Including Information and Communications Technologies in Accounting Education

Presenters:
Alfred Borgonovo, Senior Financial Management Specialist, World Bank CFRR
Michael Wells, Consultant

Bishkek, 16-17 September 2019

5th Workshop on competency-based education and Professional Accountancy Organizations

CFRR
Centre for Financial Reporting Reform
WORLD BANK GROUP

KAREP
Kyrgyz Audit and Reporting Enhancement Project

KAREP is funded by:

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
State Secretariat for Economic Affairs SECO

Purpose of this session

- To examine the development and assessment of competence in information and communications technologies (ICT) in aspiring professional accountants;

- To determine ways to help aspiring professional accountants explore new technologies and innovations that will impact their career.

Learning Objectives for this session

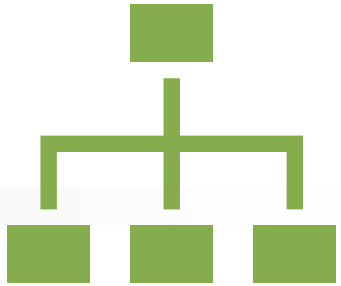
Based on this session, you should be able to:

a) Explain the competence related to information and communications technologies (ICT) that is needed by aspiring professional accountants;

b) Determine ways to develop and assess ICT competence in accounting students;

c) Integrate ICT with other competence areas in activities and assessments.

Structure of this session



I. Competence in ICT

II. Developing ICT competence

III. Integrating ICT with other competence areas

IV. Wrap-up

I. Competence in information and communications technologies

Importance of competence in information and communications technologies

Why focus on ICT?

Information and communications technologies (ICT):

- organizations and society are becoming more reliant on technology
- systems have become increasingly integrated
- disruptive technologies are re-shaping the way business is conducted

Competence in ICT is essential for future success as a professional accountant.

Why focus on ICT?

Findings from the IAESB ICT Taskforce:

» "**Two years ago,** 78% of CFOs considered **proficiency in Excel** as the most important skill for their financial planning and analysis teams. Only 5 percent feel the same today. Instead, CFOs rated **adaptability to new technologies as the top skill for new hires**."
(Adaptive Insights, Q4 2017 CFO Survey)

» "Data has been called the **world's most valuable resource**"
(PwC's *Confidence in the Future* report)

Why focus on ICT?

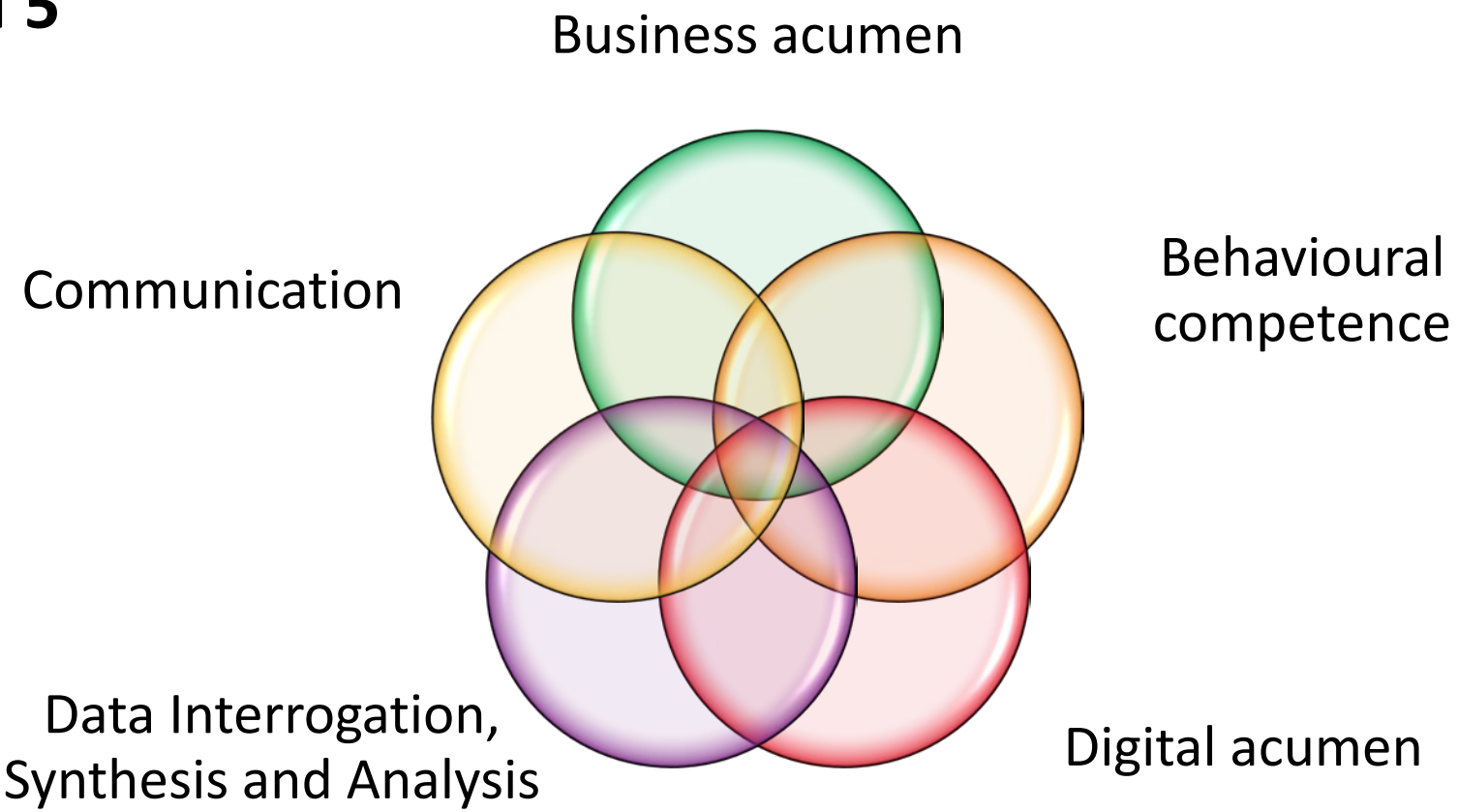
Findings from the IAESB ICT Taskforce:

- From 2016 to 2017, worldwide **venture capitalist** investment in:
  - **AI and machine learning** increased 89% (to almost $11 billion USD)
  - **Blockchain** increased 82% (to $1 billion USD)

Defining ICT competence

Defining ICT competence

IAESB ICT Task Force identified 5 ICT Elements:



Defining ICT competence

Business acumen:

» "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**."

Source: http://www.iaesb.org/system/files/meetings/files/Agenda-4-Information-Communications-Technology.pdf

Defining ICT competence

Behavioural competence:

» "Enhance **intellectual curiosity, critical thinking, agility** and **lifelong learning** to effectively respond to an environment of rapid technological change.

» **Professional judgment** and **professional skepticism** will be applied in more situations, which requires a strong sense of **self- and situational-awareness**.

» Demonstrate **ethical use and dissemination** of data."

Source: http://www.iaesb.org/system/files/meetings/files/Agenda-4-Information-Communications-Technology.pdf

Defining ICT competence

Digital acumen:

- "Understand how new and emerging technologies **operate, are used, and impact** the generation, processing, and flow of data.
- Understand and influence how **governance** effectively oversees the impact of ICT, including **data security**."

Source: http://www.iaesb.org/system/files/meetings/files/Agenda-4-Information-Communications-Technology.pdf

Defining ICT competence

Data Interrogation, Synthesis and Analysis:

- "Use **structured and unstructured data**, evaluate **data integrity** (complete, accurate and relevant) and **understand exceptions** to expectations.
- Effectively and appropriately **interpret the "story"** the data is telling and **make decisions** accordingly.
- Conduct **risk assessments, predictive analysis** and effectively use **visualization tools**."

Source: http://www.iaesb.org/system/files/meetings/files/Agenda-4-Information-Communications-Technology.pdf

Defining ICT competence

Communications:

» "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."

Source: http://www.iaesb.org/system/files/meetings/files/Agenda-4-Information-Communications-Technology.pdf

IAESB's new Learning Outcomes for ICT

ICT competence

IESs 2, 3, 4 and 8 have undergone recent revision:

- IAESB considered 5 ICT elements and identified trends that impact expected competence of professional accountants.
- Studied impact of disruptive technologies, erosion of trust, increased use of intelligent systems, data mining, etc.
- Learning Outcomes for ICT have been revised and expanded.

ICT competence

ICT Competence Area in IES 2 (Intermediate level of proficiency):

Learning Outcomes from IES 2
(i) Explain the impact of ICT developments on business and an organization's environments.
(ii) Explain how ICT supports data analysis and decision making.
(iii) Explain how ICT supports the identification, reporting and management of risk in an organization.
(iv) Use ICT to analyze data and information.

... continued

ICT competence

ICT Competence Area in IES 2 (Intermediate level of proficiency):

Learning Outcomes from IES 2
(v) Use technology effectively to communicate.
(vi) Apply ICT to enhance the efficiency and effectiveness of an organization's systems.
(vii) Analyze the adequacy of ICT processes and controls.
(viii) Identify improvements to ICT processes and controls.

II. Helping students/candidates develop ICT competence

ICT competence

Remember that the IESs require the Learning Outcomes to be:

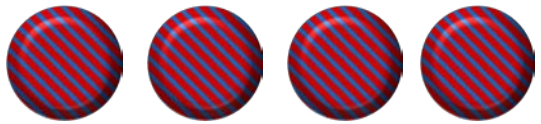
- Prescribed as part of Initial Professional Development leading to qualification; and
- Assessed prior to qualification based on verifiable evidence.

ICT competence

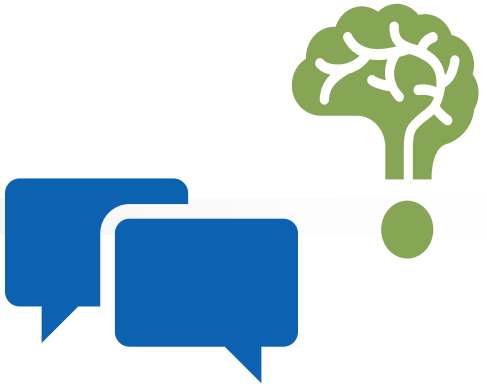
Two approaches:

1. Separate technology related-topics and teach them within a separate course.

2. Integrate information and communications technology topics across the range relevant technical domains.



ICT competence



Activity:

What are the arguments supporting each approach?

1. Separate technology related-topics and teach them within a separate course.
2. Integrate information and communications technology topics across the range of relevant technical domains.

ICT competence

Arguments supporting each approach:

Separate course	Integrated throughout
Ensures sufficient depth of technical detail	Repetition helps build competence over time
Course can be developed and taught by a specialist in ICT	Allows for better application by instructors with expertise in each competence domain
Allows ICT to mastered in isolation before needing to integrate	More representative of pervasive nature of how ICT are used

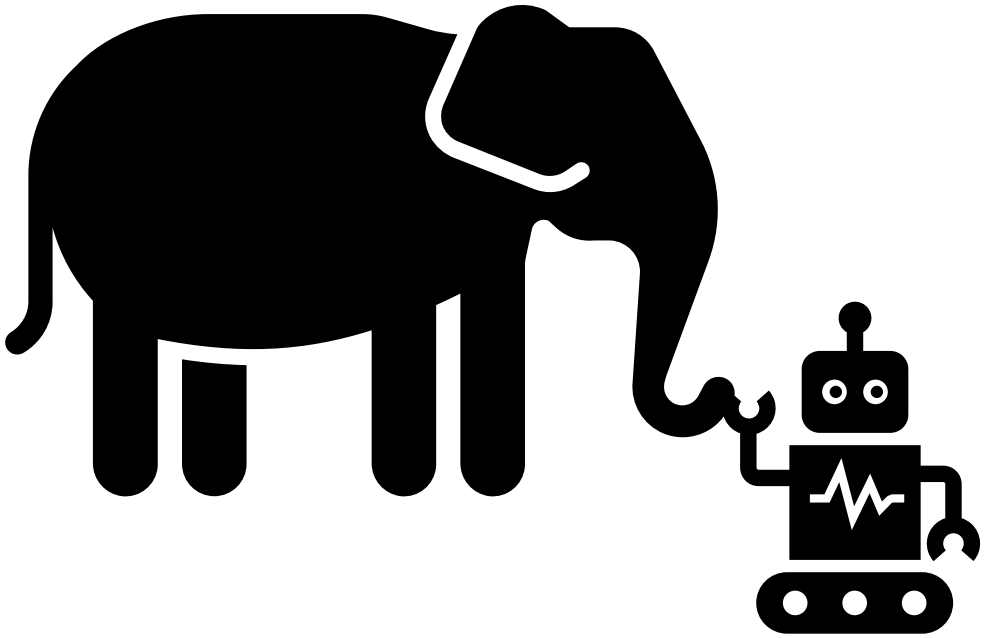
ICT competence

Aspiring professional accountants can benefit from the combination of both approaches:

- A foundation course that provides sufficient depth on ICT, and
- Integration throughout program through inclusion of practical examples and activities exploring current and future technologies.

Developing ICT competence

The Elephant in the Room:

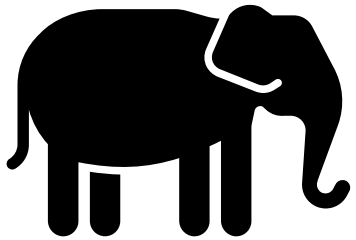


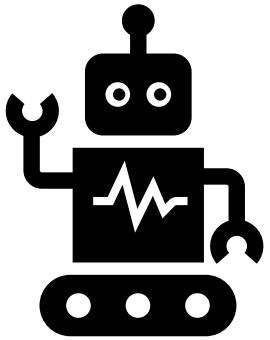
Do accounting instructors have sufficient competence in ICT to teach students?

Developing ICT competence

Group discussion:

How can we ensure adequate ICT competence among instructors?

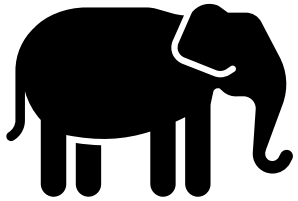


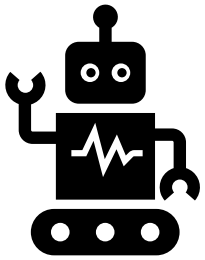


Developing ICT competence

Ensuring adequate competence among instructors:

- Do research – be curious
- Attend CPD courses – look for online options as well
- Collaborate with colleagues to develop materials and learn from each other
- Bring in guest lecturers to help teach (other faculty members or practitioners)





III. Integrating ICT with other competence areas

Integrating ICT with other Technical Competence Areas (IES 2)

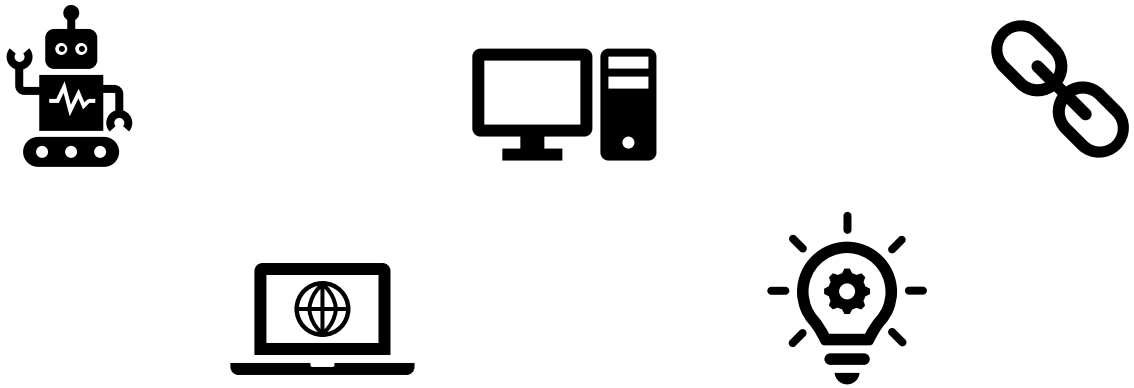
Technical competence areas

Technical competence (IES 2)	
a. Financial accounting and reporting	g. Business laws and regulations
b. Management accounting	h. Information & communications technologies
c. Finance and financial management	i. Business and organizational environment
d. Taxation	j. Economics
e. Audit and assurance	k. Business strategy and management
f. Governance, risk management and internal control	

Developing ICT competence

Activity:

For each technical competence area, how can ICT be integrated?



Technical competence areas

Technical competence (IES 2)	ICT integration ideas
a. Financial accounting and reporting	Have students use common accounting software to do assignments; Research how ICT is changing financial accounting and reporting (e.g., RPA for reporting)
b. Management accounting	Require students to use spreadsheet software for developing schedules; Research how AI/machine learning models are improving forecasting

Technical competence areas

Technical competence (IES 2)	ICT integration ideas
c. Finance and financial management	Teach basics of cryptocurrencies and how initial coin offerings (ICOs) work; Have students debate how ICOs should be treated (as securities?)
d. Taxation	Have students use tax preparation software; Research how technology is impacting tax issues (e.g., jurisdiction issues of transactions in the cloud, use of intelligent systems for tax preparation)

Technical competence areas

Technical competence (IES 2)	ICT integration ideas
e. Audit and assurance	Discuss new audit tools that rely on data analytics, and the implications of 100% testing; Research new ICT applications in the audit (e.g., drones for inventory counts, translation tools for transnational audits)
f. Governance, risk management and internal control	Teach the importance of solid data governance processes; Consider security threats, reputational risk and controls to mitigate risks

Technical competence areas

Technical competence (IES 2)	ICT integration ideas
g. Business laws and regulations	Discuss the lag of laws and regulations and implications for business; Research privacy laws and challenges that result
i. Business and organizational environment	Discuss impacts of ICT on global business (e.g., ”data is the new gold”); Consider global differences in data governance and privacy laws.

Technical competence areas

Technical competence (IES 2)	ICT integration ideas
j. Economics	Discuss supply and demand for data and implications for business; Consider how AI/machine learning will help improve economic forecasts
k. Business strategy and management	Research how AI models help manage risk; Debate strategic approaches to technology adoption (e.g., risk of early adopter versus opportunity cost of waiting)

Integrating ICT with Professional Skills (IES 3)

Professional skills

Categories of professional skills in IES 3:

Professional skills (IES 3)	Such as…
a. Intellectual	Research; analysis; integration; critical thinking; dealing with unstructured problems
b. Interpersonal and communication	Cooperation; concise, clear and persuasive written and oral communication; cultural awareness; effective listening; interviewing; negotiating

… continued

Professional skills

Categories of professional skills in IES 3:

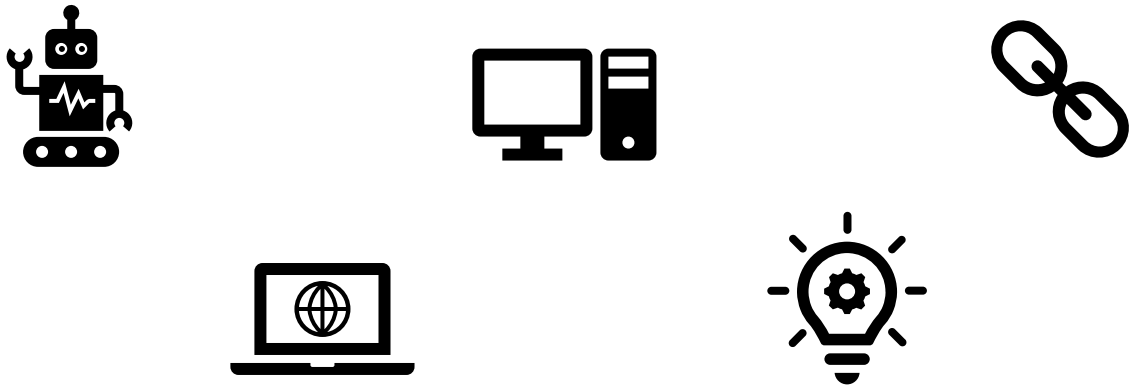
Professional skills (IES 3) …continued	Such as…
c. Personal	Commitment to lifelong learning; open-mindedness; time management; setting high personal standards of performance; anticipating challenges
d. Organizational	Quality review of self and others; adherence to established practices; leadership, motivation and delegation

Developing ICT competence

Activity:

For each category of Professional skills,

how can ICT be integrated?



Professional skills

Categories of professional skills in IES 3:

Professional skills (IES 3)	ICT integration ideas
a. Intellectual	Require research activities on business uses of AI, blockchain, etc.; Stress the need to critically evaluate output from systems and how systems are used; Encourage students to ask experts rather than guessing at answers
b. Interpersonal and communication	Include discussion activities where students research and learn from each other; Draw examples from different cultures and how ICT is being used (e.g., privacy laws differ greatly in the US vs EU vs China); Have students do presentations using common presentation software.

Professional skills

Categories of professional skills in IES 3:

Professional skills (IES 3) …continued	ICT integration ideas
c. Personal	Emphasize need to stay up to date and how the pace of change will make today's methods obsolete; Include activities to anticipate challenges from new technologies and how to address them; Discuss bias in AI data sets and algorithms
d. Organizational	Have students lead discussions on issues requiring research and where clear answers are not yet known; Have students review the soundness of each other's ideas

Integrating ICT with Professional Values, Ethics and Attitudes (IES 4)

Professional values, ethics and attitudes

Categories of professional values, ethics, and attitudes in IES 4:

Professional values, ethics & attitudes (IES 4)	Such as…
a. Professional skepticism and professional judgment	Apply a questioning mind; apply techniques to reduce bias when making decisions and conclusions; apply critical thinking when identifying and evaluating alternatives
b. Ethical principles	Identify ethical threats; analyze ethical consequences; apply fundamental principles (per IESBA Code: integrity, objectivity, professional competence and due care, confidentiality, and professional behavior)

… continued

Professional values, ethics and attitudes

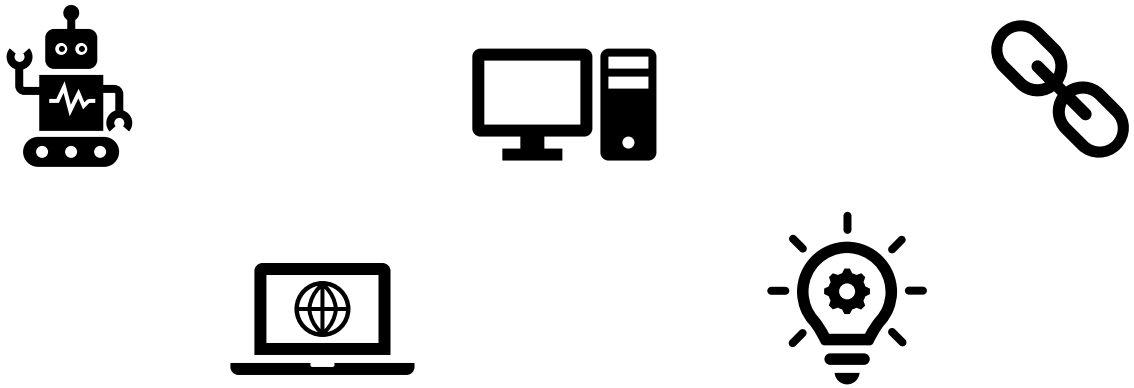
Categories of professional values, ethics, and attitudes in IES 4:

Professional values, ethics & attitudes (IES 4) …continued	Such as…
c. Commitment to the public interest	Explain the role of professional ethics with respect to social responsibility, business and governance; analyze the interrelationship between laws, ethics and the public interest; analyze consequences of unethical behaviour to the individual, the profession and the public.

Developing ICT competence

Activity:

For each category of Professional values, ethics and attitudes, how can ICT be integrated?



Professional values, ethics and attitudes

Categories of professional values, ethics, and attitudes in IES 4:

Professional values, ethics & attitudes (IES 4)	ICT integration ideas
a. Professional skepticism and professional judgment	Teach “data skepticism” – students should recognize the need to objectively validate system outputs rather than blindly following them
b. Ethical principles	Include ICT ethical dilemmas in case studies (e.g., privacy issues, impact of widening digital divide, unfair decisions being made by biased AI systems)

… continued

Professional values, ethics and attitudes

Categories of professional values, ethics, and attitudes in IES 4:

Professional values, ethics & attitudes (IES 4) …continued	ICT integration ideas
c. Commitment to the public interest	Discuss the need for ethical leadership in the future and ensuring that ICT is used to support the public good; Have students debate issues of when and how technology should be used (e.g., weaponization of AI, privacy and security issues of data gathering)

Examples of ICT integration

Example of ICT integrated with Technical Competence Area and Professional Skills

Scenario in a Management Accounting course:

XYZ Corp. uses the NPV method to determine whether to undertake projects. Recently, it has been working with an AI system provider to develop an intelligent system to calculate NPV of projects. The new system was wildly inaccurate at first, but has been trained on all project data from the past 10 years, and it is now producing results quite similar to the human experts, at a fraction of the time required.

XYZ has an opportunity to invest in a new project in a foreign country. XYZ has never undertaken a project in this country, and a decision is needed quickly. They plan to use the new system to determine whether the opportunity should be undertaken.

Example of ICT integrated with Technical Competence Area and Professional Skills

Required:

Should XYZ trust the new system with the capital investment decision? Identify two arguments in favour and two against.

The new system has been deemed to be accurate because it produces results similar to the human experts. Evaluate the validity of this conclusion.

Example of ICT integrated with Technical Competence Area and Professional Skills

Required:

Should XYZ trust the new system with the capital investment decision? Identify two arguments in favour and two against.

In favour:

Timeliness – humans will take longer and the opportunity may pass by.

Cost – system can produce a recommendation with fewer resources than human estimators.

Against:

Model has been trained on local data and may not be suitable for estimating under foreign conditions.

Time pressure - there may be insufficient time for human oversight.

Example of ICT integrated with Technical Competence Area and Professional Skills

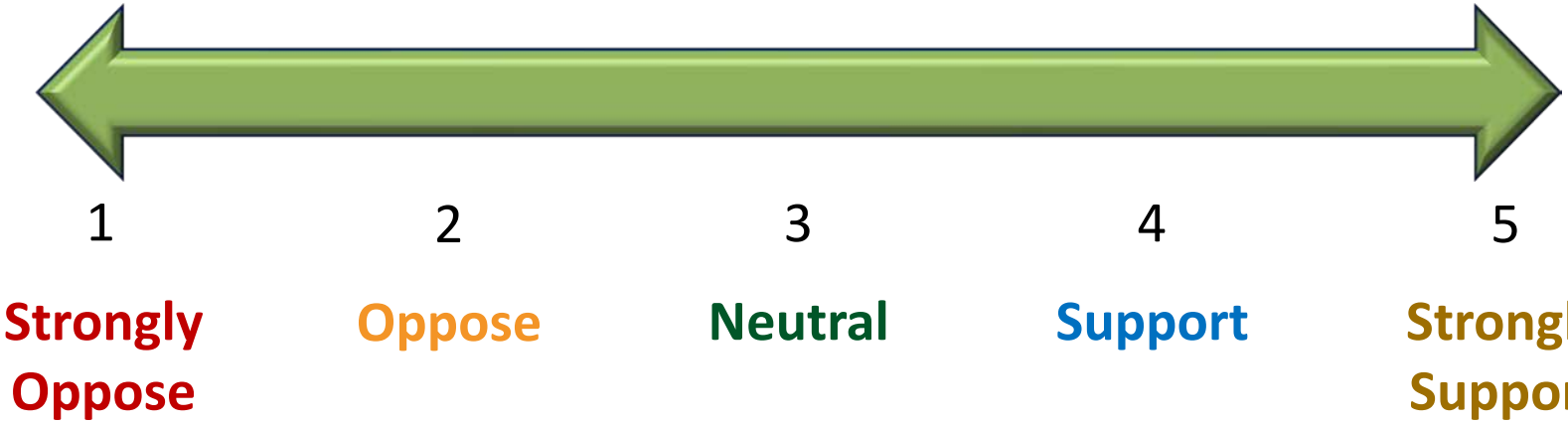
Required:

The new system has been deemed to be accurate because it produces results similar to the human experts. Evaluate the validity of this conclusion.

- This conclusion assumes that the human experts are correct, and that the system is reliable when it mimics their results. This could be invalid - what if the humans are also wrong? Given that most projects are longer term, the accuracy of the original NPV estimates are hard to evaluate. It is possible that an AI model could learn better estimation methods for predicting the cash flows and working capital requirements that underlie the NPV estimates, but if the model were deemed to be ”wrong” by deviating from the human experts, the company would lose the benefit of the system’s learning and analytics ability.

ICT integrated with Professional Ethics

LMN LLP (a PA firm) advises small business clients on strategy and growth. It uses a commercially available AI system to run forecasts and predictions for clients behind the scenes. Advisors don't have access to the criteria or rationale for the system's recommendations, but they seem to be more reliable than human-generated plans. Advisors present recommendations to clients without disclosing the source of the plans. **From an ethics perspective, would you support or oppose this practice?**



Example of ICT integrated with Professional Ethics

Factors to consider:

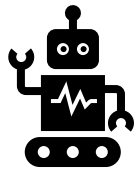
- Ethical issue is not in the use of the system, but rather in the way the advice is presented to clients.
- Advisors are being relied upon for their expertise.
- System is not understood by advisers, so they can't determine if recommendation is reasonable or not.
- System seems to be better than humans at determining plans, so clients should be given the benefit of improved performance.
- Clients should be made aware of risks and uncertainties.

IV. Wrap-up

Wrap-up

Helping aspiring professional accountants develop competence in ICT requires:

- Practice with currently-available tools and technologies
- Study of relevant emerging technologies and how they are impacting the profession
- Integration with professional skills, values, ethics and attitudes to ensure the develop a questioning mind, assess critically and use professional judgment
- Competent instructors




Questions? Comments?
Thank you!