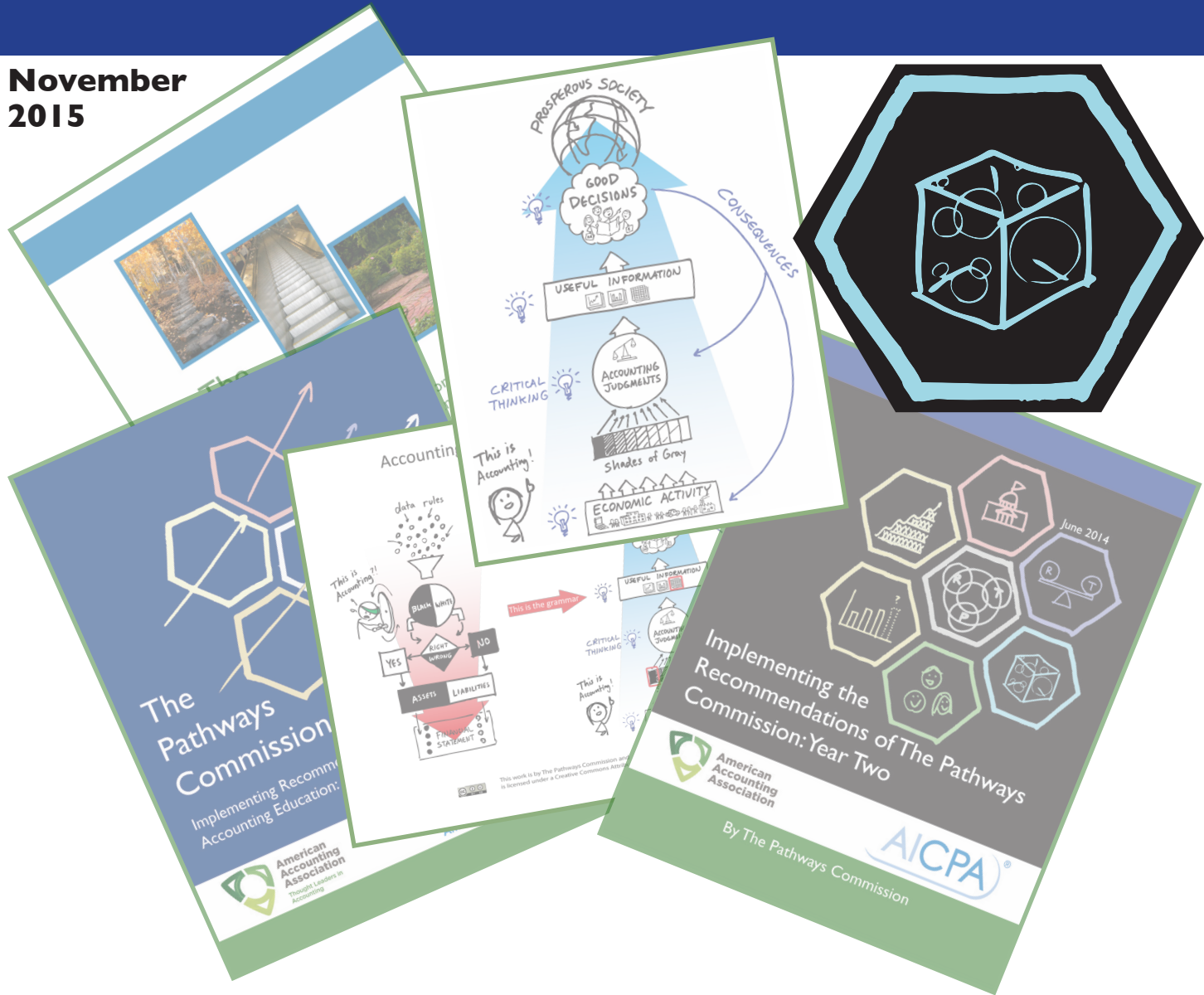November 2015

In Pursuit of Accounting's Curricula of the Future

American Accounting Association

AICPA®

By The Pathways Commission

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Issued November 2015

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Pathways Commission Recommendation #4: In Pursuit of Accounting's Curricula of the Future

Recommendation #4 of the 2012 Pathways Commission report is to "develop curriculum models and engaging learning resources and mechanisms for easily sharing them as well as enhancing faculty development opportunities in support of sustaining a robust curriculum" (The Pathways Commission, 2012). The work on this recommendation involved investigating ways to enhance the opportunities and relevance of the accounting education experience, in its broadest sense, considering the challenges and opportunities technology changes offer to both curriculum development and effective learning environments.

Realizing that the complexity of Recommendation #4's three objectives and 15 action items would take the longest time to truly implement, the commissioners selected the following Action Items under Objective 4.1 that could provide a basis for addressing the remaining Recommendation #4 Objectives and Action Items. In addition, the focus on addressing this objective was targeted for an undergraduate accounting generalist. It is anticipated that future work through the Center for Advancing Accounting Education of the American Accounting Association will focus on graduate education.

Objective 4.1: Engage the accounting community to define the body of knowledge that is the foundation for accounting's curricula of the future.

Action Item 4.1.1 to define the body of knowledge that is the foundation for accounting's curricula of the future.

Action Item 4.1.2 to define a signature pedagogy or suite of pedagogies that will support the learning approaches of a global diverse student body and technology in the curriculum.

Action Item 4.1.3 to connect the accounting body of knowledge to a map of competencies and related performance levels (e.g., Bloom's Taxonomy).

Action Item 4.1.6 to examine the current and emerging technologies in business.

Three task forces of academicians and practitioners were formed, and they discussed multiple aspects affecting the accounting profession, such as the impact technology changes are having on business, accounting, and education as well as the evolving knowledge and skill sets that will be needed by those entering the accounting profession during the next 10 years. Collectively, the task forces agreed on three premises on which to base their work.

1) Professional judgment/skepticism is a foundational skill necessary in the accounting profession.

2) The focus of the common body of knowledge for this project would be for an undergraduate accounting degree as an accounting generalist.

3) The Pathways Vision Model (The Pathways Commission, 2013) articulates the framework for understanding the role of the accounting profession (see Figure 1).
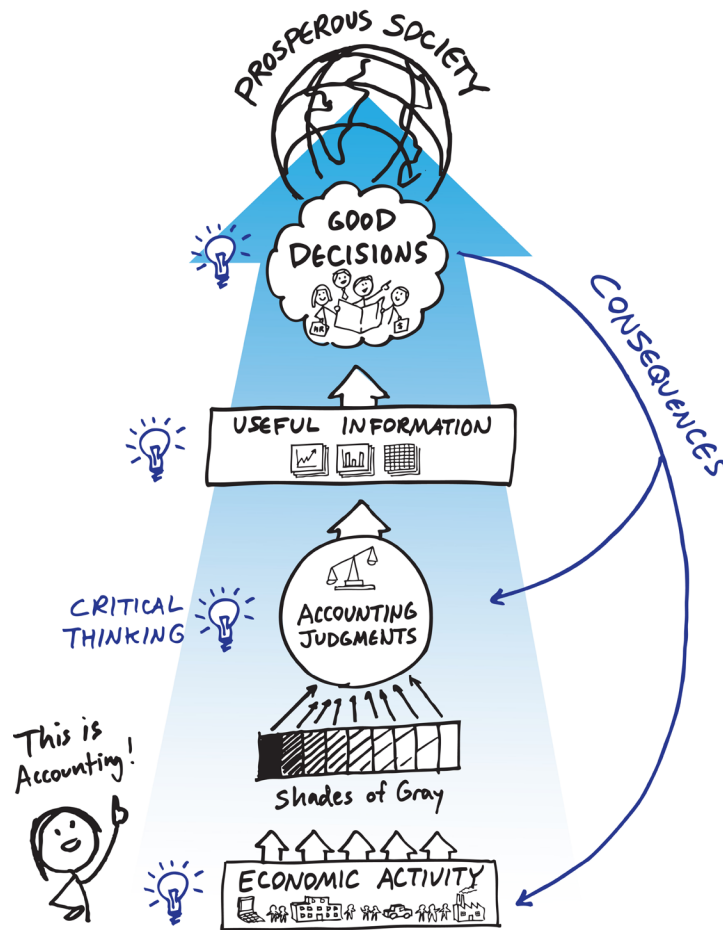
Figure 1: The Pathways Vision Model. (This work is by the Pathways Commission and is licensed under a Creative Commons Attribution-NoDerivs 3.0 unported license).

The task forces agreed that curricula, pedagogy, and technology are tightly integrated, and no one aspect could be developed in a vacuum without the others. This interrelationship concept can be illustrated using the Technology Pedagogy Content and Knowledge Model (Misra and Koehler, 2006, p. 1025), which shows how the three overlap (see Figure 2). Overlaps occur between the common body of knowledge for an accounting generalist; the signature pedagogy that develops professional judgment/skepticism; and the technology used by the accounting profession or used for the teaching, learning, and assessment of accounting. Although each has distinct characteristics, there are shared areas. Specific pedagogies can enhance knowledge acquisition. An accounting generalist must master the intersection of technology skills with accounting knowledge. Plus, synergies are possible with technology-enabled pedagogies. Therefore, the ultimate outcome for all task forces is at the intersection of all three: signature pedagogy for learning the common body of knowledge enabled by technology used in the profession and teaching. To ground and guide this outcome, the framework of the Pathways Vision Model is used.
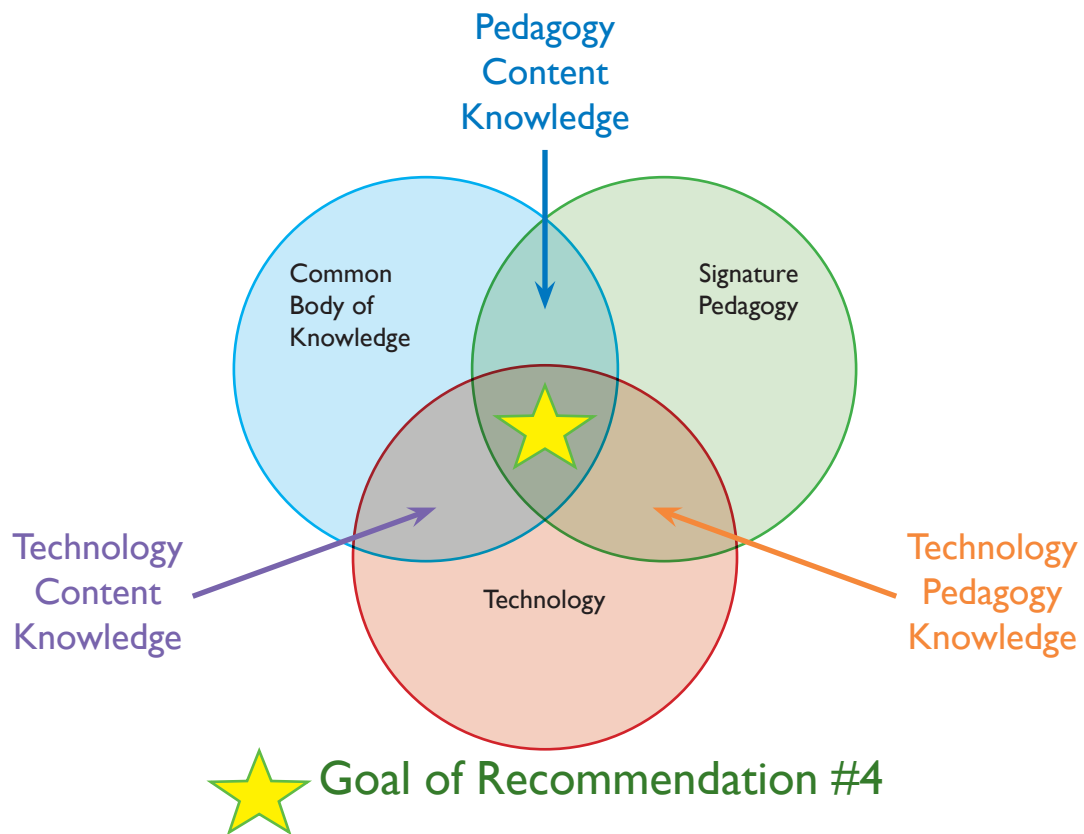
Figure 2: Technology Pedagogy Content and Knowledge Model (adapted from Misra and Koehler, 2006)

In the next section, each task force's activities and next steps will be discussed independently before looking forward to the Pathways Commission–inspired activities that lay ahead.

Common Body of Knowledge

Action Item 4.1.1: Convene a task force, led by educators and including broad representations across disciplinary areas and practice, to engage the community in defining the accounting body of knowledge.

Action Item 4.1.3: Connect the accounting body of knowledge to a map of competencies and related performance levels (e.g., Bloom's Taxonomy) for alternative accounting career paths.

During the first year, the Common Body of Knowledge Task Force volunteers examined the American Institute of Certified Public Accountants (AICPA) Competency Framework, the work being conducted by task forces of the Chartered Professional Accountants Canada and the Chartered Accountants Australia, the work of a joint task force of the Institute of Management Accountants and the Management Accounting Section of the American Accounting Association, and the work of the International Financial Reporting Standards (IFRS) Foundation and the International Accounting Standards Board (IASB) Education Initiative to develop in students the ability to make the judgments that are necessary to apply principle-based accounting. Using the competencies (accounting, broad management, and professional foundational) expressed in the article "Focusing Accounting Curricula on Students' Long-Run Careers: Recommendation for an Integrated Competency-based Framework for Accounting Education" (*Issues in Accounting Education*, May 2014) and the analysis of the core competency framework developed by the AICPA, the Common Body of Knowledge Task Force developed learning goals that would span beyond an undergraduate accounting education.

A new task force (Knowledge and Pedagogy) was then formed to translate the goals into measureable learning objectives targeted for an undergraduate accounting generalist. The learning objectives were categorized by the three competency areas (accounting, broad management, and professional foundational) and their subsections identified in the *Issues in Accounting Education* article (May 2014) and were mapped to the learning levels of Bloom's Taxonomy (see Appendix A). Higher-level learning objectives for postgraduate accounting specialists were not considered during this phase. Next, the task force began the process of validating each of the learning objectives by having them reviewed by practitioners and academicians to confirm that the objectives represented the knowledge required for any undergraduate accounting student. The Taxation Compliance and Planning learning objectives were reviewed by the Model Tax Curriculum Task Force of the American Tax Association and AICPA. The information systems–related learning objectives were reviewed by the Technology Task Force.

Next Steps

It has been apparent since the Pathways Commission began that multiple organizations and associations have been and are working on core competencies and model curricula independently. The Pathways Commission has actively scanned the global education and business environments for these efforts as evidenced by Chapter 7 of the original Pathways Report (2012) and the most recent work done by the Recommendation #4 task forces (The Pathways Commission, 2015). The result is a comprehensive and universal Pathways Common Body of Knowledge that contains measurable learning objectives mapped to the learning levels of Bloom's Taxonomy found in Appendix A.

The foundational learning objectives for an accounting undergraduate have been articulated. What remains is its Pathways Commission–inspired implementation. Successful implementation will require a wide dissemination of the Common Body of Knowledge to the accounting community (program leaders, accrediting associations, professional organizations, publishers, and faculty). Schools will need to embrace this multipurpose Common Body of Knowledge and implement its learning objectives in their accounting programs. Schools incorporating the Common Body of Knowledge's measurable learning objectives throughout their accounting curricula should be recognized for their best practices. In addition, to remain relevant and evergreen, this universal Common Body of Knowledge must continuously be reviewed and validated by the broad accounting community.

Signature Pedagogy

Action Item 4.1.2: Define and develop a signature pedagogy, or suite of pedagogies, that will support the learning approaches of a globally diverse student body.

During the first year, the Signature Pedagogy Task Force compiled a list of Pathways Commission activities conducted by the sections of the American Accounting Association; explored options to make accounting education research more searchable and accessible globally; collected a variety of educational frameworks, theories, assessment methods, and rubrics to identify relevant options for task force discussions; and reviewed the professional judgment models used by large professional service organizations. On the basis of these efforts, the task force concluded that the Pathways Vision Model (Figure 1; 2013) articulates the accounting profession's defining attribute: professional judgment. The Vision Model shows how accountants use critical thinking to recognize the shades of gray in recording economic activities and apply professional judgment to create and communicate useful information that is relied upon for decisions that lead to a prosperous society.

The task force adapted Moore's (2009) definition of professional judgment (modifications in brackets) below for its work:

> Professional judgment is a process used to reach a well-reasoned conclusion that is based on the relevant facts and circumstances available at the time of the conclusion. A fundamental part of the process is the involvement of individuals with sufficient knowledge and experience. Professional judgment involves the [clarification of issues and objectives, and the] identification, without bias, of reasonable alternatives; therefore, careful and [unbiased] consideration of information that may seem contradictory to a conclusion is key to its application. In addition, both professional skepticism and objectivity are essential to the process and to reaching an appropriate conclusion.

The development of professional judgment in undergraduate accounting students requires core curricula that have interactions with the accounting profession broadly defined. Such profession interactions "socialize students to perform the role of practitioner—as it contains pedagogical norms with which to connect and integrate theory and practice" (Wayne et. al., 2010, p. 327). The interactions should be guided by the characteristics of signature pedagogy as defined in the work of Schulman (2005, pp. 56–57).

The learning experiences should ensure that students

1) Have pervasive and routine educational experiences, cutting across topics and courses, programs and institutions

2) Have public performances that remove the cloak of invisibility

3) Be held accountable for their work to clients, student peers, faculty, and others

4) Be active and interactive

5) Experience adaptive anxiety (i.e., VUCA = volatility, uncertainty, complexity, and ambiguity; Slocum, 2013)

As students learn the common body of knowledge, such signature learning experiences should be woven throughout the educational process, so students learn to think, do, and act as accounting professionals. Figure 3 illustrates the evolution in professional judgment in a student to an accounting generalist. The interactions with the profession are woven throughout the development of competencies. As students move through their accounting programs, the weave loosens, indicating a greater use of professional judgment (more ambiguity).

Common Body of Knowledge Competencies*

- Accounting
- Broad Management
- Professional Foundation
- Interaction with Profession

PROFESSIONAL JUDGMENT

First Course in Accounting → Accounting Generalist Graduates

Curriculum

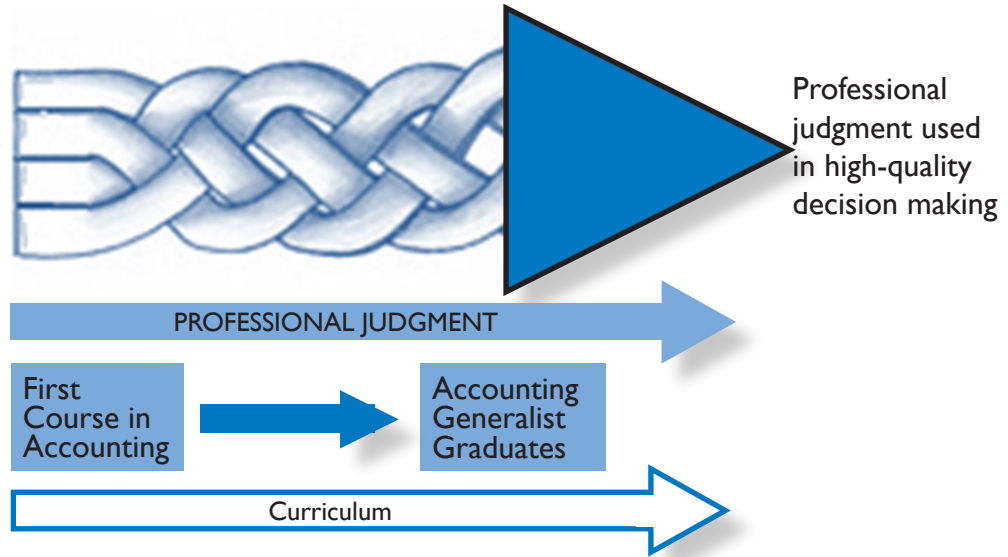Professional judgment used in high-quality decision making

Figure 3: Professional Judgment Learning Process. *Conceptual model is based on an evaluation of multiple accounting organizations' models and adapted from "Focusing Accounting Curricula on Students' Long-Run Careers: Recommendation for an Integrated Competency-Based Framework for Accounting Education (*Issues in Accounting Education*. May 2014), incorporating the AICPA Core Competency Model.

The Pathways Vision Model is useful in describing a student's growth from black or white judgments to accounting judgments that analyze the ambiguity (shades of gray) of the economic activities to report and evaluate useful information for resolving business issues and making good decisions. Thus, as students advance through the curriculum, their capacity for professional judgment and understanding of the role accountants play in society matures as evidenced by the increasing size of the Vision Model (see Figure 4).
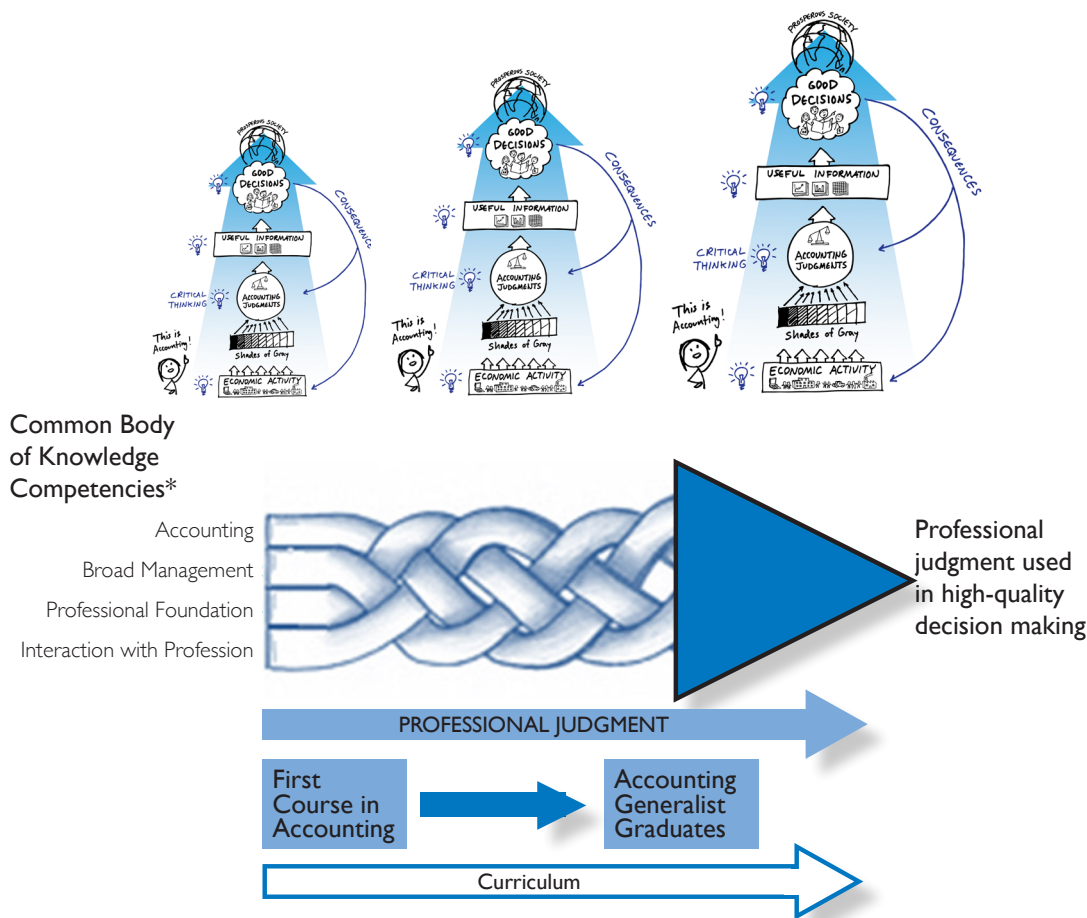
Figure 4: Professional Judgment Learning Process Integrating the Pathways Vision Model. *Conceptual model is based on an evaluation of multiple accounting organizations' models and adapted from "Focusing Accounting Curricula on Students' Long-Run Careers: Recommendation for an Integrated Competency-Based Framework for Accounting Education (*Issues in Accounting Education*. May 2014), incorporating the AICPA Core Competency Model.

The task force focused on the college education of an accounting generalist. During a student's academic career, professional interactions will become less structured and more complex as students advance through their program. Realizing the diversity of schools' missions, student populations, resources, and locations, the interactions with the profession can include a variety of learning experiences to develop professional judgment. Some examples of interactions with the profession that could occur throughout a student's academic career include the following:

Level 1: Teach financial literacy curriculum to other students (possibly partnering with organizations that focus on financial literacy)

Level 2: Prepare tax returns for low-income taxpayers (possibly partnering with organizations like Volunteer Income Tax Assistance [VITA])

Level 3: Provide accounting and business advisory services for entrepreneurial businesses (possibly partnering with organizations such as the Small Business Administration or Agricultural Extension Agents)

Level 4: Participate in experiential learning and internships (possibly partnering with governmental agencies, industry, nonprofits, and professional service organizations)

Next Steps

Future work should focus on identifying and developing effective interactions with the profession and supporting faculty development to implement them. This suggestion is made with the understanding that technology and creative ways of achieving this goal will be necessary.

Technology

Action Item 4.1.6: Transform learning experiences to reflect current and emerging technologies and global trends in business.

The Technology Task Force, while recognizing the importance of global business trends, chose to focus on technologies to better understand the technology curricular deficit as stated in the Pathways Commission's 2012 report: Students are expected to "effectively and efficiently utilize and understand technologies and their capabilities, impacts, risks, and opportunities to add value to their organizations." The task force decided to research the role information technology plays in the accounting curriculum, examining the current technology landscape for the accounting profession; any possible gap between the technologies taught in the undergraduate accounting curriculum and the technologies being used in practice; and the integration of technologies across the curriculum as outlined by Association to Advance Collegiate Schools of Business AACSB Standard A7. Their studies were conducted in two phases: (1) focus groups and (2) surveys.

In 2014, the task force conducted 11 focus groups, six with practitioners and five with academics. All participants were asked the same question: "What technologies should accounting students know to be successful in the accounting workplace?" The transcripts of the focus group discussions were used for a preliminary analysis of the technology landscape as perceived by the two groups. This phase of the research study was aggregated into a top 25 technology list (see Appendix B). Some additional insights generated by the focus group discussions were the following:

- A common language to understand the technology landscape does not exist in accounting. For example, although databases are almost unanimously identified as technology accounting students should know, the term means different things to different people: database design, database management, information retrieval, use of research databases, etc. Given its importance to understand the curriculum implications, the task force developed common definitions for the 25 terms (Appendix B).

- The data collected indicated (1) a strong consensus for some technologies (e.g., accounting students need to be highly competent with spreadsheets) and (2) significant discrepancies for other technologies.

In 2015, the task force began the survey phase of their research. They conducted a survey of accounting academics and will conduct a separate survey of accounting professionals. The purpose of the surveys is to collect data to answer questions such as the following:

- Do practitioners' and academics' expectations differ regarding the technology students should know and their level of mastery?

- Are there discrepancies between what students should know (expectations) and what is being taught?

- To what extent are technologies currently integrated across the accounting curriculum?

Next Steps

When concluded, the survey results will be shared on the pathwaysinspired.org website. Work will continue on guidance for the implementation of AACSB A7 and identifying ways in which curriculum and technology interact. In the future, additional surveys are recommended to continuously monitor the ever-changing technology landscape.

Recommendation #4: Pathways-Inspired Activities

The Center for Advancing Accounting Education of the American Accounting Association will continue to engage the community in the Recommendation #4 initiatives. We encourage all who read this document to be inspired by this report and share their learning resources and activities on the pathwaysinspired.org website.

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Appendix A

Pathways Common Body of Knowledge Learning Objectives[1] Mapped to Bloom's Taxonomy

Learning Objective	Bloom's Taxonomy
Accounting Competencies	
External Reporting and Analysis	
• Demonstrate appropriate accounting methods (e.g., US GAAP, IFRS, cash basis, and income tax basis) to complete general accounting tasks for a business.	Application
• Locate in the appropriate accounting literature relevant guidance on accounting policies/measurement methods.	Comprehension
• Prepare financial statements and other external reports, including note disclosures, which are useful to external users for decision making.	Application
• Interpret financial and nonfinancial information (e.g., ratio analysis, trend analysis, risk analysis, and forecasting) in external reports for decision making (e.g., investment, extension of credit, and audit risk).	Application
• Demonstrate a basic understanding of specialized industry, Global Reporting Initiative and International Integrated Reporting Council, and other emerging frameworks/standards/bases of accounting).	Application
• Explain how two alternative frameworks/standards/principles/methods applied to a business transaction change financial and nonfinancial reporting (e.g., cash basis vs. accrual basis; US GAAP vs. IFRS; disclosures in financial and nonfinancial reporting).	Application
• Give examples of how external reporting can be used to help an organization (e.g., value-added activities), hurt an organization (e.g., intentional misrepresentation), and keep an organization in compliance (e.g., regulation).	Comprehension
• Apply two different frameworks/standards/bases/principles/methods to the same business transaction.	Application
• Apply guidance to general accounting tasks appropriate for a particular accounting course.	Application
• Compare and contrast financial and nonfinancial information prepared under alternative external frameworks/standards/bases/principles/methods, including potential changes in external reporting requirements.	Analysis

[1]Lawson, R. A., E. J. Blocher, P. C. Brewer, G. Cokins, J. E. Sorensen, D. E. Stout, G. L. Sundem, S. K. Wolcott, and M. J. F. Wouters. 2014. "Focusing Accounting Curricula on Students' Long-Run Careers: Recommendations for an Integrated Competency-Based Framework for Accounting Education," *Issues in Accounting Education*, Volume 29, Issue 2, pp. 295–318.

The learning objectives were developed by multiple Recommendation #4 volunteers and groups of practitioners and academicians who reviewed the document.

Planning, Analysis, and Control	
• Explain the internal reporting needs of an organization after conducting interviews with key personnel.	Comprehension
• Apply methods for measuring and assigning costs for management control, decision making, and other reporting purposes (e.g., financial and tax reporting).	Application
• Describe planning processes (e.g., strategic and operating plans, budgets, forecasts, and risk management) to support the organization's strategic planning process.	Comprehension
• Prepare budgets, forecasts, and operating and strategic plans as part of an organization's strategic planning process.	Application
• Identify relevant quantitative and qualitative information required to make organizational decisions (e.g., cash management, capital investment analysis, product emphasis, and customer profitability) to support the organization's strategic and operating goals.	Comprehension
• Identify others (e.g., people, departments, functions, suppliers, customers) who need to be included in decision making to support the organization's strategic and operating goals.	Comprehension
• Interpret financial and nonfinancial performance data to assess operating efficiency and effectiveness and identify areas for improvement.	Application
• Give examples of how planning, analysis, and control can help an organization (e.g., variances identify quality problems), hurt an organization (e.g., budgetary slack), and keep an organization in compliance (e.g., transfer pricing).	Comprehension

Taxation Compliance and Planning[2]	
• Explain fundamental tax concepts for individuals and C-corporations.	Comprehension
• Prepare tax returns for individuals and C-corporations.	Application
• Apply analytical reasoning tools to assess how taxes affect economic decisions through the amount and timing of income recognition and deductions.[3]	Application
• Identify relevant information for tax compliance and planning decisions, including aspects of the individual or business entity context (e.g., type of entity, locations, types of transactions, laws and regulations, and domestic and foreign outbound and inbound transactions and investments).	Comprehension
• Discuss the similarities between financial accounting and tax accounting.	Comprehension
• Discuss the differences between financial accounting and tax accounting.	Comprehension
• Recognize internal control issues related to tax reporting.	Knowledge
• Explain the broad economic, social, environmental, and/or governance aspects of the U.S. tax regime.	Comprehension
• Compare the U.S. tax regime to one or more other important global tax regimes on the basis of broad economic, social, environmental, and/or governance aspects.	Comprehension/Application

[2]Special thanks to the ATA/AICPA Model Tax Curriculum group for reviewing and improving these learning objectives.

[3]http://www.thetaxadviser.com/issues/2009/nov/cpaexamalignswithmodeltaxcurriculum.html

Information Systems[4]	
• Explain how transactions are captured in an enterprise-wide information system.	Comprehension
• Prepare a set of modules for an enterprise-wide information system (e.g., sales, accounts receivable, procurement, etc.)	Application
• Describe a conceptual framework for an information system that supports robust, real-time financial reporting.	Comprehension
• Describe a conceptual framework for an information system that supports robust, real-time management reporting (e.g., activity-based costing, balanced scorecard).	Comprehension
• Create an information system for management reporting (e.g., activity-based costing).	Application
• Describe the information system control environment.	Knowledge
• Identify control weaknesses (e.g., privacy risks) in an information system control environment.	Comprehension
• Use current technologies to generate data required by SEC regulations for external reporting.	Application
• Identify the emerging technologies available for organization information systems.	Comprehension
• Describe the benefits, costs, and changes to risk for various emerging technologies in a given context.	Comprehension
• Apply an emerging technology to a specific organization's information system.	Application
• Identify risks to the organization if there is a poor information systems control environment.	Comprehension
• List automated audit tools used to extract and analyze data from information systems.	Comprehension
• Explain process documentation for information systems.	Comprehension
• List common types of transaction anomalies in information systems.	Comprehension
• Describe a control that could be used to identify transaction anomalies.	Comprehension
• Identify vendor service levels for an information system.	Comprehension
• Contrast vendor service levels for two different information systems.	Comprehension
• Explain the strengths and weaknesses of a current technology (e.g., XBRL) required by SEC regulators.	Comprehension

[4]Special thanks to the Technology Task Force members for reviewing and improving these learning objectives.

Assurance and Internal Control	
• Explain professional standards for audits of the financial statements of public companies, nonpublic companies, governmental entities, and not-for-profit entities.	Comprehension
• Explain professional standards for other types of assurance engagements (e.g., reviews, compilations, application of procedures, and special reports).	Comprehension
• Give examples of investigation methods used by organizations that want to meet operating, reporting, and compliance objectives.	Comprehension
• Describe the different types of assurance engagements conducted by internal and external accountants.	Comprehension
• Prepare a set of internal control policies and procedures for a company using concepts of COSO's internal control framework.	Application
• Prepare assurance reports that document the work performed and how conclusions were reached using relevant professional standards.	Application
• Give examples of organizations and stakeholders who were negatively impacted by failures in operating, reporting, and compliance objectives (e.g., inefficient operations, fraud, biased financial statements, and violations of laws and regulations).	Comprehension

Professional Values, Ethics, and Attitudes	
• Recognize ethical issues.	Comprehension
• Use an ethical reasoning process to solve an ethical dilemma.	Application
• Identify the professional values and the attitudes and behavior consistent with those values (e.g., integrity, objectivity, independence when applicable, professional skepticism, due care, and global mind-set) that are appropriate for different ethical situations.	Comprehension
• Demonstrate an open-minded attitude, including appreciation of cultural diversity and empathy for other viewpoints.	Application
• Practice self-management, including a commitment to learning, an awareness of the limitations of individual capabilities, objective consideration of others' professional criticism, and a desire for continuous improvement.	Application
• Recognize the profession's broader economic and societal responsibility to the public interest.	Comprehension

Professional Foundational Competencies	
Communication	
• Write a professional report.	Application
• Make an oral presentation in a professional manner.	Application
• Apply appropriate content, form, and media (e.g., formal vs. informal; technical vs. plain English terminology; written vs. oral; electronic vs. face-to-face; email, discussion boards, or video conferencing; and direct vs. indirect) to enhance understandability and usefulness of communication for diverse situations and various internal and external audiences.	Application
• Monitor the impact of communication to evaluate how well the desired meaning is conveyed.	Application
• Modify communication content, form, or media as needed.	Application
• Accurately document relevant information from listening, interviewing, researching, observing, and reading.	Application
• Identify the confidentiality, intellectual property rights, and security issues related to communications.	Comprehension
• Question one's own understanding of others' communication and remain sensitive to cultural and language differences.	Comprehension

Quantitative Methods	
• Use linear algebraic equations to determine revenue and profit targets (e.g., cost-volume-profit models).	Application
• Use time value of money principles (e.g., capital projects) to evaluate long-term cash flows.	Application
• Use statistical techniques (e.g., sampling and regression) to analyze data.	Application
• Draw appropriate conclusions based on statistical relationships.	Application
• Solve basic financial and operational problems and processes using appropriate quantitative methods.	Application
• Use simulation and risk analysis techniques to evaluate alternative courses of actions in financial and operating decisions.	Application
• Use appropriate data analysis to make business decisions.	Application
• Conduct sensitivity analyses to evaluate the reliability of results.	Application
• Describe limitations of various quantitative methods.	Comprehension

Analytical Thinking and Problem Solving	
• Apply a systematic process of using professional judgment to solve a problem.	Application
• Explain the decision-making process in a professional accounting context.	Comprehension
• Describe the research process necessary to gather relevant information.	Comprehension
• Interpret information accurately and objectively.	Application
• Distinguish the level of quality and sufficiency of information in making a decision (e.g., exercise due care; maintain skepticism; think independently; counteract bias, deception, and distortion) and reconcile conflicting information.	Application
• Describe the process of gathering information about a situation before making a decision (e.g., integrating information from diverse sources; recognizing and questioning assumptions; and exploring viewpoints, interrelationships, and consequences).	Comprehension
• Apply professional judgment to address key stakeholder consequences (e.g., contribute to strategic goals; weigh financial, social, and environmental effects; make trade-offs among stakeholders; comply with ethical standards; or satisfy risk tolerance).	Application
• Explain how uncertainties and contingencies influence decision making.	Comprehension

Human Relations	
• Explain how behavioral consequences can enhance or impair organizational activities (e.g., incentives associated with financial reporting, performance measurement, and internal controls).	Comprehension
• Explain the implications of corporate culture on behavior or group dynamics.	Comprehension
• Demonstrate successful negotiation skills (e.g., reach a common understanding, resolve conflicts, and choose a mutually agreeable course of action).	Application
• Work effectively as a member of diverse and cross-functional teams.	Application
• Describe the importance of and approaches to building strong interpersonal relationships with diverse individuals in professional situations.	Comprehension
• Request and respond appropriately to feedback.	Application

Technology[5]	
• Create documents using standard technology tools (e.g., flowcharting, charting/graphing, and data visualization).	Application
• Document an organization's technical architecture, including infrastructure, data structures, and application systems.	Comprehension
• Explain the characteristics of a well-structured database.	Application
• Use appropriate data analysis tools to analyze data extracted from database systems.	Application
• Describe how to evaluate an organization's systems environment for security and risks.	Comprehension

[5]Special thanks to the Technology Task Force members for reviewing and improving these learning objectives.

Broad Management Competencies	
Leadership	
• Explain the process used by a manager to define and implement common goals and purposes, including organizational vision, mission, and values.	Comprehension
• Explain the process used by leaders to foster a shared organizational culture (including team members, top management, and external partners) to accomplish common goals.	Comprehension
• Describe the process to foster an inclusive environment that supports diverse individuals.	Comprehension
• Demonstrate project management skills.	Application
• Describe approaches for managing situations involving change, conflict, and crisis.	Comprehension
• Identify the consequences of individual and organizational actions for financial, social, and environmental well-being.	Comprehension
• Predict the consequences of individual and organizational actions for financial, social, and environmental well-being.	Application

Organizational Ethics and Social Responsibility	
• Discern if appropriate ethical standards have been applied to various situations (e.g., code of conduct, standards identified by the International Institute for Sustainable Development, Global Reporting Initiative guidelines for sustainability reporting, requirement of the U.S. Foreign Corrupt Practices Act, and mandates of the Sarbanes-Oxley Act of 2002 Section 406–Code of Ethics for Senior Financial Officers).	Application
• Develop organizational structure, control systems, and practices (e.g., specifying prohibited actions, establishing a confidential misconduct hotline, and auditing compliance) for adhering to ethical standards.	Comprehension
• Describe the global nature of business for a variety of industries.	Comprehension
• Choose appropriate ethical behaviors and acts of social responsibility in different cultural contexts.	Application
• Predict the consequences of organizational activities and organizational culture on local and global stakeholders, including economic, social, and environmental effects.	Comprehension

Process Management and Improvement	
• Describe the value chains that create customer and organizational value, including key processes and technologies commonly used within and between organizations to deliver products and/or services.	Comprehension
• Describe the current, well-formed process models to document key processes using standard techniques (e.g., Business Process Modeling Notation, Business Processing Execution Language, and Unified Modeling Language).	Comprehension
• Explain ways to implement key conceptual process models in a business context.	Comprehension
• Compare quality frameworks (e.g., Six Sigma, Cost-of-Quality, ISO 9000, and the Baldrige Performance Excellence Program).	Comprehension
• Apply change management principles to process management and improvement initiatives.	Application

Governance, Risk Management, and Compliance	
• Describe the principles of good governance.	Comprehension
• Interpret the quality of governance considering an organization's structure (form of organization, roles and responsibilities of management, board of directors, and board of director committees).	Application
• Compare alignment of a company's corporate governance report to its vision, mission, and values.	Application
• Identify relevant laws and regulations (e.g., Sarbanes-Oxley Act of 2002) that influence governance and compliance.	Comprehension
• Describe processes for ensuring compliance considering the global nature of business.	Comprehension
• Describe organizational management of risk (risk identification and assessment, implementation of risk responses and controls, and ongoing communication and monitoring) using an appropriate framework (e.g., COSO Enterprise Risk Management–Integrated Framework and ISO 31000–Risk Management).	Comprehension

Additional Core Management Competencies

• Apply contemporary finance theories and methods (e.g., capital budgeting, debt and equity financing, working capital management, mergers and acquisitions, and dividend policies) to organizational practices.	Application
• Define financial instruments and financial markets (including the flow of funds, differences among types of securities/investments, and the role of financial intermediaries).	Comprehension
• Describe contemporary marketing methods (e.g., digital media, market segmentation, market strategy, and marketing mix).	Comprehension
• Describe management methods (e.g., planning, organization, leading, and controlling).	Comprehension
• Describe the effect of human behavior on organization effectiveness.	Comprehension
• Explain the impact of relevant aspects of business law (contracts, employment, property, environment, and form of business organization) in various business situations.	Application
• Describe the economic factors (social, cultural, political, legal) relevant to global business.	Comprehension
• Describe the human resource function when dealing with common workplace issues in small, medium, and global organizations.	Comprehension

Appendix B

Ranking and Definitions of the Top 25 Technologies as Identified by Academic and Practitioner Focus Groups in 2014 (in alphabetical order)[1]

Ranking[2]	Technology	Definition
5	Accounting and tax research software	Typically Internet applications used to search professional authoritative accounting and tax literature and other relevant sources, such as research publications. Examples: Accounting Research Manager, Checkpoint, FASB Codification.
23	Application integration technologies	Enable the integration of various software applications and the sharing of information among them. Examples: XML (Extensible Markup Language) to share data, ODBC (Open Database Connectivity), Mule (Enterprise Service Bus).
15	Big data technologies	Designed to extract value economically from very large volumes of a wide variety of data by enabling high-velocity capture, discovery, and/or analysis. Example: Hadoop.
2	Business intelligence and analytics technologies	Used to support the analysis of critical business data to increase understanding of an enterprise's operations, financial performance, and markets and to make timely business decisions. Examples: Cognos, Tableau.
10	Cloud computing	Enables ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., applications, servers, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. Examples: NetSuite and QuickBooks online (software as a service), Amazon Web Services and DropBox (infrastructure as a service), Windows Azure (platform as a service).
7	Communication software	Permits individuals to transmit and receive information over distances. Examples: Outlook (email software), Twitter (social media software), and WebEx (web conferencing software).
3	Database management software	Provides users and programmers with a systematic way to create, update, retrieve, and manage electronic data. Examples: Microsoft Access, Oracle.
16	Diagramming software	Used to create, modify, and validate diagrams, such as business process specifications, flowcharts, and organizational charts. Example: Visio.
1	Electronic spreadsheets	A computer application used for creating, editing, and analyzing data that is organized into rows and columns. Example: Microsoft Excel.
4	Enterprise resource planning (ERP) software	Integrated set of software modules linked to a common database, used for planning, communicating, and controlling business functions, such as finance, human resource management, materials management, sales, and distribution. Example: Oracle, SAP.
8	General ledger software	Used to record economic transactions and generate financial reports, such as income statements, balance sheets, and cash flow statements. Example: Quickbooks.
11	Generalized audit software	Allows auditors to extract data from a variety of databases, applications software, and other sources and then conduct analyses and audit routines on them. Examples: ACL, IDEA.

Ranking[2]	Technology	Definition
12	Governance, risk management, and compliance (GRC) software	Used to support an integrated, holistic approach to organization-wide governance, risk, and compliance. Example: SAP GRC.
17	Internet research software	Used to search for and capture information related to a specific topic on the Internet. Example: Google.
25	Mobile technologies	Handheld devices that incorporate software (interface and applications) and communication (network services). Example: iPhone (smartphone).
18	Network technologies	Used to connect computers and devices and enable communication, access to data and applications, and sharing of information. Examples: TCP/IP (Transmission Control Protocol/Internet Protocol), VPN (Virtual Private Network).
13	Presentation software	A computer application used to create visual aids for communicating ideas and other information to a group. Example: PowerPoint
22	Privacy technologies	Help control the appropriate use of information: what and how much information about an entity is available to others and to whom it is available. Examples: BitLocker, GnuPG.
24	Programming language	Used to create sets of commands that instruct computers to perform specific tasks. Examples: Java, Visual Basic.
14	Query languages	Computer languages for the retrieval and modification of electronic data. Example: SQL.
19	Reporting software	Helps present data in a meaningful and understandable way. Example: Crystal Reports.
6	Security technologies	Help protect information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction. Example: McAfee Security Scan Plus.
20	Tax preparation software	Computer software designed to complete tax returns. Example: TurboTax.
9	Word processing software	Facilitates entry and preparation of documents, such as letters and reports. Example: Microsoft Word.
21	XBRL	An XML-based language for the electronic communication of business and financial data.

[1]This information is from a working paper by Guido Geerts, Janie Chang, Barbara Lamberton, and Robyn Raschke. Disclaimer: Please be careful interpreting this list. The rankings should be considered as rough indicators given the sample sizes ($n = 105$, 54 practitioners, 51 academics), the composition of the focus groups, and the need to make some subjective decisions when grouping the technologies.

[2]Ranking is aggregated as identified by academic and practitioner focus groups in 2014.