



International Accounting  
Education  
Standards Board

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**Committee:** International Accounting Education Standards Board (IAESB)  
**Meeting Location:** IFAC Headquarters, New York, USA  
**Meeting Date:** July 11 - 12, 2018  
**Subject:** **Information and Communications Technology Project - Issues Paper (07/18)**

**INTRODUCTION**

1. The objective of this paper is to request input from the IAESB (“the Board”) on the Information and Communications Technology (ICT) project. This paper will also provide an update of the ICT Taskforce (the “Taskforce”) activities since the April 2018 Board meeting.
2. Integral to the issues paper are the following agenda items:

Agenda Item 3-1	Information and Communications Technology Project - Issues Paper (07/18)
Agenda Item 3-2	Evaluation of ICT-Related Skills in Existing Frameworks (07/18)
Agenda Item 3-3	Proposed Learning Goals and Number of Occurrences (Draft)
Agenda Item 3-4	Proposed Learning Goals and Granular Skills
Agenda Item 3-5	Evaluation of IAASB, IESBA and PCAOB Standards for ICT related skills

**BACKGROUND**

3. Changes in technology across the financial reporting supply chain are impacting the ICT competencies and skills needed by aspiring and professional accountants (“Accountants”) to perform their roles. Identifying the ICT skills needed by Accountants serves the public interest by enabling the accounting profession to provide high quality financial reporting, auditing, or other related financial and accounting services in the digital age.
4. The Taskforce commenced its activities in February 2017 and has held monthly conference calls and in-person meetings in June and November 2017 and April 2018. The ICT project plan was approved by the IAESB at its November 2017 meeting.
5. The scope of the project is driven by the overall focus on professional competence and the evolution of the knowledge, skills and behaviors (collectively referred to as skills) needed in ICT. The approach was a baseline evaluation of skills that are needed without consideration

of the existing Competency Areas and Learning Outcomes in the International Education Standards (IESs). The Taskforce believes this approach mitigated the effect of anchoring bias.

### PROJECT SCOPE UPDATE

6. The five ICT elements identified and supported by information gathering activities are presented below and have guided the ICT skills discussion. These elements have not changed from those presented to the Board at the April 2018 meeting.

1	ICT Elements	April 2018 Description
1	<b>Business acumen</b>	<p>Strategic business decisions are based on the integration of appropriately analyzed large data sets and professional judgment as applied to differing business environments amongst stakeholders such as vendors, customers, and employees.</p> <p>Understand the impact ICT has on business models and risk, including how current and emerging technologies will impact the way business is conducted and measured.</p>
2	<b>Behavioral competence</b>	<p>Enhance intellectual curiosity, critical thinking, agility and life-long learning to effectively respond to an environment of rapid technological change.</p> <p>Professional judgment and professional skepticism will be applied in more situations faced by Accountants, which requires a strong sense of self- and situational-awareness.</p> <p>Demonstrate ethical use and dissemination of data.</p>
3	<b>Digital acumen</b>	<p>Understand how new and emerging technologies operate, are used, and impact the generation, processing, and flow of data. For example, increased functionality through the cloud, elimination of manual processes through robotic process automation, artificial intelligence that senses, analyzes and learns from data and automates decision making, and blockchain that securely records transactions and eliminates third party verification or reconciliation.</p> <p>Understand and influence how governance effectively oversees the impact of ICT, including data security.</p>
4	<b>Data interrogation, synthesis and analysis</b>	<p>Use structured and unstructured data, evaluate data integrity (complete, accurate and relevant) and understand exceptions to expectations.</p> <p>Effectively and appropriately interpret the “story” the data is telling and make decisions accordingly.</p> <p>Conduct risk assessments, predictive analysis and effectively use visualization tools.</p>
5	<b>Communication</b>	<p>New and emerging technologies will change the channels of communication from and across systems, for example, using social media and smart devices.</p> <p>Effectively use new and emerging communication channels to communicate with impact, influence, and tell the “story” of new insights gained through the use of technology.</p>

7. The findings from the Taskforce have informed the Board’s determination of the standard and related guidance development activities needed to support ICT skills development of Accountants. At the April 2018 Board meeting, it was determined by the Board and supported

by the Consultative Advisory Group (CAG) that the Learning Outcomes in the IESs require revision. This decision was based on:

- a. Discussions of the breadth and depth of the information gathering activities to-date and the related results.
  - b. A mapping of the five ICT elements to existing IESs that highlighted gaps (the mapping of the five ICT elements to existing IES has been reproduced in Appendix 1 for reference).
  - c. Acknowledgement that the speed of change in ICT has presented an opportunity to revisit the IES through a digital lens.
8. The nature and extent of the revisions to the IESs will be determined after a gap analysis is completed. In addition, further standard or related guidance development activities may include any or all of the following:
- a. Amending or adding Competency Areas
  - b. Modifying the Levels of Proficiency
  - c. Adding Explanatory Material within IESs
  - d. Providing non-authoritative guidance
9. The Taskforce has substantively completed its analysis of the information gathering activities and has developed an inventory of learning goals with example granular skills<sup>1</sup>. The principal activities to be completed are developing Learning Outcomes from the learning goals and conducting a gap analysis to the existing competency areas, Learning Outcomes and levels of proficiency in the IESs.

**INFORMATION GATHERING ACTIVITIES**

10. Based on feedback from the April 2018 Board meeting, information gathering activities were held with the International Public Sector Accounting Standards Board (IPSASB) to obtain further input from the public sector, and round tables were conducted in China to increase the geographic representation of outreach. The sources and methods used for information gathering activities performed to date comprised the following:

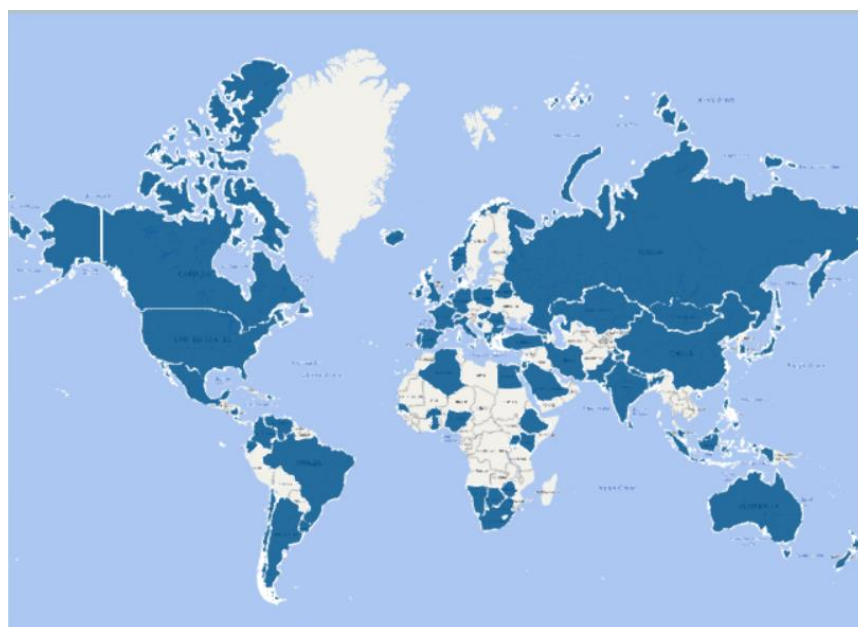
<b>SOURCE</b>	<b>METHOD</b>
Member bodies, academics, other interested stakeholders, and representatives of STAREP <sup>2</sup>	Initial online surveys
Regulators, Small and Medium Practices, sole practitioners and other professional accounting organizations	Targeted online surveys
IPSASB	Interactive Webinar
Member Bodies, American Accounting Association	Mixture of individual and group interviews

<sup>1</sup> Information gathering activities that are in process relate to further input from regulators and the Association to Advance Collegiate Schools of Business (AACSB). Once completed, their input will be analyzed and incorporated into the learning goals.

<sup>2</sup> Strengthening Auditing and Reporting in the Countries of the Eastern Partnership (STAREP) is a regional program of the World Bank Centre for Financial Reporting Reform (CFRR), which supports the development of transparent policy environments and effective institutional frameworks for corporate reporting in Eastern Partnership countries: Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine.

SOURCE	METHOD
Public Accountants in Business Committee, Financial Executives Institute (FEI), Global Accounting Alliance	Presentation and discussion
Private sector, public accounting, academics, students	Round tables in Nairobi, Kenya; Mexico City, Mexico; Chengdu, China
Academics	Interactive webinars
Literature	Literature review conducted by J. Birt (CAG Member)
Articles	Identified skills cited in recently published articles related to ICT
International Standards on Auditing (ISAs) <sup>3</sup> , auditing standards issued by the PCAOB <sup>4</sup> and Code of Ethics <sup>5</sup>	Analysis of content to identify ICT skills inherent in the standards
Competency frameworks	Analysis of content to identify ICT skills

11. The questions developed and used by the Taskforce for stakeholder outreach are presented in Appendix 2.
12. There is a high degree of geographic dispersion from where input was obtained as depicted by the countries in dark shading (see below). The Taskforce has concluded there was sufficient diversity in countries, stakeholders, and types of analysis to provide a reasonable basis for the development of the skills inventory (Learning Goals).



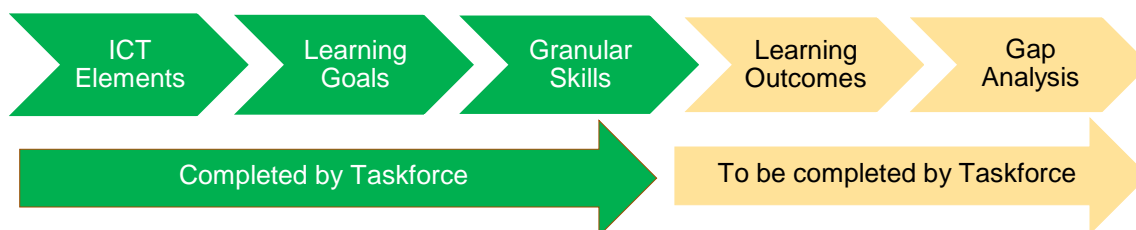
<sup>3</sup> ISAs as issued by the International Auditing and Assurance Standards Board (IAASB)

<sup>4</sup> Public Company Accounting Oversight Board

<sup>5</sup> As issued by the International Ethics Standards Board for Accountants (IESBA)

## CONSIDERATIONS IN CONDUCTING THE ANALYSIS

13. The Taskforce analyzed the skills identified from the information gathering activities and developed 28 learning goals. These learning goals were used as the basis to frame granular skills. The granular skills can be revised to reflect Learning Outcomes with the use of an appropriate directive verb. Learning Outcomes will be used as the baseline to perform the gap analysis against the IESs. The process flow is presented in the following diagram:



14. Further discussion of the method used by the Taskforce to identify the learning goals is presented in Appendix 3.

15. The Taskforce considered the following factors when developing the learning goals and granular skills:

- a. Should qualitative factors be developed and used in determining the relative degree of emphasis to be placed on the development of Learning Outcomes?

There was a high degree of variability in the nature and extent of learning goals derived by source as depicted by the charts presented in paragraph 20. The Taskforce concluded the information obtained from the sources contemplated the relative degree of importance to the source; accordingly, the Taskforce concluded there was not meaningful value in developing further qualitative considerations to conclude on the relative importance of the learning goals.

- b. Should there be a minimum number of occurrences for each learning goal before they are further developed into Learning Outcomes?

The Taskforce concluded there should be a minimum number of occurrences for a learning goal before the development of a Learning Outcome from that learning goal. This is based on the need to obtain sufficient evidence to support the Learning Outcomes that will serve as the basis for the gap analysis. A minimum number will be further evaluated by the Taskforce and considered when determining the number of Learning Outcomes to be developed.

- c. Should the learning goals be further disaggregated to provide more detail to increase their usefulness while balancing the need for principle based standards?

The Taskforce concluded granular Learning Outcomes can be developed that continue to be principles based and provide more detail to positively impact the users of the IESs and their ability to implement. The granular skills were developed with more detail than existing Learning Outcomes included in the extant IESs.

**Questions:**

**A. What is the Board’s point of view on the conclusions reached by the Taskforce on the exclusion of qualitative factors and the need to determine a minimum number of occurrences?**

**Note: the disaggregation of learning goals into granular skills is addressed in Question D.**

**RESULTS OF ANALYSIS**

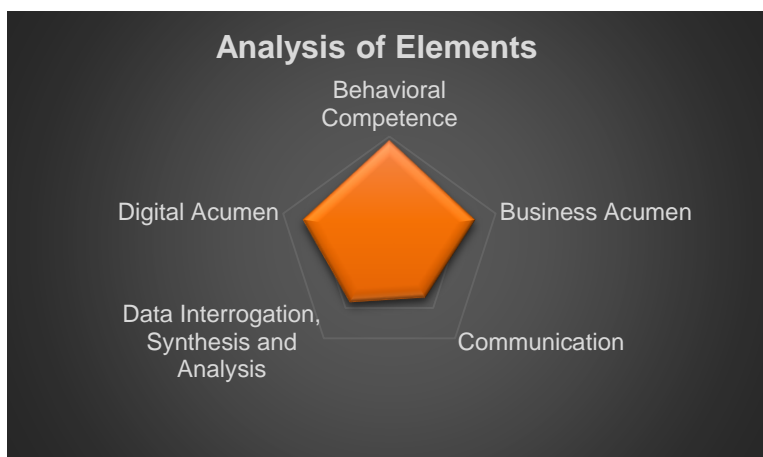
16. For purposes of the analysis, the sources of information gathering activities were categorized as follows:

<b>Categories</b>	<b>Explanation</b>
Member bodies	IFAC member bodies
Other stakeholders	Professional Accountants in Business Committee, Academics, American Accounting Association, Regulators, practitioners and other professional accounting organizations
Literature	Literature review and recent articles
Standards	ISAs, Auditing Standards issued by the PCAOB and Ethics Standards
Frameworks	Frameworks issued by CGMA, IMA, AICPA, AIA, ACCA, CFI, HKICPA, SAICA. <sup>6</sup> (See Agenda Item 3-2)

17. Overall, there was a preponderance of emphasis in behavioral competence, digital acumen and business acumen as measured by the total number of occurrences of learning goals in each ICT element. In summary, there were 1,063 total occurrences, 28 learning goals identified and 92 granular skills.

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<sup>6</sup> Chartered Global Management Accountant, Institute of Management Accountants, American Institute of Certified Public Accountants, Association of International Accountants, Association of Chartered Certified Accountants, Corporate Finance Institute, Hong Kong Institute of CPAs, and South African Institute of Chartered Accountants organizations.



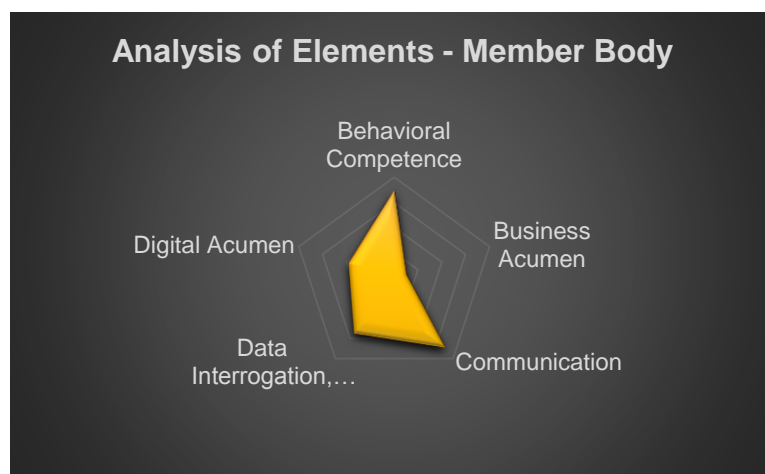
18. The occurrences of learning goals by ICT element varied by source of information:

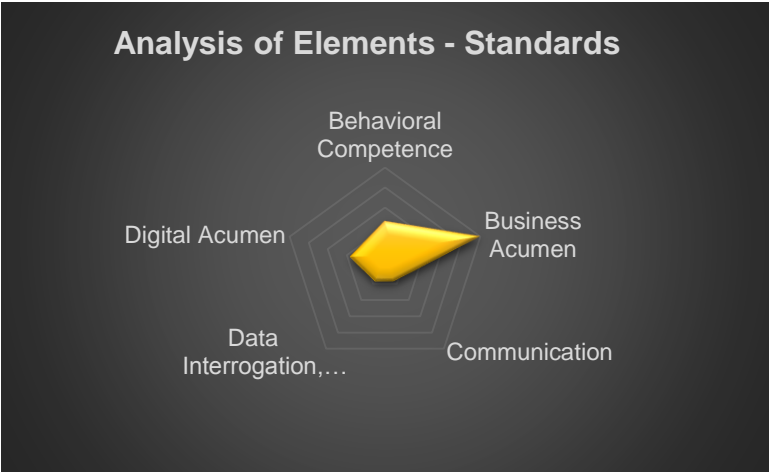
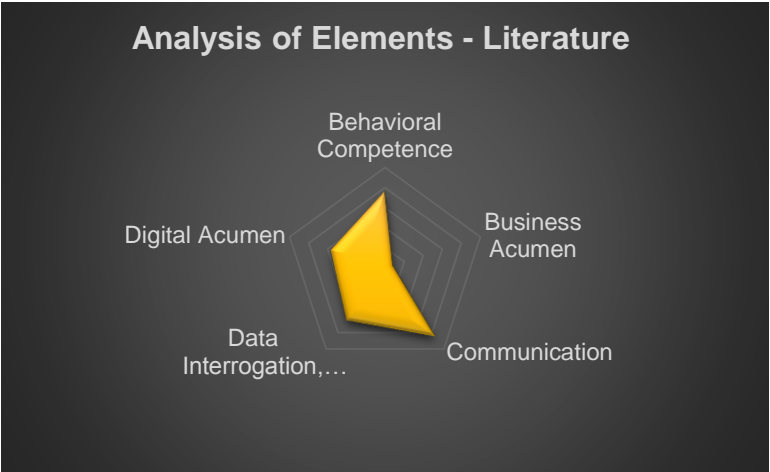
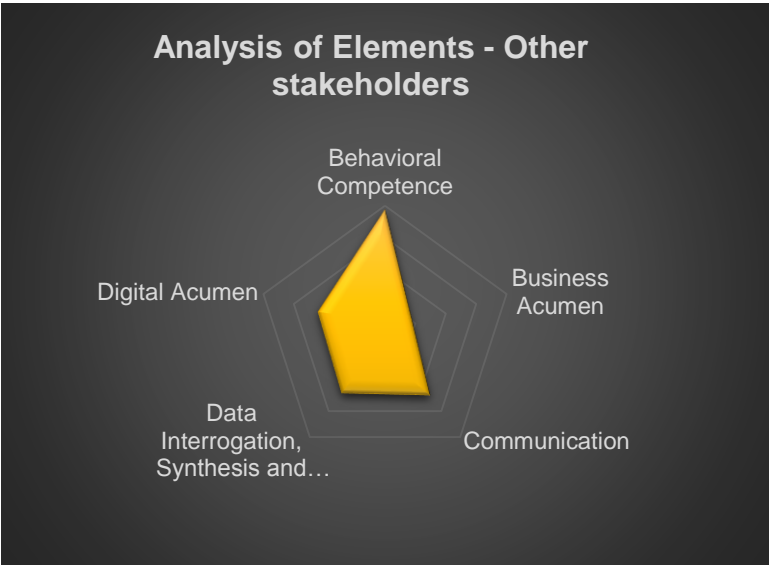
Category	Top ICT Element
Member bodies	Behavioral competence and communication
Other stakeholders	Behavioral competence
Literature	Communication
Standards	Business acumen
Frameworks	Digital acumen

19. Observations from the charts that depict the relative importance of the ICT elements as measured by the number of occurrences in information gathering activities performed to date include the following:

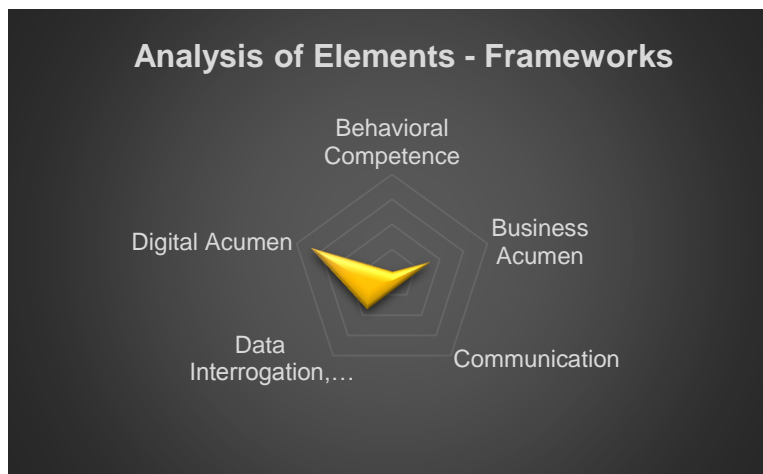
- a. The Standards were the only sources that placed an emphasis on business acumen
- b. Member Bodies and other stakeholders most frequently referenced those skills associated with behavioral competence
- c. The Standards and Frameworks did not place a high degree of emphasis on communication

20. A pictorial view by source, ICT element and number of occurrences is presented below.









21. The overall results of the analysis performed by the Taskforce yielded the following insights (not presented in order of significance):

- a. Many respondents indicated a need for current and future accountants to embrace change, in particular changes related to technological evolution. This includes developing learning environments that encourage curiosity, self-awareness and life-long learning. Given the pace with which technology evolves, there is also a need for current and future accountants to be self-aware of gaps in their own skill sets and seek learning mechanisms to resolve this gap as applicable.
- b. The ability to identify relevant data analyses and large data sets and use technology to perform these analyses efficiently is also highly sought after. Many respondents have indicated that accountants need to be proficient with current technologies that can analyze data while at the same time seeking to understand new technologies that may assist with these same analyses. Further, the desired skill sets also included the ability to modify and implement such technologies in addition to using them.
- c. The auditing and ethics standards include a significant number of references to understanding the business and processes. This is necessary to understand potential risks in using both current technology and evaluating the impact of any potential new technology to the process, in addition to understanding and managing risk in data transmission and security. This was consistent with other stakeholder groups who indicated that applying ICT knowledge and experience and being able to identify similarities and differences in circumstances when applying this knowledge is also a key skill.
- d. Collaboration and communication not only within finance functions but also with other functions evolved as a necessary skill set for current and future accountants. Given the need to leverage technology in the current and anticipated future environments, collaboration with individuals in departments such as IT, Data Management and Risk was deemed necessary.

## LEARNING GOALS AND GRANULAR SKILLS

22. Agenda Item 3-3 provides the proposed learning goals by ICT element. The number of occurrences are included with each learning goal using all sources of information obtained to

date. The process used by the Taskforce to develop the learning goals is provided in Agenda Item Appendix 3

23. Consideration was given to evaluating different options in developing Learning Outcomes.
  - a. Option A is the revision of the learning goals into Learning Outcomes without disaggregation into further detail.
  - b. Option B is the disaggregation of the learning goals into granular skills (as noted in Agenda Item 3-4) first, and then using those granular skills as the basis for Learning Outcomes.
24. A combination of Option A and Option B may also be appropriate depending on each learning goal. For example, certain learning goals may capture sufficient specificity from which to develop a single Learning Outcome.
25. The majority of the Taskforce favored Option B or a combination of Option A and Option B; however, an evaluation of an inconsistency in other Learning Outcomes likely not impacted by ICT and the number of potential new Learning Outcomes needs to be further evaluated.
26. With a view towards providing the Board with information that may better inform recommendations, examples under both options are provided below using the Business Acumen ICT element.<sup>7</sup>

	<b>ICT Element</b>	<b>Learning Goals</b>	<b>Option A: Learning Outcomes</b>	<b>Option B: Granular Learning Outcomes</b>
1	Business Acumen	Evaluate and respond to process failures. (N=13)	Identify the cause of process failures and develop responses to mitigate their reoccurrence.	Identify process failures and their cause. Evaluate the impact of failure to the process environment. Formulate responses to process failures identified.
2	Business Acumen	Perform procedures to obtain an understanding of business models, industries and environments. (N=72)	Use relevant data and information to enhance the understanding of industries, environments and existing processes.	Describe business models and the impact of technology on drivers of value, revenue generating activities, and the impact of the external operating environment. Articulate the impact of industry specific considerations including business risks, processes and flow of information and data, and the application of relevant accounting standards to the business environment.

<sup>7</sup> 'N' references the number of times this learning objective was mentioned in information gathering activities.

	ICT Element	Learning Goals	Option A: Learning Outcomes	Option B: Granular Learning Outcomes
				Explain emerging ICT trends impacting the entity.
3	Business Acumen	Obtain understanding of existing processes and design appropriate response. (N=39)	Apply understanding of processes to assess and recommend improvements in the interaction of technology, people and processes.	<p>Demonstrate an awareness of stakeholder information needs.</p> <p>Describe how process, people and technology operate together when developing digital strategies for the organization.</p> <p>Obtain an understanding of the business environment and determine relevant technology-related processes and controls.</p> <p>Identify technology-related processes and controls and appraise their completeness and effectiveness.</p> <p>Formulate solutions to identified gaps or deficiencies in technology-related processes.</p> <p>Apply knowledge of industry and ICT-related processes.</p>
4	Business Acumen	Uses data obtained to assess risks within an organization. (N=32)	Identify and analyze relevant data to assess risks to the organization or environment.	<p>Identify relevant and reliable information and data to assess risks to the organization or environment.</p> <p>Assess the completeness and accuracy of information and data produced from digital sources.</p> <p>Defend the risk assessment performed considering the likelihood of an inappropriate decision based on the circumstances including faulty data or sources of data.</p>
5	Business Acumen	Appropriately applies ICT related experience and knowledge to manage technology	Apply ICT related experience and knowledge to manage technology related risks.	<p>Identify ICT risks associated with the environment and design controls to manage risks.</p> <p>Contribute to the formulation of IT strategies to manage ICT related risks.</p>

	ICT Element	Learning Goals	Option A: Learning Outcomes	Option B: Granular Learning Outcomes
		related risks. (N=7)		
6	Business Acumen	Support business processes and assist organizations with financial reporting, decision making, and control needs. (N=6)	Recommend improvements to business processes through the use of IT.	Recommend improvements to business processes through the use of IT (same as previous column).

**Questions:**

- B. The Taskforce has concluded the process to develop an inventory of learning goals from information gathering activities is sufficient. Does the Board agree?**
- C. Is the approach to developing granular skills based on the learning goals appropriate? If not, does the Board have any further recommendations to improve the approach?**
- D. What is the Board's point of view on whether Option A, Option B or a combination is more useful and meaningful to stakeholders?**
- E. Based on your knowledge and experience are there any gaps to the inventory of learning goals?**

27. In fulfilling the Board's objective of evidenced based standard setting, a planned approach to perform the gap analysis is presented below. Business Acumen is used as an example to illustrate the process starting from the ICT element, to the Competency Area and Learning Outcomes in the IESs, to the learning goals and lastly possible additions or revisions to existing Learning Outcomes. This example is based on Option A and does not consider possible changes to Competency Areas or Levels of Proficiency.

ICT ELEMENT	COMPETENCY AREA (existing IESs)	LEARNING OUTCOMES (existing IESs)	LEARNING GOALS	POSSIBLE ADDITIONS or EDITS TO LEARNING OUTCOMES
<p><b>Business acumen</b> Strategic business decisions are based on the integration of appropriately analyzed large data sets and professional judgment as applied to differing business environments amongst stakeholders such as vendors, customers, and employees</p> <p>Understand the impact ICT has on business models and risk, including how current and emerging technologies will impact the way business is conducted and measured.</p>	<p>Business and organizational environment (IES 2)</p> <p>Business strategy and management (IES 2)</p> <p>Business environment (IES 8)</p>	<p>Describe the environment in which an organization operates, including the main economic, legal, political, social, technical, international, and cultural forces.</p> <p>Analyze the external and internal factors that may influence the strategy of an organization.</p> <p>Analyze relevant industry, regulatory, and other external factors that are used to inform audit risk assessments including, but not limited to, market, competition, product technology, and environmental requirements.</p>	<p>Able to perform procedures to obtain understanding industries and environments including processes and controls (N=52)</p> <p>Able to perform procedures to obtain understanding of existing processes and designing appropriate response (N=24)</p> <p>Uses data obtained to assess risks within an organization (N=21)</p> <p>Able to respond to process failures (N=4)</p> <p>Able to evaluate and respond to process failures (N=1)</p> <p>Appropriately applies ICT related experience and knowledge to mitigate IT related risks (N=1)</p>	<p>IES 2 (Add) Recognize the impact emerging technologies may have on the strategy of an organisation</p> <p>(Add) Apply relevant data to enhance the understanding of industries and environments, and existing processes</p> <p>IES8 (Amend) Integrate relevant data and industry, regulatory, and other external factors that are used to inform audit risk assessments including, but not limited to, market, competition, product technology, and environmental requirements.</p>

**Questions:**

**F. What is the Board's point of view on whether the example gap analysis achieves its intended objective to demonstrate the basis for additions or edits to Learning Outcomes?**

**OTHER THEMES**

28. As noted in Appendix 3, the Taskforce also identified several themes as a result of the round tables, surveys and webinars that provided valuable information that will be considered by the Taskforce in other Board activities.
- a. There is a growing need for innovative or non-conventional teaching methods including case studies, site visits, observations and e-Labs.
  - b. There is a need to consider retraining or upskilling instructors or professors who can benefit from understanding advances in technology and its impact on the business environment.
  - c. There is a need to bring back broader skills that include IT and other chief accounting officer type skill sets.
  - d. Business strategies have been significantly influenced by ICT and business models will continue to change.

**COORDINATION WITH OTHER TASKFORCES**

29. At its April 2017 meeting, the Board endorsed the creation of several work streams related to professional skepticism and agreed to form a Taskforce to address Behavioral Competence. The Behavioral Competence, Professional Skepticism and ICT Taskforces have conferred and concluded the ICT and Professional Skepticism Taskforces will complete their principal activities prior to the Behavioral Competence Taskforce re-engaging on their project scope. This conclusion was based on the acknowledgement that the results from the current activities being performed by the ICT and Professional Skepticism Taskforces will benefit the Behavioral Competence Taskforce and avoid duplication of effort.
30. The Taskforce acknowledges the broader consideration by the Board to address the potential for amending existing IESs due to the current work of multiple taskforces while also considering the timing and objectives of a post-implementation review.

**PROPOSED MILESTONES AND TIMELINE**

31. The proposed milestones and expected completion dates are presented below.

Milestones	Completion Dates
Literature review scoping, evaluation and completion	Completed
Survey stakeholders <ul style="list-style-type: none"> <li>• Develop &amp; conduct survey</li> <li>• Analyze and summarize survey responses</li> </ul>	Completed
Initial discussions with other independent standard setting boards and IFAC Board Committees and work streams <ul style="list-style-type: none"> <li>• IAASB's Data Analytics Working Group</li> <li>• IFAC Technology Advisory Group</li> <li>• Professional Accountants in Business Committee</li> </ul>	Completed
Develop and complete analysis of Standards	Completed
Review of global accounting competency or skills frameworks	Completed
Identify ICT skills needed by aspiring and professional accountants in order to perform their roles	Completed
Plan and execute stakeholder outreach	October 2018 (regulator and AACSB in process)
Finalize the analysis of ICT learning goals and granular skills	October 2018
Perform an analysis of ICT skills identified from the information gathering activities against the Competence Areas and Learning Outcomes in the IESs	October 2018
Present a gap analysis and draft Learning Outcomes	October 2018

## RESOURCES

32. The Taskforce members are Anne-Marie Vitale (Chair), Helen Partridge (Secretary), David McPeak (IAESB Staff), Keryn Chalmers, Mienkie Etcheverrigaray, Sue Flis, Sarah Jakubowski, Steve Matzke, Greg Owens, Sidharta Utama, and Robert Zwane.

## PROPOSED WAY FORWARD

33. Based on the input to be provided by the Board in July 2018 and advice from the CAG in September 2018, the Taskforce will revise its draft recommendations and approach to the development of Learning Outcomes as needed.

APPENDIX 1

Mapping of ICT elements to existing IESs.

	ICT ELEMENT	COMPETENCY AREA	LEARNING OUTCOMES
1	<b>Business acumen</b>	Business and organizational environment (IES 2)	Describe the environment in which an organization operates, including the main economic, legal, political, social, technical, international, and cultural forces.
Business strategy and management (IES 2)		Analyze the external and internal factors that may influence the strategy of an organization.	
Business environment (IES 8)		Analyze relevant industry, regulatory, and other external factors that are used to inform audit risk assessments including, but not limited to, market, competition, product technology, and environmental requirements.	
2	<b>Behavioral competence</b>	Intellectual (IES 3)	Apply professional judgment, including identification and evaluation of alternatives, to reach well-reasoned conclusions based on all relevant facts and circumstances.
Apply reasoning, critical analysis, and innovative thinking to solve problems.			
Personal (IES 3)		Demonstrate a commitment to lifelong learning.	
		Apply professional skepticism through questioning and critically assessing all information.	
Professional skepticism and professional judgment (IES 4)		Apply a questioning mindset critically to assess financial information and other relevant data.	
	Identify and evaluate reasonable alternatives to reach well-reasoned conclusions based on all relevant facts and circumstances.		
3	<b>Digital acumen</b>	Information technology (IES 2)	Analyze the adequacy of general information technology controls and relevant application controls.
Explain how information technology contributes to data analysis and decision making.			
Information technology (IES 8)		Evaluate the information technology (IT) environment to identify controls that relate to the financial statements to determine the impact on the overall audit strategy.	
4	<b>Data interrogation, synthesis and analysis</b>	Information technology (IES 2)	Use information technology to support decision making through business analytics.
Intellectual (IES 3)		Evaluate information from a variety of sources and perspectives through research, analysis, and integration.	



	ICT ELEMENT	COMPETENCY AREA	LEARNING OUTCOMES
		Organizational (IES 3)	Apply appropriate tools and technology to increase efficiency and effectiveness and improve decision making.
5	<b>Communication</b>	Interpersonal and communication (IES 3)	Communicate clearly and concisely when presenting, discussing and reporting in formal and informal situations, both in writing and orally.

## APPENDIX 2

### Questions for Stakeholders

The following questions were used with the indicated stakeholders.

#### International Public Sector Accounting Standards Board

- What is your perspective on what ICT means for the public sector?
- How is ICT currently being considered by public sector entities?
  - a. How do you assess its level of integration (past and future trends)?
  - b. Are these trends in any way linked to accrual accounting adoption?
- How do you expect ICT will impact public financial management in the future? Do these expectations impact your standard-setting process?
- What are the challenges faced by the public sector when responding to, and adapting to, changes in how public financial management is conducted due to ICT?
- What is your point of view on whether ICT competencies and skills are needed to properly apply the IPSASs in light of your answers to the prior questions?
- Do you think the ICT needs for the public sector are the same as those of the private sector?
- From a public-sector perspective, how would you rank the ICT five elements in order of importance? Why?

#### International Forum of Independent Audit Regulators

- What types of Information & Communication (“ICT”) skills do you expect from auditors?
- What types of Information & Communication (“ICT”) skills do you expect from professional accountants in the financial reporting supply chain?
- What, if any, are the main differences in the ICT skill for auditors compared to professional accountants in the financial reporting supply chain?
- What skills are the most important for auditors and professional accountants to develop to effectively work in a technology driven business environment?
- What are the risks you see for the auditors and professional accountants with the increase use of technology to operate, manage and provide governance over entities?
- What are the risks you see with the increase use of technology to conduct audits?
- What recommendations do you have to reduce audit failures caused by the lack of understanding the interplay of technology, people and processes?
- What gaps have you observed in ICT skills that have contributed to poor audit quality?

#### Round table – Mexico City, Mexico – Academics, Member Organizations, or Education/CPD providers

- How has the actual and expected evolution of Information and Communication Technology (ICT) impacted how you educate your students/members and the content of your curricula/materials?

- What types of skills are employers seeking that are not being demonstrated by students at the university level?
- Discuss the challenges you encounter when introducing new skills needed to respond to changes caused by new technology to students/members?
- What additional actions are needed at the university level to prepare future professional accountants?
- What skill sets are the most important for students/members to develop to effectively work in technology-led business environment?
- What support is needed to assist students/members to adapt to changes in the current business environment caused by the digital age?

### Round table – Mexico City, Mexico – Practitioners (Big 4, Independent Firms, Professional Accountants in Business)

- How has the actual and expected evolution of ICT skills impacted how your firm/company attracts and retains talent?
- What are your firm/company's new and existing clients/customers expecting of you in the digital age?
- What skill sets are the most important for employees to develop to effectively work in technology-led business environment?
- How can employees best prepare themselves to adapt to changes in the business environment caused by the digital age?
- How does your firm/company support its employees to adapt to changes caused by the digital age?

### Round table – Kenya, Nairobi – Academics, Member Organizations, or Education/CPD providers

- How has the actual and expected evolution of Information and Communication Technology (ICT) impacted how you educate your students/members and the content of your curricula/materials?
- What types of skills are employers seeking that are not being demonstrated by students at the university level?
- Discuss the challenges you encounter when introducing new skills needed to respond to changes caused by new technology to students/members?
- What additional actions are needed at the university level to prepare future professional accountants?
- What skill sets are the most important for students/members to develop to effectively work in technology-led business environment?
- What support is needed to assist students/members to adapt to changes in the current business environment caused by the digital age?

### Round table – Kenya, Nairobi – Practitioners (Big 4, Independent Firms, Professional Accountants In Business)

- How has the actual and expected evolution of ICT skills impacted how your firm/company attracts and retains talent?
- What skill sets are the most important for employees to develop to effectively work in technology-led business environment?
- How does your firm/company support its employees to adapt to changes caused by the digital age?

Round table – Chengdu, China – Academics, member organizations, ACCA, or education/CPD providers

- How has the actual and expected evolution of Information and Communication Technology (ICT) impacted how you educate your students/members and the content of your curricula/materials?
- What types of skills are employers seeking that are not being demonstrated by students at the university level?
- Discuss the challenges you encounter when introducing new skills needed to respond to changes caused by new technology to students/members?
- What additional actions are needed at the university level to prepare future professional accountants?  
What skill sets are the most important for students/members to develop to effectively work in technology-led business environment?
- What support is needed to assist students/members to adapt to changes in the current business environment caused by the digital age?

Round table – Chengdu, China – Accountants (accounting firms, professional accountants in business, people accounting in the public sector/state sector)

- How has the actual and expected evolution of ICT skills impacted how your firm/company/organisation attracts and retains talent?
- What are your firm/company's/organization's new and existing clients/customers expecting of you in the digital age?
- What skill sets are the most important for employees to develop to effectively work in technology-led business environment?
- How can employees best prepare themselves to adapt to changes in the business environment caused by the digital age?
- How does your firm/company/organisation support its employees to adapt to changes caused by the digital age?

Academic Webinars

- How has the actual and expected evolution of Information and Communications Technology (ICT) impacted (i) how you educate your students and (ii) the content of your curricula/materials?
- What types of skills are employers seeking that are not being demonstrated by students at the university level?

- Discuss the challenges you encounter when introducing new skills to students in order to respond to changes caused by new technology?
- What additional actions are needed at the university level to prepare future professional accountants?
- What skill sets are the most important for students to develop to effectively work in a technology-led business environment?
- What support is needed to assist students to adapt to changes in the current business environment caused by the digital age?
- How does the use of technology enhance/inhibit critical thinking skills, research skills or problem-solving skills?
- What are your views on how accounting faculty are responding to the important changes that are confronting the accounting profession such as smart and digital technology?
- Do you have any examples of innovations in the content and delivery of accounting curricula associated with the rise of smart and digital technology?
- What might be emerging assessment methods for these new skill sets?
- Are there any existing skills that need to be emphasized to a lesser degree, to the extent of not being included in the curriculum.

*The following questions were previously presented at the April 2018 meeting:*

### Global Accounting Alliance

- Which ICT skills do you believe should be demonstrated by your members?
- What types of skills do you expect from your members that are currently not being demonstrated?
- How do you rank the level of importance of each ICT element? Are there other elements you think that should be examined?
- Do you believe behavioral skills needed to demonstrate ICT competence can be taught? How do you cultivate these skills in your training programs?
- What skillsets are the most important for accountants to develop to effectively work in technology led business environments?
- How do you capture and measure whether the important ICT skills are being demonstrated by your members?
- How can the IAESB provide value to your organization in its efforts to have members demonstrate competency in the area of ICT?

### Financial Executives Institute

- How has your role changed due to current or expected changes in ICT?
- Which ICT skills do you believe provide the most value to your organization?
- What types of skills do you expect from your finance organization that are currently not being demonstrated?
- How have advances in technology changed your training investment approach?

- How do you rank the level of importance of each ICT element? Are there other elements you think that should be examined?
- How do you cultivate behavioral skills needed for ICT competence in your employees/organization?
- What skillsets are the most important for accountants to develop to effectively work in technology led business environments?
- How does your employee performance review process capture and measure whether the important ICT skills are being demonstrated?

Professional Accountants in Business Committee

- How do you cultivate behavioral skills needed for ICT competence in your employees/organization?
- What skillsets are the most important for accountants to develop to effectively work in technology led business environments?
- How does your employee performance review process capture and measure whether the important ICT skills are being demonstrated?

American Accounting Association

- Have your learning objectives and class materials changed as a result of the demand for ICT skills by employers? If so, what are those changes?
- Have your research projects changed as a result of the transformative effects of ICT on business? If so, how?
- Which ICT skills do you believe are the most valuable to the accounting profession?
- How do you rank the level of importance of each ICT element? Are there other elements you think that should be examined?
- Do you believe behavioral skills needed to demonstrate ICT competence can be taught? How do you teach these skills?
- What skill sets are the most important for accountants to develop to effectively work in technology led business environments?

Association to Advance Collegiate Schools of Business

- How do you rank the level of importance of each ICT element for a professional accountant? Are there other elements you think should be examined?
- Are educational institutions responding to the ICT elements?
- How do you expect educational institutions to cultivate behavioral skills needed for ICT competence?
- What trends do you see in institutions' educational curriculum or offerings to address the ICT elements? Do the trends vary by geographic region?
- Are there any education related initiatives or activities your organization is implementing or driving to enhance accountants' ICT skills?

- What skillsets are the most important for accountants to develop to effectively work in technology led business environments?

Member Body

- Have your learning objectives and class materials changed as a result of the demand for ICT skills by employers? If so, what are those changes?
- Have your research projects changed as a result of the transformative effects of ICT on business? If so, how?
- Which ICT skills do you believe are the most valuable to the accounting profession?
- How do you rank the level of importance of each ICT element? Are there other elements you think that should be examined?
- Do you believe behavioral skills needed to demonstrate ICT competence can be taught? How do you teach these skills?
- What skill sets are the most important for accountants to develop to effectively work in technology led business environments?

Targeted Surveys – Questions for Individuals Associated with Other Public Accounting Organizations

- What types of Information & Communication Technology (“ICT”) skills do you expect from your colleagues or employees that are not being demonstrated?
- How has the actual and expected evolution of ICT impacted how you educate your employees and the content of your curricula/materials?
- What skillsets are the most important for professional accountants to develop to effectively work in a technology driven business environment?
- How have changes in your customer’s business due to ICT impacted your work?

Targeted Surveys – Questions for Individuals Associated with a Regulator or Audit Oversight Body

- What types of Information & Communication Technology (“ICT”) skills do you expect from your colleagues or employees that are not being demonstrated?
- To the extent your organization provides guidance to external parties, how has the actual and expected evolution of ICT impacted the guidance you provide?
- What skillsets are the most important for professional accountants to develop to effectively work in a technology driven business environment?
- What are the most important ICT skills to support audit quality?
- What gaps have you observed in ICT skills that have contributed to poor audit quality?

Targeted Surveys – Questions for Individuals Associated with a Small or Medium-sized practice

- What types of Information & Communication Technology (“ICT”) skills do you expect from your colleagues or employees that are not being demonstrated?
- Discuss the challenges you encounter when identifying and learning new skills needed to respond to changes caused by ICT.
- How has the actual and expected evolution of information and communication technology impacted who you recruit and how you train your employees (including changes to the content of your curricula/training materials)?
- What skills are the most important for professional accountants to develop to effectively work in a technology driven business environment?
- How have changes in your client’s business due to ICT impacted your work?
- How have advances in technology changed your training investment approach?

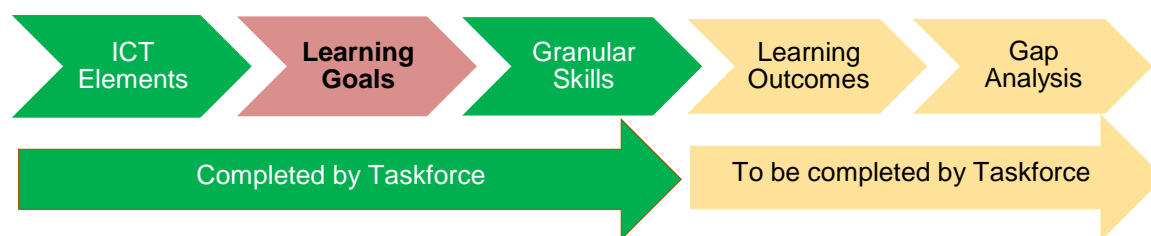
Targeted Surveys – Questions for Sole Practitioners, or Individuals in an Other or Personal Capacity

- How has the actual and expected evolution of information and communication technology impacted your responsibilities as a professional accountant?
- Discuss the challenges you encounter when developing skills needed to respond to changes caused by new technology.
- Do you encounter challenges when discussing new skills needed to respond to changes caused by new technology with clients, customers or other professional accountants? If so, what are they?
- What skills are the most important for professional accountants to develop to effectively work in a technology driven business environment?
- To the extent relevant, how have changes in your client’s business due to ICT impacted your work?



## APPENDIX 3

## Development of Skills Inventory (Learning Goals)



1. The Taskforce conducted information gathering activities with or through sources that served as the basis in the development of an inventory of ICT skills. These skills are referred to as learning goals. The sources are presented below.
  - IFAC Member Bodies
  - Literature review and articles
  - Representatives of STAREP
  - Regulators
  - Representatives from academia
  - Accounting, finance and related organizations
  - Board members from the International Public Sector Accounting Standards Board
  - Practitioners
  - Students
  - Auditing and Ethics standards review
  - Existing Framework Reviews
2. Information obtained from each source was evaluated to identify:
  - a. ICT skills and the number of occurrences reasonably inferred from a statement or reference, and
  - b. Other themes that are relevant to standard and related guidance development activities, for example, themes that may be included in implementation guidance.
3. Skills were identified based on the cumulative knowledge obtained through the information gathering activities and the Taskforce's judgment as to an ICT skill to be reasonably inferred from the statement or reference.
4. The number of occurrences were determined based on the following methods:
  - *Surveys* – Number of occurrences is based on the number of times a statement or phrase specified or indicated an ICT-related skill.

- *Member Body Outreach, Round tables, Webinars and Other Outreach* – Number of occurrences is based on the number of times a statement, phrase or concept that indicated an ICT-related skill was discussed in the responses submitted or during the discussion held.
  - *Literature and Article Review, ICT References and Existing Frameworks* – Number of occurrences is based on the number of times a statement, phrase or concept occurred that indicated an ICT-related skill. A detailed list of standards considered, phrases referenced and related skills is included in Agenda Item 3-5.
5. These learning goals were used as the basis to develop more detailed actionable items that are provided as example granular skills that can inform the Taskforce as a basis for potential Learning Outcomes. The results of the skills inventory are included in Agenda Item 3-4.
6. Other themes identified through the information gathering activities were classified into the following categories and will be considered by the Taskforce in future standard and related guidance development activities:
- Manner of learning and development
  - Considerations for delivery of any additional ICT Skill Education guidance (for example implementation guidance, revision of existing IES, audience)
  - Current environment