and solvers, and the relevant information in a problem context (Nunamaker, 1993).

3- Information Systems In Industry

To illuminate reasons for poor success in supporting its vocational role, we need to understand the professional needs

of the IS community. The role of IS in industry has changed over time, resulting in an evolution not only in the skills required by IS professionals but in the management of IS (Sullivan, 1999). IS curricula have often been ill matched with business needs because business use of IS has continually evolved. This evolution has placed different demands on IS professionals.

More end-user focused business orientations are clearly required (Lee 1995).

During Era I, from the 1950s to the early 1970s, IS operated as a regulated monopoly. The primary focus of applications was organization-wide (payroll, accounting, production scheduling, and order entry). New applications typically automated clerical functions and were justified by cost elimination or displacement. As a result most data processing functions were established as part of accounting or financial organizations.

Era II began with the introduction of minicomputers and timesharing in the early 1970s, and accelerated in the 1980s with the advent of the PC. This led to a "free market" for IS services, as users had a wide range of new channels to acquire technology expertise and information processing capabilities. Individual and work unit effectiveness became key justification measures. Some organizations moved IS expertise out into business units. Since Era I applications were still important to business success, many IS departments remained in financial units. In most cases IS personnel in operating units continued to report to a central IS function.

During Era III, the 1990s, the focus was on strategic and competitive applications, administered through a regulated free-market environment. The trend to move IS functions out to the user community accelerated (Couger 1995). In some cases, these applications transformed internal organizations and functions, and IS functions were established within operating units. In other cases technology use transcended traditional departmental boundaries, so that IS organizations were moved upward. As the strategic importance of IS grew. More chief information officers are reporting directly to chief executive officers, rather than to lower-level executives. More chief information officers (CIO) are being included on management committees. (Glass, 1998).

Era IV, today's ubiquitous era of computing, focuses on the development of widely distributed, flexible information management systems and communication networks to enable correct information to be available anytime, anywhere. Administration of the IS function is collaborative. Justification is based upon organizational effectiveness. Enterprise resource systems with links throughout the extended value chain are becoming widespread. IS functions within individual units are often supplemented with more central functions to enable collaboration.

As IS becomes more strategic it is expected that CIOs should be peers of other functional leaders and ought to report to the Chief Operating Officer (COO) or the Chief Executive Officer

(CEO) (Gordon, 1995). A 1997 survey of senior level IS executives by Ernst & Young indicated, however, that most CIOs in the late 1990s continued to report to the chief financial officer (CFO) or an equivalent finance-oriented role (Ernst & Young 1997). Titles and functions of the immediate bosses of the 230 CIOs who responded to the survey are shown in Table 1. A 1998 survey of 417 chief financial officers (CFOs) by the Financial Executives Institute reported even more CIOs reporting to CFOs as shown in Table 1 (Hildebrand 1998). However, the numbers in the latter survey varied considerably by industry. In industries where information systems are central to daily operations, there is a greater likelihood that the CIO reports to the chief executive officer (CEO). For example, respondents in the insurance and financial service sectors report that 38% and 33% of their CIOs, respectively report to the CEO. Financial executives feel that finance is the best place for IS to report because these executives are technologically literate and objective so that prospective projects get a balanced analysis. However, when companies are technology dependent, the chairman of the Financial Executive Institute's committee on finance and information technology suggests that it may be wiser to have a direct CIO/CEO reporting relationship.

4- Technology Issues Facing the Profession

The AICPA technology committees have identified the 10 most important technological challenges and opportunities facing professional accountants (Tie 2000).

E-business. E-business can optimize return on investment and speed growth. E-business allows small companies to compete with the largest companies and creates new opportunities for all businesses. To effectively advise clients, accountants need to know the e-business culture, its benefits and problems.

Information security and controls. There will be continued and increased security threats as more systems are moved online. This historically has been an area of accountant expertise. Current technology advances, however go well beyond traditional capabilities and accountants need significantly more technical background if they are to be effective in the future.

Training and technology competency. Accountants must have technology training that focuses on developing skills to assist clients with their goals. Lifetime learning programs are essential for highly skilled professionals and time for training is always a problem. Having fundamental technological skills entering the profession can enhance career progress.

Disaster recovery. It is a subject that is frequently discussed, but in light of recent terrorist attacks awareness will be heightened for this pressing need.

High availability and resiliency of systems. It is essential that systems are available when clients need them. Timeliness and flexibility in gathering and reporting financial information will be expected in the future.

Technology management and budgeting. Business process

outsourcing (BPO) is expected to explode, as many high growth firms want to focus on their core competencies. CPAs as well as other accountants will find a high demand for these services if they have the necessary systems competence.

Electronic financial reporting. The AICPA's XFRML project has provided better tools and processes to create these reports but there are significant issues related to required compilations. New, creative ideas in advanced technologies can resolve these problems.

Internet Issues. Because nearly half of the American population will use the internet, the accounting profession must have the skills and the expertise to take advantage of this vast market.

Virtual Office. The accountant must have an exceptional work ethic to succeed in this new environment. It will be essential to have special technical training that will allow the accountant to be more self-sufficient and independent.

Privacy. With the growth of e-commerce, the internet and new web technologies, privacy becomes a major concern for many clients. How the accountant deals with sensitive data transfers will require substantial technical expertise in the future.

The bottom line is that the limited technology background of the traditional accounting graduate will not allow them to effectively assist firms and their clients in addressing these priority issues.

5- Needed Changes in the Accounting Curriculum:

The past two decades of change requires an accountant entering the profession to possess a different skill set than the accountant of the 1980's and 1990's. The accounting graduate must still possess strong analytical and problem solving skills, be articulate with effective communication skills, and have the traditional accounting, audit and tax skills. But to be competitive in today's market, the aspiring accountant must also be well grounded in business systems and e-business technology.

On the other hand, since the economy began shaking out those marginal "dot-com" firms with inoperable business models, a wave of experienced "systems" professionals found themselves on the street. Many trade publications proclaimed that, virtually overnight, the sellers market of systems people became a buyers market of companies looking to hire them. What is not often discussed, however, is that much of this glut of available technology professionals consists of people with very specific technology skill sets and not much in the way of business acumen. A case can still be made that the shortage of business savvy and technology savvy professionals remains unabated. Arguably, the factor that contributes most to this demand is the continuing movement toward electronic business processes and their strategic impact. Industries and individual companies continue to see the value of e-business and are moving forward on numerous fronts. If nothing else, the demise of the dot-coms signaled the end of the "wild west" phase and the beginning of a more mature, planned

progression to e-business. As before, the technology expertise required to support e-business will continue to place ever-greater demands on our pool of IT professionals.

As the accounting profession shifts to accommodate the changing requirements of the evolving e-business model, individuals with a strong technical background and an innovative accounting skill set will undoubtedly be in high demand.

The traditional accounting program required one basic information technology course (introduction to various types of software such as word processing, spreadsheets, etc.) followed by an accounting systems course. Today's accounting professional is in need of more extensive training in ERP systems, e-business technology, information security and controls, etc.

Both academicians and practitioners agree that if accounting is to serve a useful role in this changing environment, accounting education and accounting research should become broader based, dynamic, and not restricted or constrained by a single model or approach. Numerous committees formed by the American Accounting Association (AAA), the American Institute of Certified Public Accountants (AICPA), and others have recommended significant changes in accounting education [AAA, 1986; Perspectives, 1989; AECC, 1990]. The consensus of these committees was that accounting education should include general knowledge, business knowledge, accounting knowledge, and the accounting curriculum should include a greater role for accounting history in both teaching and research [Coffman et al., 1993]. The American Accounting Association Committee on the Future Structure, Content, and Scope of the Accounting Profession (the Bedford Committee, AAA, 1986) stated that accounting education should develop "knowledge of the accounting profession including: history of accounting and its role as an information system in society" [p. 183]. "The Perspectives on Education: Capabilities for Success in the Accounting Profession" [Perspectives, 1989], a document issued by executives from public accounting firms, stated that accounting knowledge must include "the history of the accounting profession and accounting thought" [p. 8]. The Accounting Education Change Commission [AECC, 1990] also expressed similar views when it said, "knowledge of historical and contemporary events affecting the profession is essential to effective teaching" [p. 310] and "history of the accounting profession and accounting thought" [p. 311] are both essential to effective teaching.

6- The Need for a Joint Degree:

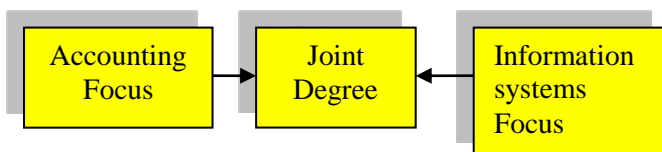
There is a definite need for individuals with both a strong accounting and information systems background. Today's typical accounting graduates have an insufficient technology background to even audit today's complex information systems, let alone the ability to assist clients in assessing system requirements, system selection and implementation, or the tailoring of these systems to fit a client's specific needs. On the other hand, an e-business technology graduate

possesses knowledge of a system's technological capabilities but is not well versed in accounting information systems, design of accounting reports needed by management, information security, internal controls, etc.

A new joint degree is needed that will focus on accounting principles and methods, accounting information systems, and e-business technology. Such a joint degree would be a three year program designed for students planning to enter accounting profession either private or public accounting. These students would be trained in financial accounting and reporting, cost and managerial accounting and accounting information systems. They would get the traditional problem solving and analytical skills involved in accounting programs as well as research skills using the web and other electronic media. Joint Accounting degree in the technology area, the students would need not only a minimal exposure to a programming language, but also intensive courses in e-business technologies, ERP systems and databases.

7- Joint Degree Program Philosophy

Joint Honours in Science scheme, which allows student to combine the study of two complementary subjects. A joint honours degree course is a combination of two different subjects – students study 50% of one subject and 50% of another.



8- Why bother with joint degrees?

- ✓ Extended expertise of Lecturers
- ✓ Broader experience for students
- ✓ Brand advantage in recruitment
- ✓ Can demonstrate 'internationalist' commitment
- SO, What's the advantage in offering joint **degrees**?

8-1 Advantages of Studying a Joint Degree

- The opportunity to gain a broad perspective on business-related issues by studying in two distinct areas.
- The opportunity to develop skills in two complementary subjects.
- The chance to keep job options open.
- Employability for students

One career advantage that students graduating from a school of business with a traditional technology (IS, MIS, CIS) degree have always had is an exposure to a broad spectrum of business concepts. Accounting programs traditionally have been the bedrock of the business school, providing students with skill sets crucial to the function of the enterprise. The key issue for combined programs of the future is how to effectively build on this business foundation to produce

graduates with the technical skills desired by recruiters.

A typical business technology graduate has strong technical skills in computers and systems but generally a weak background in accounting or accounting information systems. Most technology consultants do not have an accounting background and cannot therefore adequately relate to issues and problems involved in accounting information systems. This program will provide a graduate who is trained in both technology and accounting. This rather rare combination will be in high demand by both consulting firms and corporate America. Students who choose to continue their education to qualify to sit for the CPA or CA exam will also be very appealing potential employees for traditional CPA firms. They will have a skill set not found in the traditional accounting student.

The following section addresses four key areas in the development of a new program

Targeted students: Students recruited for this program will not be traditional accounting students. This major will appeal to students who have a strong interest in technology and e-business but who are also interested in understanding the accounting principles which underscore e-business success. Students will appreciate the uniqueness of the combined program and the career growth and security that it offers. In all probability, most students seeking this path will not move into traditional public accounting positions because their technology background will afford them the opportunity to enjoy high paying and challenging careers without the necessity of a fourth or fifth year of study.

Targeted employers: It is anticipated that these students will be seeking careers more with consulting firms such as Accenture and Booz Allen, or consulting staffs of CPA firms. Graduates will also be recruited by corporations with accounting information systems and e-business staffs.

Accounting focus of joint degree: The new joint will support the traditional areas of financial accounting and reporting, financial statement analysis, and managerial and cost accounting systems. There will be much more emphasis on accounting information systems and controls, systems analysis and design, management of technology, electronic reporting, and ERP systems. An essential element will be practical experience through an internship in a systems environment such as ERP.

E-business technology (EBT) focus of Joint Degree: The EBT focus of the major ensures that the students will have the technical/systems background to apply their accounting skills in an innovative "e-business manner".

Students will be exposed to programming basics and will study e-commerce and related issues and technologies, data base design and development, and ERP systems.

9- Course Roadmap

9-1 Accounting Courses

9-1-1 Financial Accounting: These are the traditional intermediate I and II courses involving financial accounting and reporting. In addition to the traditional topics, students will be introduced to ERP systems and will work exercises with the SAP system. Students will also be given cases that will require research and written reports as well as presentations of case and analytical problems, to further develop communication and presentation skills.

9-1-2 Cost/Managerial Accounting: This will include the typical topics covered in such a course, e.g. cost behavior, activity based costing, budgeting and planning, responsibility reporting and performance measurement, etc. The course will also use the SAP controls module to illustrate a cost accounting system and extract information for analysis and internal reporting.

9-1-3 Accounting Information Systems I: This course is intended to serve as an initial required course in the accounting information systems track as well as a required overview course for other accounting majors. It will examine contemporary topics concerning the use of information technology and accounting information systems by modern business organizations and to explore the accountant's potential role as user, manager, auditor, and/or designer of such technologies and systems. Topics include: systems description and documentation, transaction processing and primary transaction cycles, database management systems, electronic business/commerce systems, accounting systems software, enterprise resource planning systems with particular emphasis on SAP applications, internal control and IT security, and the systems development process. Emphasis will be placed on oral and written communications skills, research skills, critical thinking, and hands-on practical real-world application. The latter item requires groups of students to describe and flow chart a transaction cycle for a real business and analyze its strengths and weaknesses. Both written and oral reports will be made on the project.

9-1-4 Accounting Information Systems II: This course is intended to serve as a subsequent required course in accounting information systems; accounting majors will not be permitted to take this course. It will be designed to explore, in some depth, the principle vulnerabilities of and threats to information technology and accounting information systems. It will also examine, in detail, the corresponding security and internal controls necessary to protect organizational IT and AIS resources and reduce risks associated with such technologies and systems. Topics include: non-subversive/unintentional threats, subversive/intentional threats, computer-based information system and technology exposures and vulnerabilities, computer and network security fundamentals, pervasive controls/countermeasures (e.g., operating system controls, data management and database controls, organizational structure controls, systems development controls, systems maintenance controls, computer center security and controls, network and e-commerce controls, and personal computer controls), and application controls/countermeasures (e.g., input controls,

processing controls, and output controls) for primary transaction cycles.

AIS Internship: The intent is to have this internship in an SAP environment with a consulting firm or corporation.

9-2 E-Business Technology Courses:

9-2-1 Java Programming for the Web: This course focuses on programming of web-based applications. As the course title states, Java will be used as a first programming language. The assumption is that the student has no prior programming experience. Focus is on programming concepts and structures. Principles of programming style are emphasized. Classes, constructors, and keywords are stressed along with an introduction to applets and applications. The programming experience gained in this class should be transferable to any 3rd generation or object-oriented programming language. Students should come away from this course with a thorough grounding in how to problem-solve using programming as the solution mechanism.

9-2-2 Electronic Commerce: This course provides an in-depth examination of the concept and application of electronic commerce. It is one of the "soft" technology courses within the major. Some hands on work are done through the use of SAP R/3 in an effort to introduce the students to business process integration. E-commerce topics are explored in detail using both lecture and case methods. Topics include an overview of the critical information technologies that provide a basis for electronic commerce, ecommerce business models, the effect of Internet commerce on existing business models, and important issues surrounding the implementation of e-commerce in organizations. Students completing this course have a good foundation in the strategic issues, which affect the e-commerce subset of e-business.

9-2-3 E-Business Communication Networks: This course provides an in-depth examination of data communication processes and structure. Central focus is on LAN, WAN, and Intranet technologies, as well as design and implementation of networking applications within the organization. Although it focuses primarily on networking support of web-based communications, it necessarily must deal with LAN's, NOS's, and hardware concepts. Both Linux and Windows networking are discussed as well as Novell's Netware. Network concepts, e.g. structure, topologies, protocols, and administration, are presented in detail. Hands-on work includes not only network design, but also actual installation, including hardware (cables, switches, etc.) and software components. Students take away from this class the ability to design, build, and administer the networks which support e-business.

9-2-4 E-Business Database Development: This course provides in-depth coverage of database technology issues including data modeling, CASE, logical design, and implementation in a relational DBMS environment. Students gain hands-on experience in the use of enterprise-level development tools. There are three technical objectives to this class, all based on the assumption that RDBMS's will remain

the database engine of choice for the foreseeable future. Since relational tables will continue to provide the back-end storage component of web-based systems, students are given an extensive exposure to table design. SQL is then presented in detail. Finally, utilizing Java, SQL, and other tools, the students put together the back-end components of a production quality e-commerce web site. MS SQL Server is the database of choice for this class due to its relative ease of administration, and the fact that students have had extensive exposure to MS Access in earlier business foundation classes. Students finish this course with the background necessary to both design and program the database support necessary to maintain ebusiness systems.

9-2-5 Enterprise Systems Management: This course provides an extensive investigation into the business environment of enterprise resource planning systems. Discussion topics include competition in the ERP arena, ERP architectures, evaluating and modeling business processes, and implications for ebusiness. Case studies will be used to explore the management issues of effective use of information technology within the organization. This course is designed to give the students a detailed look at enterprise back-end systems and processes, as well as the new web-based initiatives (portals, B2B, CRM, etc.) from the traditional ERP vendors. Although very much a case-based course, the students will also have significant hands-on exposure to SAP. The student should take away from this course a thorough understanding of business process integration, as well as a feel for how traditional ERP systems are being re-defined and recast around web technologies.

10- Challenges

The described program faces many challenges some of which are addressed below:

10-1 Accreditation Issues: While there have been calls for drastically changing accounting programs (Albrect and Sack 2000) there is uncertainty as to how the AACSB will view such changes when considering accreditation. AACSB encourages the development of broad and diverse programs in accounting. The standards for separate accounting accreditation indicate that a minimum of 21 hours are needed in accounting, including six hours of introductory accounting. It would appear that the program would meet these standards. However, it must be remembered that the accreditation process is mission driven and it would be necessary for schools to adjust their mission to include a joint program of this type.

10-2 Faculty issues: The described program will require faculty members sufficiently trained in information technology to teach the accounting systems courses. Given the shortage of faculty in this area and the high salaries, such a program may be beyond the reach of many schools. Faculty in financial and cost accounting will also need a background in SAP, or other selected ERP software, if it is to be implemented in these courses. This will most likely mean required attendance at software training courses. The

increased technology will also increase the need for continuing education because of the rapidly changing nature of information technology. Both of these increase costs for the institution in terms of travel, faculty released time, conference fees, support grants, etc. It may also be necessary to provide incentives for faculty to get them involved in such a program. Significant additional time will be needed to prepare for classes and this will take away from other faculty efforts such as research and service. Encouragement can be provided through released time, summer support grants etc. The University administration must recognize these efforts and their potential impact on research or service productivity.

Attracting Students: For the program to be viable it must attract a critical mass of students. This may not occur in the first year or two because of student uncertainty concerning the desirability of such an undergraduate degree. The university needs to be committed to the start up time and realize that it may take a year or two to attract a desirable quantity of students. For the program to be successful the students need to be those with excellent academic credentials. For this reason, the program may have higher GPA standards than other programs. This will create a unique academic major that will be attractive to both students and potential employers. Meaningful, well paying summer internships will also help attract students. The most effective way to attract top quality students will be the placement of graduates in high paying positions.

10-3 Attracting employers and internship opportunities: The joint Degree provides a unique individual to the market. Employers are looking for technically competent students who have both interpersonal and communication skills. It is important to have potential employers involved in the program before interns or graduates are to be placed. Employers can provide speakers for classes, field trips, etc. It is preferable to have upper level management in accounting systems involved in the process because they are the individuals who can most directly affect internships and employment. Making these individuals aware, on a first hand basis, of the program and the quality of students in the program is the most effective approach in student placement. Providing internships will also give potential employers a chance to observe students in the work environment before full-time employment offers are extended.

11- Examples from the jobs description: at
<http://www.jobsite.co.uk/>

Systems & Data Controller

“We are now looking to compliment this team by recruiting a Systems & Data Controller. Key responsibilities will include ensuring the integrity of ERP/SAP /Business Warehouse systems, preparation of product costs and prices; maintenance and calculation of all master data relating to pricing, analysing changes and movements; provision of SAP training and 1st line support and overseeing the quality control of data within SAP systems.

To be successful you will need to be a fully or part-qualified (CIMA or ACCA) accountant, with experience of guarding systems integrity within an ERP/SAP Business Warehouse environment. Key to success in this role will be your ability to produce reports, manage data downloads from SAP and implement process and systems changes where necessary.”

Maintenance and Asset Accountant

The successful applicant will be a qualified accountant with three to five years post qualified experience, be highly computer literate, with strong Microsoft skills, and confident in using a range of IT applications. An ability to demonstrate initiative and also to work with other departments will be essential. A degree of exposure to UK and overseas VAT would be an advantage. An interest or experience in aircraft and engineering would be desirable.

12- The Joint Degrees Programme in Accounting @ UK Universities

The Joint Degrees Programmes in UK Universities offer 31 Possible Combinations as it is shows on table 2 below and details at Appendix 1. there one university provide 8 joint degree, another university provide 7 joint degree, two universities provide 6 joint degree , 5 universities provide 4 Joint degree (details table 1 below)

12-1 Joint Honours - Accounting

In the joint honours programmes the student usually spend an equal amount of time on both subject areas. However, at Stage 1 of the of accounting degrees only spend a third of the time studying accounting and finance subjects, namely foundations of accounting, information technology and business finance. The rest of the time is either made up by taking optional modules from other subject areas or by spending more time on the second subject of your degree.

At Stages 2 and 3 half your modules are taken from the discipline of accounting and finance. You choose some modules in the core areas of financial reporting, management accounting, or finance, as well as having the scope for some optional modules in other areas of accounting or finance. Descriptions of the computing science, information systems, mathematics and statistics modules, the subjects that you can study alongside accounting and finance as part of this scheme, are given in the appropriate subject sections of this Prospectus.

12-2 Joint Honours - Information Systems

Information systems is concerned with the application of computer systems and you normally spend half of your time studying modules in this subject at each Stage of the programme. At Stage 1 this includes modules concerned with programming, as well as the impact that computer systems have on our daily lives. At Stages 2 and 3 you continue to develop the skills you have learnt at earlier Stages of the programme through more advanced modules. Some of the topics you cover include databases, information handling, software project management and systems administration.

Table 1

No of the Universities	No of the Joint Degree
1	8
1	7
2	6
5	4
2	3
7	2
33	1
Total 51	31

Source: UCAS Statistics

Table 2: The Joint Degrees Programme Combination

Accounting/Combined Studies
Accounting Information Systems
Accounting/Communications, Media and Culture
Accounting/Computing
Accounting/Information Systems
Accounting/Intelligent Systems
Accounting/Multimedia Systems
Accounting and Computing
Accounting/Software Engineering
Information Systems /Accounting
Accounting and Business Information Technology
Accounting and Computing
Computerized Accounting
Banking and Business Information Technology
Business Enterprise and Computer Aided Design
Business Enterprise and Computer Animation
Financial Services and Computing
Business Information Technology and Financial Services
Computing and Accounting
Accounting and Computer Information Systems
Accounting/Computing
Accounting and Information Systems
Accounting/Information Communication Technologies
Accounting and Computer Information Systems
Computing/Accounting
Information Technology with Accounting
Information Communication Technologies/Accounting

Accounting With Computing
Accounting With Computer Information Systems
Accounting/Computing
Accounting and Information Systems
Accounting/Information Communication Technologies
Accounting and Computer Information Systems
Computing/Accounting
Information Technology with Accounting
Information Communication Technologies/Accounting
Accounting With Computing
Accounting With Computer Information Systems
Source: UCAS Statistics

13- Conclusion

Application of technology in the business environment continues to change rapidly. The accounting professional of the future must have more e-business technology education if they are to be successful. This is evidenced by calls from both educators and accounting professionals for changes in the curriculum. It is also evidence by proposed changes in the CPA exam and the AICPAs project to expand services offered by CPAs. The joint program outlined above meets these new challenges and will provide graduates who are unique to the market place. They will be professionals who are competent in both accounting and ebusiness technology.

Most academic institutions have experienced declining enrollment in accounting, a traditionally high enrollment area. The described program will attract new and better students and will reverse the current trend in accounting education. While the initial investment for the university may be significant, the long term benefits to the university, students, and the business community are even greater.

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APPENDIX 1

1- University of East London

Degree
Business Information Systems/Accounting
Computer Networks with Accounting
Information Technology with Accounting
Information Technology/Accounting
Internet Technologies/Accounting
Software Engineering with Accounting

Adel Ahmed / An Investigation and Evaluation of Information Systems Combined/Joint Honours Degree into Accounting Programmes - An Evidence from UK Universities.

2- London Metropolitan University

Accounting and Business Information Technology
Accounting and Computing
Computerised Accounting
Banking and Business Information Technology
Business Enterprise and Computer Aided Design
Business Enterprise and Computer Animation
Financial Services and Computing
Business Information Technology and Financial Services

3- London South Bank University

Accounting and Business Information Technology
Accounting and Computing
Accounting and E-Business IT
Business Information Technology and Accounting

4- Middlesex University

Accounting with Business Information Systems
Business Information Systems with Accounting

5- Queen Mary, University of London

Computer Science with Business Management and Accounting
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6- The University of Ulster

Computing with Accounting

7- University of Dundee

Accountancy and Applied Computing
Accountancy with Management and Information Systems
Applied Computing and Financial Economics

8- Glasgow Caledonian University

Accountancy with Other Disciplines

9- Napier University

Accounting and Information Management

10- University of Paisley

Business Information Technology and Accounting
--

11- The University of Stirling

Accountancy/Computing Science
Finance/Computing Science

12- University of the West of England, Bristol

Accounting and Artificial Intelligence
Accounting and Internet Systems
Accounting and Multimedia Computing

13- University of Gloucestershire

Accounting & Financial Management and Business Information Technology
Accounting & Financial Management and Internet Systems Development
Accounting & Financial Management and Multimedia
Database Systems and Accounting & Financial Management

14- University of Portsmouth

Accounting and E-Business

15- University of Central England in Birmingham

Accountancy and Computing
Accountancy and Information Communication Technology
Finance and Computing
Finance and Information Communication Technology

16- Coventry University

Information Technology with Accounting
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17- De Montfort University

Accounting and Computing

18- University of Derby

Accounting and Computer Information Systems

19- The University of Northampton

Accounting/Computing
Accounting/Information Communication Technologies
Computing/Accounting
Information Communication Technologies/Accounting

20- The Nottingham Trent University

Accounting and Information Systems

21- Oxford Brookes University

Accounting/Combined Studies
Accounting/Communications, Media and Culture
Accounting/Computing
Accounting/Information Systems
Accounting/Intelligent Systems
Accounting/Multimedia Systems
Accounting/Software Engineering

22- Staffordshire Univ. Regional Federation

Information Systems Accounting

23- Staffordshire University

Accounting Information Systems

24- University of Wolverhampton

Accounting and Computing

Adel Ahmed / An Investigation and Evaluation of Information Systems Combined/Joint Honours Degree into Accounting Programmes - An Evidence from UK Universities.

25- Coventry University

Information Technology with Accounting

26- De Montfort University

Accounting and Computing

27- University of Derby

Accounting and Computer Information Systems

28- The University of Northampton

Accounting/Computing

Accounting/Information Communication Technologies

Computing/Accounting

Information Communication Technologies/Accounting

29- The Nottingham Trent University

Accounting and Information Systems

30- Sheffield Hallam University

Accounting and Information Systems

31- The University of Sheffield

Accounting & Financial Management and Information Management

32- The University of Huddersfield

Accountancy with Information Systems

33- Leeds Metropolitan University

Accounting and Information Systems

34- University of Leeds

Accounting and Computing

Accounting and Information Systems

35- The University of Newcastle upon Tyne

Accounting and Computing Science

Accounting and Information Systems

36- Sheffield Hallam University

Accounting and Information Systems

37- The University of Sheffield

Accounting & Financial Management and Information Management

38- University of Sunderland

Accounting and/with Computing

Accounting and/with Information Technology

Artificial Intelligence and/with Accounting

Computer Studies and/with Accounting

Intelligent Robotics and/with Accounting

Business Enterprise with Information Technology

39- University of Teesside

Accounting with Information Technology

40- University of Bolton

Accountancy and Business Information Systems

Accountancy and Computing

41- The University of Huddersfield

Accountancy with Information Systems

42- Lancaster University

Accounting, Finance and Computer Science

43- The University of Liverpool

Accounting and Computer Science

44- The Manchester Metropolitan University

Accounting Information Systems

45- The University of Manchester

Accounting with Business Information Systems

46- The University of Buckingham

Accounting with Information Systems

47- University of Hertfordshire

Accounting and Management Information Systems

48- The University of Kent

Accounting & Finance with Computing

Computing and Accounting & Finance

49- University of Wales, Aberystwyth

Accounting & Finance with Computer Science

Accounting & Finance with Information Management

Computer Science with Accounting & Finance

Information Management with Accounting & Finance

50- University of Glamorgan - Prifysgol Morgannwg

Accounting and Corporate Information Management

51- University of Greenwich

Finance and Financial Information Systems

52- Keele University

Computer Science and Finance

Finance and Information Systems

53- The University of Sheffield

Computing for Banking and Finance