Active Learning and Student Engagement in the Business Curriculum: Excel Can be the Answer

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ABSTRACT

Business educators are struggling with how better to engage their students in the learning process. At the same time, stakeholders are reporting that business students are ill prepared in problem solving techniques and the effective use of spreadsheets. The systemic use of Excel as a teaching tool in the business curriculum may be the answer to both situations. This paper reviews how computer literacy (with a particular focus on spreadsheets) is addressed in a sample of AACSB accredited business schools. Three models are discerned and discussed. We then follow with an examination of how business faculties are using spreadsheets as a means of student engagement. The results of the literature search in this area are summarized and discussed. The paper concludes with recommendations and directions for future research and curriculum development.

INTRODUCTION

Educators have long recognized the need to revise our pedagogical approach for the new generation of business students. While socially technically savvy, as evidenced by their use of Facebook, Twitter and Google, these students are frequently not prepared to use technology as a tool, as students and as professionals, to address business problems. Creighton, Kiloyne, Tarver and Wright (2006) found college freshmen majoring in business were not able to complete a rudimentary spreadsheet problem. Students earned an average score of 27% on the Excel assignment, which consisted of totaling columns, entering formulas, formatting numbers and making a chart. A recent survey of finance managers found that only 17% believed their non-finance managers could link a cell in one worksheet to a formula in another spreadsheet in the same workbook (Serven, 2007). Even students' self-assessment of their spreadsheet skills is low and showing relatively slow improvement (Stoner, 2009).

While assessments of the spreadsheet skills of students and recent graduates are low, the business community continues to rank spreadsheet functionality in business situations as a critical need for new employees (Spiech, 2005; Stoner, 2009). As an additional indicator from the business community of the pervasive need for professionals to understand Excel, BarnesandNoble.com currently lists 325 different books (none textbooks) available supporting the use of Excel. While many business curriculums typically include a course or course segment on spreadsheets, business education has been slow to comprehensively incorporate spreadsheets as a fundamental and multi-disciplinary tool.

The engagement of students is not restricted to business education. From the sciences (Marshall and Nykamp, 2010; *Popkess and McDaniel, 2011*) to engineering (Heller, Beil, Dam and Hairum, 2010; Smith, Sheppard, Johnson and Johnson, 2005) to political science (Peters and Beeson, 2010), educators have been struggling with the issue of how to make students active participants in the learning process. When students are active participants in their own learning, whether via tutorials (Seal, Przasnyski, and Leon, 2010), cases (Springer and Borthick, 2007), discussion and activities (Coram, 2005; Serva and Fuller, 2004; Smith and Van Doren, 2004) or service learning (Ayer, Gartin, Lahoda, Veyon, Rushford and Neidermey-

er, 2010; Eyler and Giles, 1997; Still and Clayton, 2004), students report higher satisfaction and/or better performance. Additionally, active learning shows improvements in short term retention as evidenced by higher test scores (Yoder and Hochevar, 2005). Of the many ways business faculty can employ active learning, the use of Excel for problem solving and analysis is among the most relevant and accessible. In addition to gaining the instructional benefits of active learning, students will be reinforcing their spreadsheet skills, which will serve them well in the job market and beyond. This paper seeks to examine to what extent spreadsheets are being taught and used in the business school curriculums, summarize the innovative ways in which Excel can be used as an active learning tool and propose directions for pedagogical development and research.

WHERE WE ARE

To what extent are business schools teaching and using Excel in the curriculum? To address that question a random number generator was used to select a random sample of 25 of the 477 domestic schools accredited by The Association to Advance Collegiate Schools of Business (AACSB) in the spring of 2010. We chose to focus on the Bachelor of Science in Management degree, thus eliminating three schools that did offer this degree. Of the remaining 22, we analyzed the curriculum and course catalog information from the individual school web pages to determine where spreadsheets were taught and used in the curriculum.

An examination of the descriptions of required courses indicated that although each school requires courses that teach the use of Excel, there is no consensus among schools as to the methodology. There appears to be three models that schools are using to address computer literacy, including spreadsheets. The most prevalent is the inclusion of Excel within a required lower division business course. Even within this model, there is a lack of consensus as to how to incorporate the teaching of Excel in the curriculum. In some cases, the course is Excel specific, but more likely, the use of Excel is one of several topics within the course. Credit for these courses range from 0 to 3 credits and course titles vary from "Computer Literacy Concepts for Business" to "Information Systems in Organizations". Note, that in some cases, the business school allows students to take a proficiency exam to waive a course requirement. The second model differs from the first only by requiring that students take a lower division course in computing outside of the business school. This method allows students to complete a general education requirement at the same time as developing computer literacy. The least common approach has computer literacy built into a university-wide requirement in that every student, regardless of major (i.e. business, humanities, social science) must demonstrate computer literacy. In this case, a proficiency exam must be passed. A summary of the school surveyed by computer literacy model is presented in Table 1. A detailed summary of the schools and curriculum models is provided in Appendix A.

Each of the methods listed below ensures that students have been exposed to Excel and can demonstrate some ability in the use of this software prior to the junior-level. Unfortunately, unless students routinely apply Excel in classes or projects, their ability to utilize it as a tool in making business decisions decreases significantly due to a lack of use. The situation is this: Students learn Excel

TABLE 1
SUMMARY OF SCHOOLS BY COMPUTER LITERACY MODEL

Business Schools with Excel Embedded Within a Lower Division Business Course (Model 1)
Appalachian State University
DePaul University
Indiana University
Indiana University – Fort Wayne
Kennesaw State University
Loyola University Chicago
Pennsylvania State University
Saginaw Valley State University
San Francisco State University
Temple University
University of Michigan
University of Montevallo
University of Nebraska
University of Rhode Island
University of Tennessee–Chattanooga
Winston-Salem State University
Business Schools with Excel Outside of Business School (Model 2)
LaSalle University
Loyola University Maryland
Siena College
University of Wisconsin–Whitewater
Business Schools with Excel as Part of University Requirement (Model 3)
Rowan University
University of Houston – Victoria

while as a freshman or sophomore in a specific class dedicated to Excel or information technology and are then expected to remember this two to three years later, upon graduation without consistent use of Excel in upper division classes. Fewer than 50% of the schools reviewed had an advanced course in problem-solving using Excel and of those that did; none of them were required courses for the management major. A recent study at an AACSB institution showed that the incorporation of spreadsheets in the curriculum lags behind word processing, presentation software and internet research applications. In addition, the use of spreadsheets is stronger in the accounting curriculum in than in the general business core (Varnon, 2010).

WHERE SOME OF US HAVE BEEN

The literature is rife with cases and notes, from the basic to the advanced, on using Excel in the business curriculum. While our review of the literature cannot be viewed as exhaustive, we found that nearly every business discipline is represented in published pedagogical papers in peer-review journals. Table 2 summarizes our findings of articles explaining innovative ways in which Excel is being used in the classroom in economics, finance, accounting, information systems, marketing, operations management and statistics. We have noted qualitative and quantitative outcomes of these teaching techniques and approaches if they were presented in the paper. Likewise, we have noted to what extent the technique, lesson or approach is pre-

TABLE 2
SUMMARY OF INNOVATIVE SPREADSHEET USE IN THE BUSINESS CURRICULUM

Citation	Topic	Summary
Chen (2007)	Overview of the use of pivot tables in summarizing data.	Although the examples are in Excel 2003, the concepts of variable selections, data summary, sorting, grouping, collapsing and filtering are readily transferable to other versions.
Erfle (2001)	Describes how Excel is used as a teaching platform in managerial economics, where students do not necessarily have exposure to calculus, statistics or Excel. The course focuses on constrained optimization and econometric estimation The author notes that some typical managerial topics are omitted due to the necessity to teach calculus, statistics and Excel from the ground up. The prominence and versatility of Excel make it the ideal learning platform, regardless.	Labs begin with present value calculations (NOT the function) to introduce basic concepts such as writing formulas and absolute vs. relative cell addressing. Eventually students use Excel to examine linear and non-linear trends and do simple forecasting.
Friedman and Munter (2004)	This step-by-step practitioner focused article shows how a spreadsheet can be created for financial officers and accountants to identify unusual changes in financial statements.	Includes the usage of named cells, the IF, ABS and VLOOKUP functions, conditional formatting and data validation
Ganesh and Paswah (2010)	Introduces spreadsheet based decision models in an undergraduate marketing course to expand their understanding of the financial accountability of the marketing role. The course, Marketing and Money, is taught with 50+ mini-cases and spreadsheet modules.	Two "how to" modules and ten concept modules include such topics as channel mark-ups, contribution analysis, the breakeven point and decision making under uncertainty. An illustrative example is provided.
Gordon and Gordon (2009)	Graphical simulations for teaching introductory statistics concepts	Students can see a graphical representation of the population and the sample. They can change the population distribution and level of significance to explore the concepts of randomness and variation. The article provides the URL for downloading the Excel simulations.
Hanna (2010)	Deming's funnel experiment to address system variation. The author uses the simulated experiment for class discussion and has found it to energize discussion and enhanced student retention of key concepts	Uses =RANDBETWEEN to generate x and y coordinates to simulate the funnel experiment. The spreadsheet also generates a control chart. Copies are available from the author by request.
Jelen (2008)	A short article that attempts to address the confusion in Excel with dates stored as an integer number.	Introduces (with examples) functions for doing calculations with dates, including =DATEDIF, NETWORKINGDAYS and WORKDAYS.

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Citation	Topic	Summary
Larson and Hsu (2010)	Analysis of Variance	Provides a good overview of ANOVA in Excel. Students are asked to solve single factor analysis of variance given only the sample summary statistics. Excel (and all other statistical packages) can no invoke ANOVA without input data. This article discusses a macro so that students can input the summary statistics and an artificial data set will be developed. The macro and instructions are available from the author upon request.
Mangiero, Manley and Mollica (2010)	Dynamic spreadsheets were developed to show students the sensitivity of the solution to various parameter manipulations. Time value of money: the classic retirement annuity and capital structure: EBI – EPS analysis	This is NOT a guide for developing a dynamic spreadsheet; however, the file is available from the author (gmangiero@iona.edu) upon request.
Palocsay, Markham and Markham (2010)	Notes that Excel can provide practical and relevant business intelligence (BI) functionality at a fraction of the cost of higher end BI tools.	Provides examples and figures on sorting, filtering, pivot tables, pivot charts, linking a spreadsheet to a database and extracting and importing external data into Excel.
Patterson, Harmel and Friesen, 2010	Develops a spreadsheet simulation to look at the win-loss probability in the Monty Hall Let's Make a Deal door selection problem.	The spreadsheet design, which includes macros, in discussed. A copy of the spreadsheet is available upon request from the author (mike.patterson@mwsu.edu).
Paquette (2005)	Teaching note asks students to communicate sales and earnings performance graphically and numerically, using average and compound growth rates.	The problem is given in the Appendix and the teaching note discusses the calculations and use of graphics. Introduces more sophisticated, custom, graphing including Line-Column on two axis for working with two sets of time series data Uses the =GEOMEAN for calculating the geometric mean as a better measures of growth rate over multiple periods. Provides step-by-step instructions for fitting an exponential trend line to the data set.
Price and Zhang (2007)	Outlines a 15-20 minute die-tossing classroom experiment to illustrate the central limit theorem	Students record the rolls of the die in a spreadsheet that generates histogram dynamically. The central limit theorem comes to life as the bell-shaped curve emerges as the number of samples and the sample size increase. The spreadsheet template is available from the authors.
Serven (2007)	Although NOT a guide to using Excel in the budgeting process, this article does raise budgeting questions that can be addressed with a spreadsheet, such as what costs can be budgeted on a per head basis and how much will be saved in the budget by delaying a new hire 3 months.	Recognizes (and documents) that most managers cannot effectively use Excel to create and manage a budget and recommends other software solutions.
Stout and Juras (2009)	Presents a case that requires students to complete as a cost-analysis project. Student analyze and model, linearly and non-linearly, the direct labor-hour consumption associated with the production of radar units. A model should be recommended for cost-estimation in the contract bidding process.	Presents a 6-page case and basic and optional requirements. Appendix A (3 pages) offers a tutorial on the learning curve model, a form of an exponential function. Appendix B (11 pages) covers using Excel 2007 to estimate linear and non-linear functions. Covers Excels regression tool and Solver as well as the functions =LINEST, INDEX, TREND, FORECAST and FDIST.
Strulik (2004)	Demonstrates two core models of dynamic macroeconomics: the neoclassical growth model and the basic real business cycle model Suggests that use of Excel frees students from the tedious calculations and allows to spend their time on concepts, such as how changes in monetary policy, taxes, wage income and consumption affect investment, employment, inflation and growth.	Uses cell names, intermediate formulas, Goal Seek and =ABS (absolute value)

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SUMMARY OF INNOVATIVE SPREADSHEET USE IN THE BUSINESS CURRICULUM

Citation	Topic	Summary
Thomas (2004)	Supports financial planners developing customized spreadsheet templates to offer clients greater control and flexibility to improve communication. The paper provides a generic development plan and emphasizes the need for testing. The advantages of Monte Carlo simulation and allowing for the incorporation of probability are discussed.	An illustrative case, using the @RISK add-on, is available from the author at frank.thomas@stockton.edu
Togo (2004)	Three simulation risk analysis examples are presented in the paper: capital budgeting, budgeted cash flows and budgeted income statement. This technique can also be used for risk analysis associated with economic order quantity, costing, profit planning, cost-volume-profit planning and audit sampling	The add-in @RISK is used to model uncertainty of the input variables with 30+ probability distributions

sented in a turnkey manner. In many cases the authors provide, post or are willing to send the files to other educators.

The use of spreadsheets in the business curriculum offers a number of pedagogical benefits. The first is that by being active participants in the modeling or running of the analysis, students are more engaged and gain a firmer grasp of the material. For example, Springer and Borthick (2007) found that students who were taught with cognitive conflict tasks, problems for which there was no prescribed right answer, used higher-level thinking and achieved higher scores than students taught in the traditional manner. Rather than doing standard problem solving, the students in the experimental group were given business situations and asked to build spreadsheet models and analyze the affects of assumptions and decisions. Not only did these students perform better on the examination, they were also more likely to enroll in a higher level accounting course when taught with cognitive conflict method in the principles course. Using spreadsheets allows students to address larger and more realistic problems, engaging them in higher level learning thus moving from knowledge and comprehension to application, analysis and synthesis (Bloom, 1956).

A secondary benefit is that students further cultivate their spreadsheet skills, resulting in a positive impact on their future employment and productivity. While students may learn the spreadsheet basics in an introductory course, repetitive usage will solidify those skills and broaden their outlook on what spreadsheets can do. A review of the innovative uses of Excel in the business curriculum in Table 2 outlines a number of intermediate features that most business students would not typically be exposed to including filtering and database functions, linking multiple spreadsheets and linking spreadsheets to databases, calculations with dates, sophisticated graphing and statistical functions.

Finally, the adoption of Excel as a medium for active learning in business is relevant, feasible and accessible. Employers want to hire graduates who are computer literate, in general, and adept with spreadsheets, specifically. Excel is nearly universally available on campus and in the workplace. Active learning exercises are accessible and can be incorporated into many of the traditional business courses. In addition to the specific exercises reviewed in the prior table, Table 3 offers a list of sources of related data, problems, exercises and resources including selected practitioner journals that publish articles pertaining to the use of Excel in business situations. The course elements should increase the skills and knowledge of the application, rather than simply provide an illustration of the application's usage (Varnon, 2010).

A ROADMAP FOR GETTING THERE

While seemingly obvious, it is nonetheless the greatest barrier: both the students and faculty must be comfortable with the spreadsheet basics. It would be impossible to use Excel effectively as the tool for delivering higher-level concepts if those involved are not sufficiently confident in basics such as data entry and manipulation, writing formulas and formatting numbers and text. Time and again, studies have found that students are not proficient with spreadsheets (Awasthi, Bee, De Mello-e-Souza and Tinius, 2010; Hindi, Miller and Wenger, 2002). As indicated by our curriculum review, most schools are already at this point with 9.1% requiring a computer literacy exam as part of the general education requirement and 90.9% requiring a course in software applications. But what about

TABLE 3
Additional Resources on Using Excel as a Tool for Active Learning in the Business Curriculum

TEXTBOOKS

Textbooks, particularly those in more quantitative fields, are putting a greater emphasis on Excel. A cursory examination of the Pearson/Prentice Hall titles revealed many books, across the business disciplines, which make extensive use of Excel. The following is an illustrative list:

- Mastering Financial Mathematics in Microsoft Excel: A Practical Guide for Business Calculations (2011–ISBN-10: 0273730339 | ISBN-13: 9780273730330)
- Basic Marketing Research with Excel (2012–ISBN-10: 0135078229 | ISBN-13: 9780135078228
- Strategic Management: Concepts and Cases (2009–ISBN-10: 013607930X | ISBN-13: 9780136079309)
- Statistics for Managers Using MS Excel (2011–ISBN-10: 0137035195 | ISBN-13: 9780137035199)
- Quantitative Analysis for Management (2012–ISBN-10: 0132149117 | ISBN-13: 9780132149112)

WEBSITES AND DATA SETS

Bill Jelen writes applied and practical guides to using Excel in accounting and finance in Strategic Finance. Recent topics have included calculations with dates (see Table 2), custom sorts, naming ranges and highlighting outliers.

In addition to the hundreds of data sets available from textbook publishers, faculty could use data from a number of organizations and agencies such as U.S. Census Bureau (http://factfinder.census.gov) and the U.S. Bureau of Labor Statistics (http://www.data.gov). The University of Michigan publishes Statistical Resources on the WEB (http://www.lib.umich.edu/govdocs/stecon.html) which gives a comprehensive list of data sources and links.

SELECTED PRACTITIONER JOURNALS

Bank Technology News
CPA Journal (The)
CPA Technology Advisor
Guardian (The)
Information Week
Internal Auditing
Investment Weekly News
Journal of Business Forecasting
Meetings and Conventions
Quality Progress
Strategic Finance

the faculty? It is likely that many faculty have self-taught themselves Excel and have received limited formal training. While they may be able to accomplish known tasks, they may not know the full functionality of the tool. The release and university adoption of Excel 2010 is the perfect time to pursue faculty training and consider new textbook adoption. As more students arrive on campus with the new Office suite, the increase in backward compatibility issues will force universities to adopt Office 2010, including Excel 2010. This adoption of Office 2007/2010 from Office 2003 provides an excellent opportunity for faculty to pursue training and consider new textbook selections. This adoption can also act as a prime motivator for faculty to make the curriculum revisions needed to embed Excel in upper division courses.

CONCLUSIONS AND DIRECTIONS FOR RESEARCH

Most curriculums provide students with the basics of spreadsheets, either as a university wide requirement or as part of a required lower division course. Our preliminary examination of the curriculums of 22 AACSB business schools revealed significant lack of consensus as to how to embed the use of Excel in the curriculum. Researchers may choose to broaden this examination to seek a more complete picture. A review of teaching notes and articles unearthed a number of innovative ways Excel is being used in courses in the business curriculum. We have proposed employing spreadsheets in upper-level business classes can provide the mechanism to engage students in more active learning support higher level learning. While we have, anecdotally, seen these benefits in our classrooms, it has not been empirically addressed. Future research should build upon prior active learning research and seek to confirm the potential pedagogical success of using spreadsheets for student engagement in the learning process.

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APPENDIX A
DETAILED SUMMARY OF SCHOOLS AND CURRICULUM MODELS

Institution	Required Course(s) Containing Excel	Cr	Summarized Course Description	Model
Appalachian State University	CIS 2025 Personal Computing Effectiveness	3	This hands-on course provides students with the opportunity to understand the role of information technology to enhance the use of computer-based applications to achieve personal and professional goals. Upon successful completion of this course, students should be able to use application software such as Microsoft Excel, Word, Access, PowerPoint, FrontPage and Outlook to make better decisions and improve their individual skills, to conduct on-line research, and to study e-commerce. Other topics covered include the use of communication tools, emerging technologies and digital media, and security issues.	1
DePaul University	MIS 140 Management Information Systems	3	MIS 140 Management Information Systems (Formerly MiIS340) (Prerequisite: None)Management Information Systems addresses how information technology is used to support business operations and management, especially the use of spreadsheets in business applications to insure that students can analyze and present business data. Topics include strategic uses of IT, databases, data warehouse, decision support and artificial intelligence, e-commerce, systems development, IT infrastructure, security, emerging trends, social, ethical and legal considerations. (Formerly MIS 340) Prerequisite: None.	1
Indiana University	BUS K201 The Computer in Business, BUS X201 Technology	3,3	BUS-K 201 The Computer in Business Provides an introduction to the role of computers and other information technologies in business. After introducing basic concepts of computer use, course lectures focus on current technological innovation in social and business environments. The weekly discussion section focuses on functional computer literacy, which includes an introduction to and hands-on application of Microsoft Access and Microsoft Excel. BUS-X 201 consists of two components: a lab and a lecture. The lecture provides an introduction to a range of technologies currently deployed in organizations including a broad understanding of how technologies are deployed, their impact and potential, their strategic importance, and their impact on organizations and on society. The labs focus on technologies that transform data into usable information to enhance decision making. They rely heavily upon Microsoft Excel and, to a lesser extent, Microsoft Access to develop sophisticated data analysis and modeling tools.	1
Indiana University-Purdue Fort Wayne	BUS K200 Computer Literacy Concepts for Business, K211 Business Spreadsheets for Business (K212, K213 Database and Internet are part of the series)	0,1	Orientation to spreadsheet design and use from end-user / manager perspective. Topics include cell addressing through macro development	1

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Institution	Required Course(s) Containing Excel	Cr	Summarized Course Description	Model
Kennesaw State University	BISM 2100 Business Information Systems and Communication	3	BISM 2100–Business Information Systems & Communication 3 Class Hours 0 Laboratory Hours 3 Credit Hours Prerequisite: ENGL 1101, three credit hours of MATH numbered 1101 or higher. This course assumes a basic proficiency in MS Office applications (Word, Excel, and Power Point. The Office for Undergraduate Business Programs has a list of the basic skills required; free training on those skills is available through Information Technology Services for students currently enrolled in any KSU course. Business information systems course designed to: (1) improve communications skills appropriate to the business setting; (2) expand proficiency in the use of business application software; and (3) introduce information technology concepts relevant to doing business in an electronic environment.	1
LaSalle University	CSC 151 Introduction to Computing Using Packages	3	Survey of computers and computer systems; problem-solving and computer applications for business and social science. Introduction to a PC-based Graphical User Interface/windowed operating system. Computer packages include a word processor, electronic spreadsheet, and presentation software. Internet use including electronic mail and the World Wide Web. Credit will only be given for one of CSC 151, CSC 152, and CSIT 154. Prerequisite: Computer Literacy.	2
Loyola University Chicago	ISOM 247 Computer Concepts and Applications	3	Focuses on using information technology to support business processes. The purpose and composition of information systems, the utilization of technology and hands-on experience in developing microcomputer business applications with productivity tools (Microsoft Excel and Access). Outcome: Understanding of using information technology to support business processes, and of developing business spreadsheet and database applications.	1
Pennsylvania State University	MIS 204 Introduction to Business Information Systems	3	Applications oriented course that provides an overview of (1) the role of information systems in business process design (2) the current technologies used for obtaining, storing, and communicating information in support of operations and decision-making within a business organization, and (3) the concepts and principles for programming, developing, and using popular spreadsheet and database tools. Applications focus on important problems and issues found in business disciplines, including accounting, finance, marketing, supply chain operations, and general management.	1
Rowan University	CS 01080 Computer Literacy MIS02.334 Management Information Systems	3,3	Students who have not demonstrated computer literacy at the time of admission to the university are required to complete CS 01080. (this course does not count towards degree requirements) MIS 02.334 is an upper division course in the business curriculum discussing computer file management, data storage, architecture etc. Uses extensive hands-on use of Office and the Internet.	3

APPENDIX A
DETAILED SUMMARY OF SCHOOLS AND CURRICULUM MODELS

Institution	Required Course(s) Containing Excel	Cr	Summarized Course Description	Model
Saginaw-Valley State University	ECON 151 Computer Applications in Business	2	Introductory course using standard software programs that frequently are encountered in business and management situations. Taught through microcomputers and terminals	1
San Francisco State University	ISYS 262 Introduction to Information Systems ISYS 363 Information Systems for Management	3,3	Application of information systems (IS) in a business environment. Topics include information technology (IT), networks and internetworks, types of information systems and their development, problem solving using end-user tools, and social impact of IT. Classwork, 2 units; laboratory, 1 unit. Information systems for management decision-making. Information system development from the end-user's perspective. Applications software used to develop solutions to business problems. Classwork, 2 units; laboratory, 1 unit	1
Siena College	CSIS Ø1Ø Microcomputer Applications or CSIS Ø11 Spreadsheet Problem Solving	3,1	**CSIS Ø1Ø**: Into to computers and applications using both character and graphical user interfaces. Topics will include hardware components; application software including word processing, spreadsheets, graphics and database management; data communications; issues in information systems such as privacy and security; computer operations; and networking. **CSIS Ø11**: A lab-based introduction to problems, problem solving, and the kinds of problems amenable to spreadsheet solutions. Provides a foundation for analyzing business and decision support problems using spreadsheet technology. Typical techniques studies may include absolute and relative addressing, macros, and conditionals. Students will be expected to apply their skills to various business scenarios and cases.	2
Temple University	MIS 21Ø1–Information Systems in Organizations	3	Explain the role of information technology as a business enabler and identify and explain management information systems applications. Evaluate the organizational fit and suitability of business applications and interpret the interaction between information technology, customers, processes, data, infrastructure, participants, and environment in an organization. Understand the ethical challenges of information technology and explain the evolving role of management information systems in the organization, and the role and careers of MIS professionals.	1
University of Houston–Victoria	BCIS 13Ø5 Business Computer Applications (can be used to satisfy University Computer Literacy requirements COSC 3325 Information Systems in Organizations	3	**BCIS 13Ø5:** Computer terminology, hardware, software, operating systems, and information systems relating to the business environment. The main focus of this course is on business applications of software, including word processing, spreadsheets, databases, presentation graphics, and business-oriented utilization of the Internet. **COSC 3225**: An introduction to the functions of information systems in organization and their relationships to organizational objectives and structure. Studies of decision theory, quantitative procedures, system design and types of applications that are part of an information system.	3

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DETAILED SUMMARY OF SCHOOLS AND CURRICULUM MODELS

Institution	Required Course(s) Containing Excel	Cr	Summarized Course Description	Model
University of Michigan	BIT 200 Personal Productivity in Information Technology	1.5	Following the AACSB guidelines for undergraduate programs in business, this course focuses on the development of skills in the use of information technology. To that end, the course includes exercises and assignments that involve the use of spreadsheets (Excel), databases (Access and SQL), web development tools (FrontPage), and other software as appropriate.	1
University of Montevallo	MIS 161 Introduction to Computers	3	An up-to-date coverage of computers, application software, and their uses with an emphasis on personal computers, their operating systems and application software, such as word processing and spreadsheeting.	1
University of Nebraska	BSAD 150 Business Computer Applications	1	This is a basic skills computer course. It is designed to ensure that all CBA students know basic skills in Microsoft Word, PowerPoint, Access and Excel in order to complete assignments in future CBA courses. The course is eight weeks long and students are required to attend all class sessions. Throughout the course, students will work in groups to complete assigned projects and to take assessments. Students may test out of this course.	1
University of Rhode Island	BUS 110 Business Computing Applications	3	Applications, concepts and skills relevant to information technology in the context of the modern business environment. Topics include word processing, spreadsheet, presentation, and internet software.	1
University of Tennessee-Chattanooga	BMGT 100 Computers in Business	3	Introduction to the use of computers in business. Emphasizes spreadsheet and database applications, using microcomputer hardware and software. Also includes word processing and presentation software, Internet use, the basic structure and organization of a computer, ethical issues in computing, and the impact of computers on society.	1
University of Wisconsin–Whitewater	COMPSCI 162 Computer Applications	3	The goal of this course is the give the students a comfortable working knowledge of basic personal productivity software, especially those functions available in Microsoft Office 2007 including word processing, spreadsheets, data management, and presentation software.	2
Winston-Salem State University	MIS 1380 Microcomputer Applications	3	This course provides in-depth experience with spreadsheets and database software on microcomputers. A graphical operating environment such as Windows is used. Students are required to design and develop projects, which address common business problems. Relevant information systems concepts providing the foundations for advanced study in MIS are provided.	1