INFT 3800

Professional Practice in IT

Sem 1, 2021

LECTURE NOTE – WEEK 1

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Review of Computing Practice

Review of computing practice

- Professional practice defined
- Computing practice defined
- Data to Information
- Information age to knowledge age
- Different between knowledge, competence, performance & practice in the design of professional activities.
- Practice Management & PM Defined
- Professional in Entrepreneurship
- Route to professional practice
- Methodologies for professional practice

Summaries

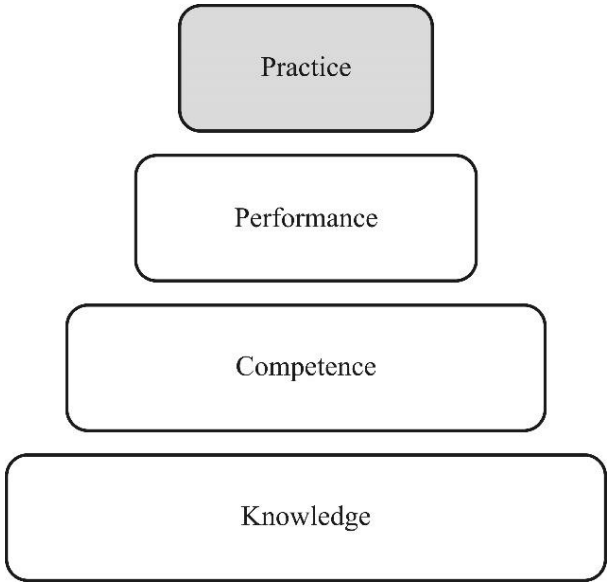
More on Assessment 2, 3, 4

Computing Practice Defined

- Warm up questions:
  - What is professional practice?
  - What is computing practice?
  - Is computing practice a technical skill?
  - Why do we need to know about computing practice?
  - When was a computing practice first introduced?
  - What`s the different between IT and ICT?
  - How data and information play role in computing practice?
  - How computing practice is able to generate new knowledge?
  - What is meant by being a professional computing practitioner?
  - What are the future composite professional practice?
  - How to prepare for professional practice?

Professional Practice Defined

- Professional is defined as man or woman who does skilled work to achieve a useful social goal.
- The dedication towards the service they perform.
- Miller`s model represent a developmental sequence of stages that are needed and have their importance impact on professional practice:

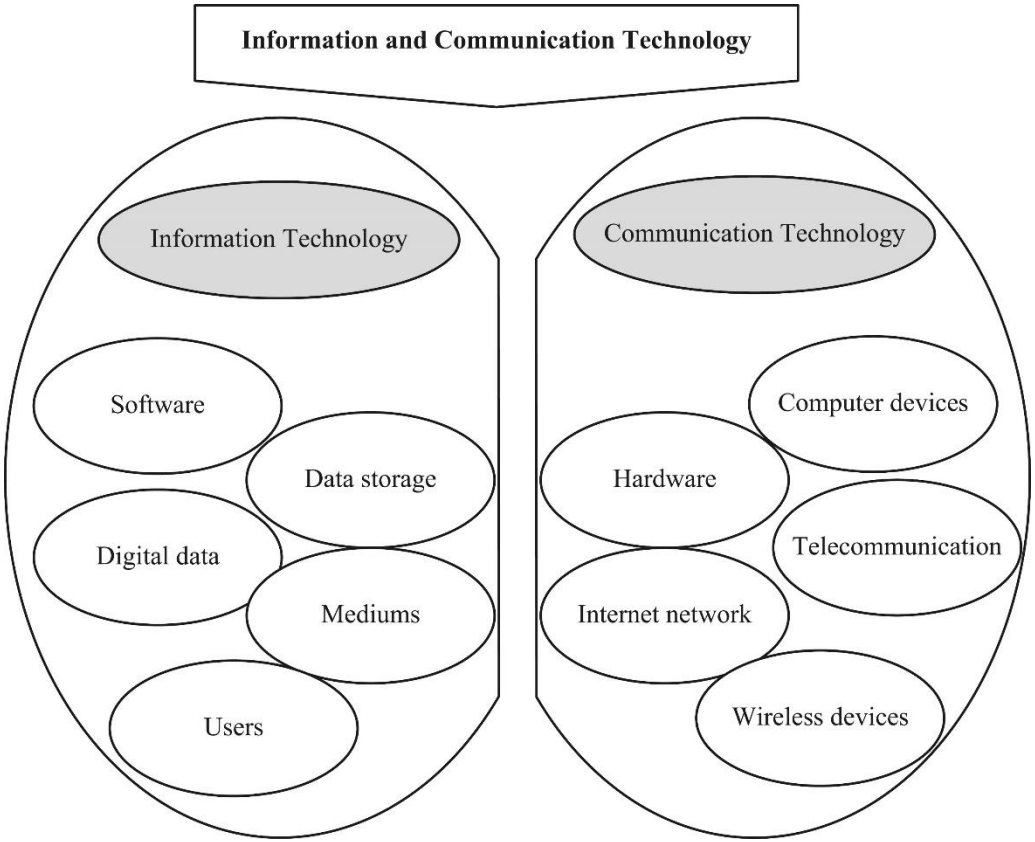


Computing Practice Defined

- Computing is the procedure of calculating; determining something by mathematical or logical methods.
- Computing technologies including IT and ICT allow people to communicate and share information worldwide.
- IT embraces not only the development of the technology to manipulate information but also for knowledge management.
- IT is “the study, design, development, implementation, support or management of computer-based information systems, software applications and computer hardware”. (ITAA)

Computing Practice Defined

- ICT refers to all computer-based advanced technologies for contributing to innovative change in business and daily life.
- ICT is broader than IT.
- The figure shows the components of ICT and a typical flow of information through a medium of communication.



Computing Practice Defined

Evolution of Computers

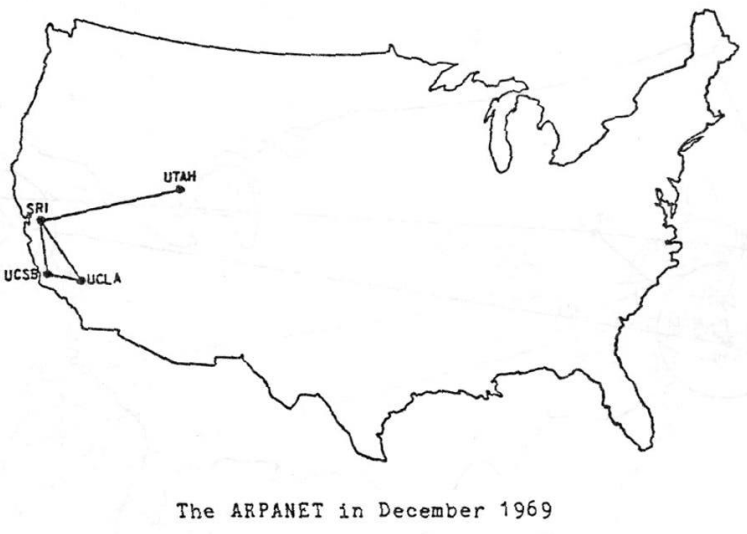
- 1623 – 1662: Blaise Pascal built the first calculating machine
- 1791 – 1771: Charles Babbage worked on a mechanical computer which could perform a mathematical calculations
- 1815 – 1852: The world`s first computer algorithm by Ada Lovelace
- 1903 – 1957: John Von Neumann developed Von Neumann architecture
- 1903 – 1995: Alonso Church developed the key concepts of computability and computing (lambda calculus)
- 1912 - 1954: Alan Turing introduced core concept of computer science “Turing Machine”.
- 1906 – 1992: Grace Brewster Murray Hopper invented one of the first compiler related tool
- 1994: The first large-scale automatic digital computer was created by IBM

Data to Information

- Hoff (1971) invented the first microprocessor for an integrated circuit with 2,300 transistors (equal to a CPU).
- Two memory chips were attached to the microprocessor:
  - one to move data in and out of the CPU and
  - another to provide the program to drive the CPU.
- 1975: The first PC was developed
- 1977: Radio shack introduced the first PC with keyboard and display monitor.

Data to Information

- 1969: The project that initiated the groundwork of the Internet began by ARPANET.
- ARPANET initial plan: to connect four locations;
  - The UCLA
  - The UC, Santa Barbara
  - The Stanford Research Institute
  - The University of Utah
- 1971: 2 dozen sites connected
- 1974: 62 dozen
- 1981: more than 200 sites



The ARPANET in December 1969

Source: theconversation.com

Information Age to Knowledge Age

- Technological advancement has transformed global society into knowledge society.
- Knowledge Society Explained Video (Source: Systems Innovation)
  - How does IT contribute to creating knowledge society?

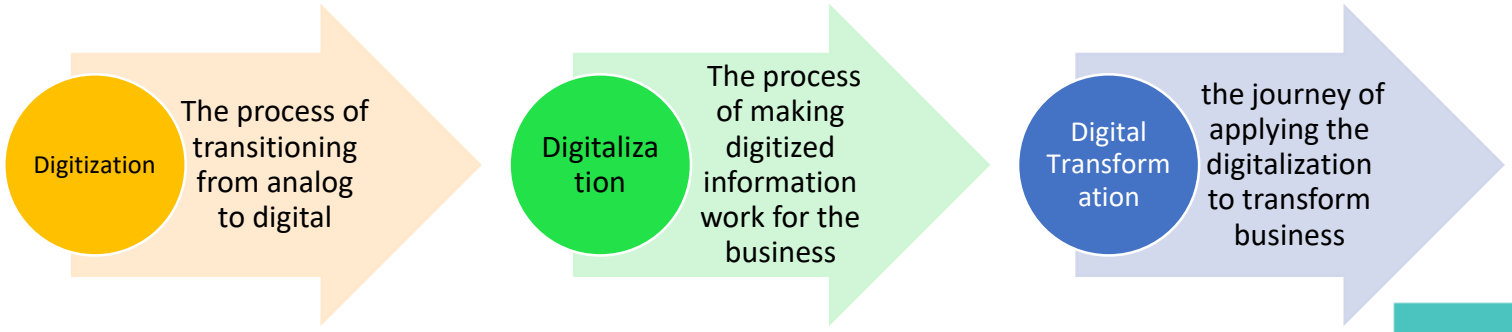
Information Age to Knowledge Age

- In Internet of Things (IoT) era, sensors are embedded into every device and appliances
- Allowing communication with each internet users

Source: circuitdigest.com

Information Age to Knowledge Age

- The digitization of information has had a profound impact on traditional media businesses. Eg. Book publishing, the music industry and television and cable networks.
- Information is described in digital forms
- What`s the different between digitization and digitalization?



Information Age to Knowledge Age

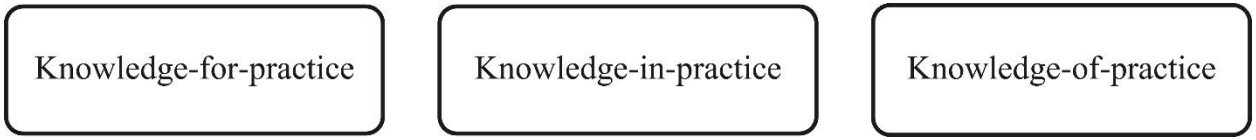
- Helps now come from machines which have a much greater ability to process large amounts of data points at the same time from multiple sources and multiple domains in real-time; Machine learning, deep learning etc.
- Two central focus area require work to do:
  1. Collecting data
  2. Transforming information into **knowledge**

Knowledge, Competence, Performance & Practice

- Knowledge is “[...] a mixture of organized experiences, values, information and insights offering framework for the evaluation of new experiences and information”.
- The identified professional practice gap of the learner can be based on a range of needs. One such need includes knowledge that is the range of one’s “information or understanding, the sum of what is known.”

Knowledge, Competence, Performance & Practice

- Knowledge in the process of practice development is classified into three types:



1. *Knowledge-for-practice*: represents formal knowledge for professionals to improve practice though education and lifelong training and learning.
2. *Knowledge-in-practice*: knowledge that is embedded in the practice process. Eg. Journal, reflection.
3. *Knowledge-of-practice*: knowledge that grows through reflection on the practice by using the practice inquiry. Eg. ITIL, COBIT, ISO, etc.

Knowledge, Competence, Performance & Practice

- Competence is "[...] the relationship between the tasks assigned to or assumed by the person or the group and their capability and potential to deliver a desired performance. People mobilise knowledge, skills and behaviours to "do the right thing at the right moment"".
- Competence is the strategy a professional would apply in practice if given the opportunity. For example, competence is demonstrating the ability to apply in a case or simulated environment the knowledge of which class or type of antibiotic or antibiotics should be used on whom and when.
- Competence is ***knowledge*** put into action.
- "Knowing how to do something"

Knowledge, Competence, Performance & Practice

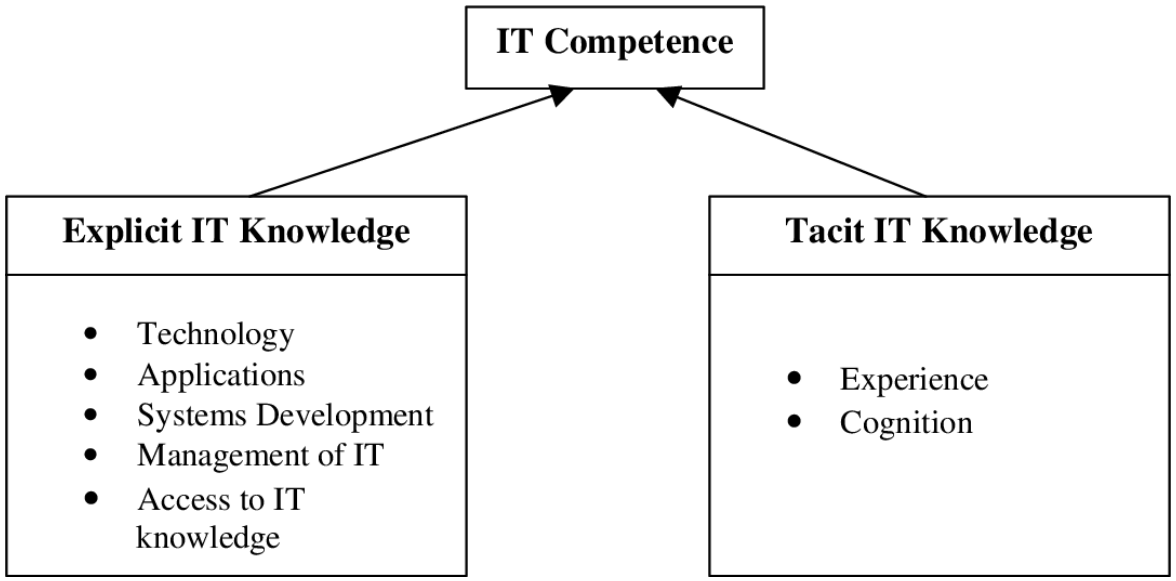
- Competence or “know-how” is the ability, not yet put into practice, to do something as a result of knowledge in the presence of experience and judgement.
- It is the strategy an individual would apply in practice if an opportunity exists.
- Competence = Knowledge + skills + ability + attitude
- Example of IT competence?

Knowledge, Competence, Performance & Practice

- For individuals to be IT competent, need to have skills in many areas; technical skills, business competence, problem-solving ability, teamwork, creativity and management.
- While technical skills are important, still need the ability to make decisions independent of technologies so that the best decision for the business environment is made.
- IT competence is important for many reasons:
  - IT innovation and long-term strategic advantage
  - Increasing the outputs of business processes
  - Develop business competitiveness
  - To cope with changes
  - Better communication

Knowledge, Competence, Performance & Practice

- Model of IT competence



- *Explicit Knowledge*: knowledge that can be readily articulated, codified, stored and accessed. It can be easily transmitted to others.
- *Tacit knowledge*: he kind of knowledge that is difficult to transfer to another person by means of writing it down or verbalizing it (implicit knowledge)

Knowledge, Competence, Performance & Practice

- Performance is “[...] things that people actually do, actions they take, that contribute to the organization’s goals”.
- Performance is based on one’s competence but is modified by system factors and other circumstances.
- Performance is the implementation of learned strategies.
- Performance is competence implemented, or applied in actual practice:”show-how”.
- Professional performance may be influenced by knowledge, competence, or by other factors external to individual, such as; incentives, resources, expectations or demands.

Knowledge, Competence, Performance & Practice

- The end goal is to place competence and performance into practice.
- Represent what professionals actually do during day-to-day practice.
- The impact on clients or society is often the result of more than just a single practitioner`s performance.
- Example of IT impact on society?

Knowledge, Competence, Performance & Practice

- Practice is “defined as to use an idea or actually put it into place. It also refers to the act of continually doing something in order to get better at it. An example of **practice** is to make a habit of something”.
- The term 'professional practice' refers to the conduct and work of someone from a particular profession.
- Best practices are defined into standards

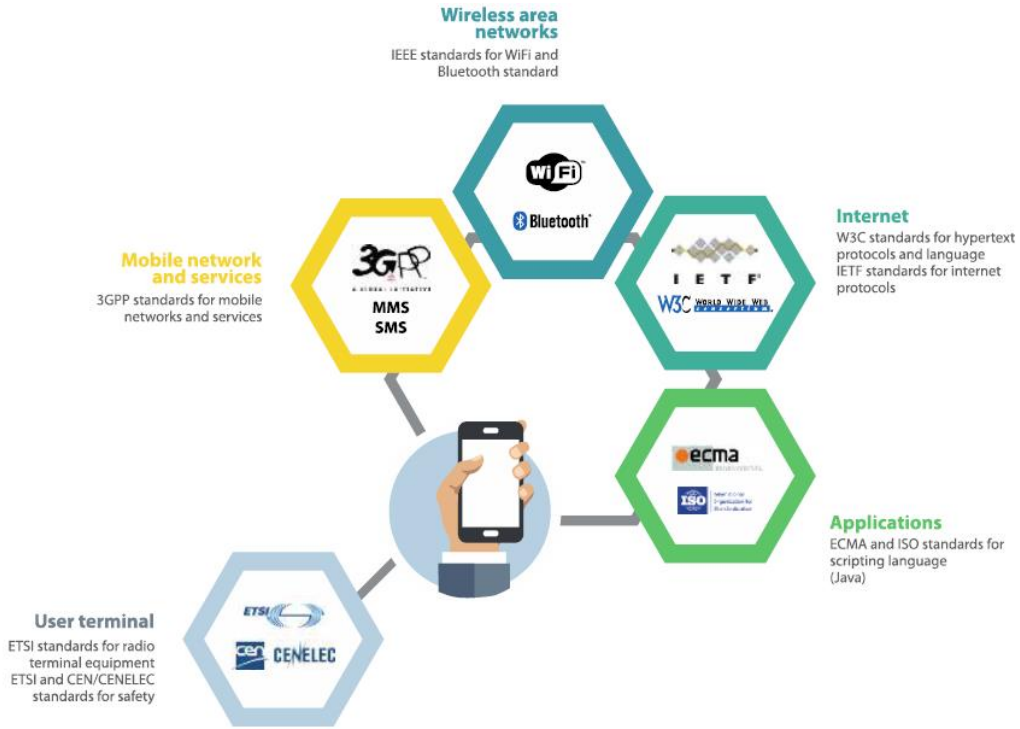
Knowledge, Competence, Performance & Practice

- Why do we need standard?

Source: ETSI.org

Knowledge, Competence, Performance & Practice

- For example, when we are using smartphone; some standards are adopted.



Source: ETSI.org

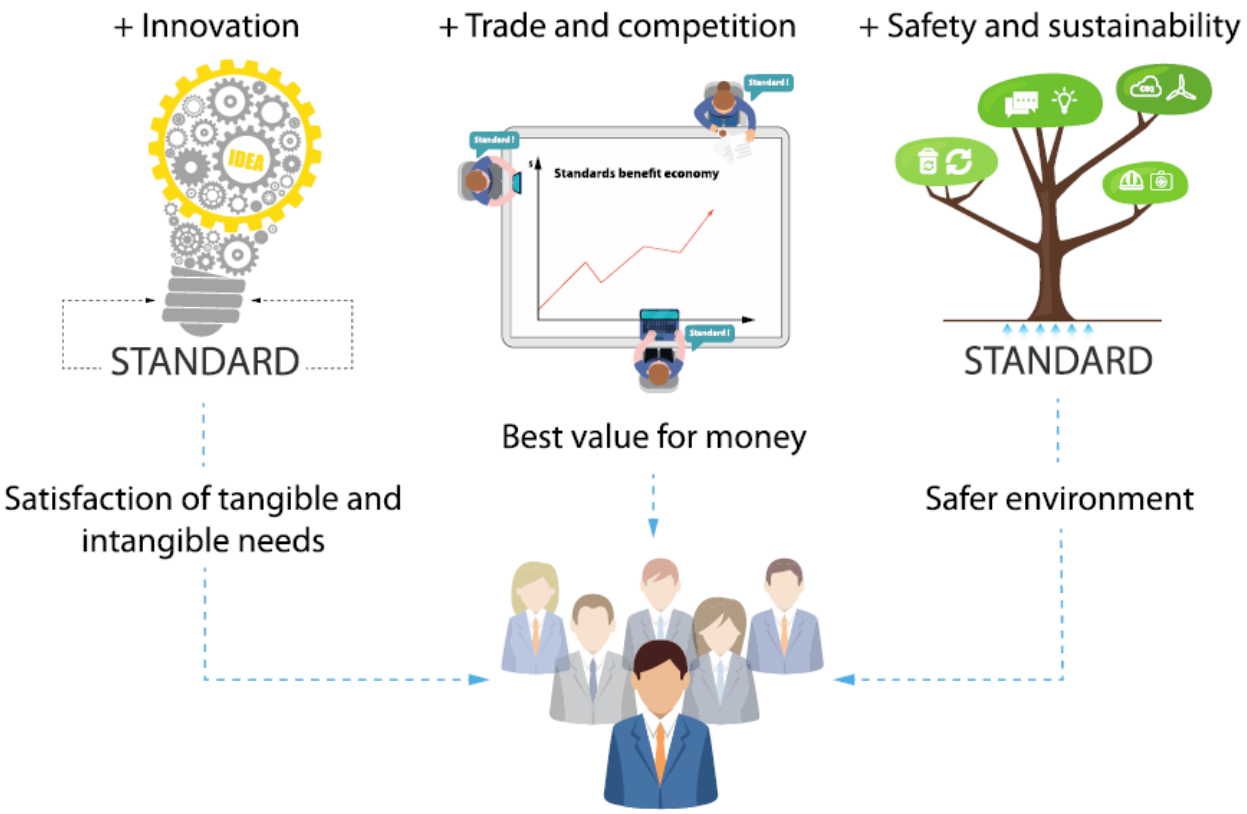
Knowledge, Competence, Performance & Practice

- Another example, when we are using Personal Computer.

Source: ETSI.org

Knowledge, Competence, Performance & Practice

- Benefit of standards:



Source: ETSI.org

Knowledge, Competence, Performance & Practice

- So, the principal goal of professional practice:
  - To acquire the right people and skills
  - Measure progress
  - Deliver results on time and to budget
  - To meet expectations
  - Importantly to adhere to:
    - standards,
    - regulations and
    - codes of ethics
- Professional practices are embedded in different projects which require proper management.

Practice Management & PM Defined

"Management is, above all, a practice where art, science, and craft meet."

Henry Mintzberg

[Simply Managing: What Managers Do and Can Do Better (2013)]

- Practice Management is about how an engineer or computing professional should manage a firm.
- It requires an understanding of different types of business structures;
  - Laws, regulations, and ethics surrounding professional practice;
  - Financial issues and responsibilities;
  - and other related aspects of a firm that must be in place before a client contract is signed.
- The main goal is to protect the public`s health, safety, and welfare.

Practice Management & PM Defined

- PM, on the other hand is all about how to manage a project.
- A project is a planned temporary venture that consists of tasks to be executed over a fixed period and within a certain scope, budget, quality, timescale, deliverables, and limitations.
- The process focuses on establishing and delivering on:
  - Contract requirements
  - Project teams
  - Client
  - Fees
  - Schedule
  - Risk management
  - Effective communication skills
  - Quality control throughout the project

Practice Management & PM Defined

- The different between practice management and PM is the point at which a contract is signed and a project begins.

- PM covers the execution of all contracts, including owner-engineer agreements, engineer-consultant agreements, owner-consultant agreements and others.

Professional in Entrepreneurship

- Computing professionals should have all the skills necessary to be successful entrepreneurs.
- The technical skill and innovation required
  - To convert innovative ideas into reality for common use.
- An entrepreneurially mind
  - To place product benefits before design features and leverage technology to fill unmet customer needs

Professional in Entrepreneurship

Purpose of entrepreneurial mindset:

"To design value-added products and processes that create demand through innovation, resulting in positive revenue and regenerative profits for the enterprise producing the product"

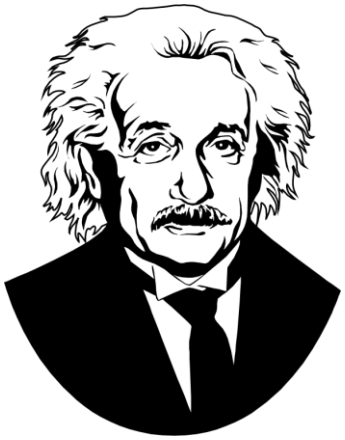
(Kriewall and Mekemson, 2010)

Professional in Entrepreneurship

- The entrepreneurial professional should have the ability to transform information into knowledge.
  - Understand basics to quickly assess what needs to be done
  - Can acquire the tools needed
  - Use the tool proficiently
  - Work with anybody, anywhere
  - Communication skills
  - Team skills
  - Understanding global and current issues to work effectively with other people

Route to professional practice

"I never teach my pupils, I only attempt to provide the conditions in which they can learn"



Albert Einstein

Route to professional practice

- A key objectives:
  - Provide tools necessary to begin the professional practice journey
  - Systematic synthesis, design process and management projects
  - Ethical conduct, professional accountability and effective communication skills in professional domains

Route to professional practice

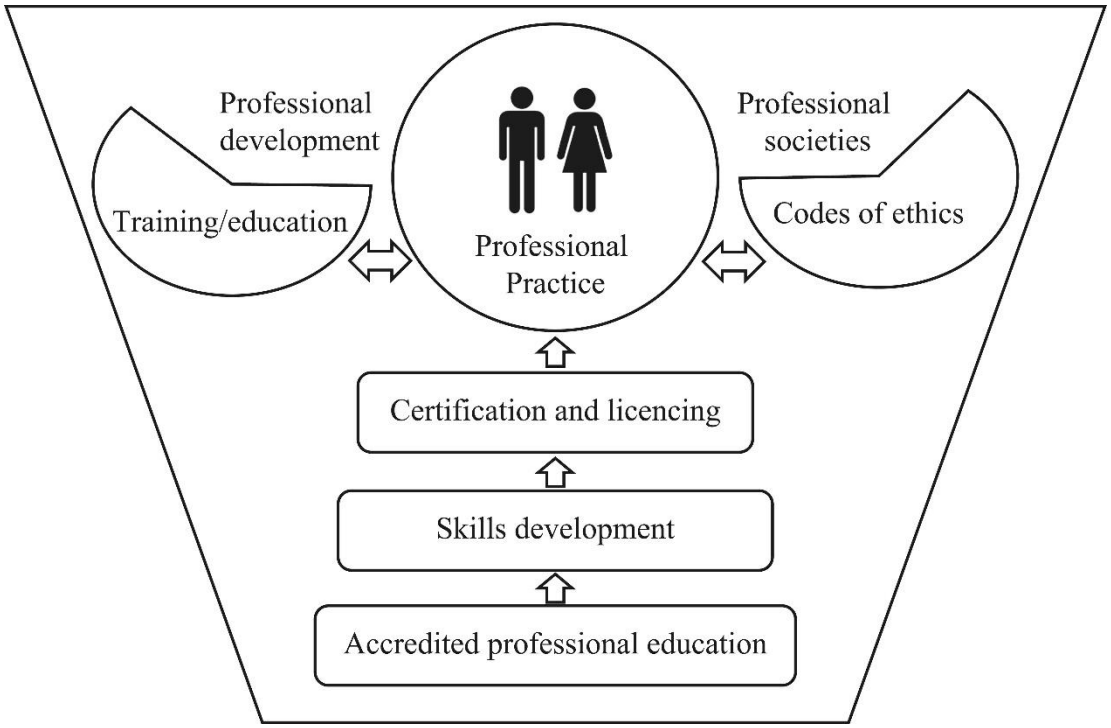


Figure 2. The route to professionalism

Methodologies for Professional Practice

- The research graduates vs the practice-oriented graduates
- Be participative
- Learn by doing
- Space and resources
- Actual whole problem has no right answer
- Reflection

Methodologies for Professional Practice

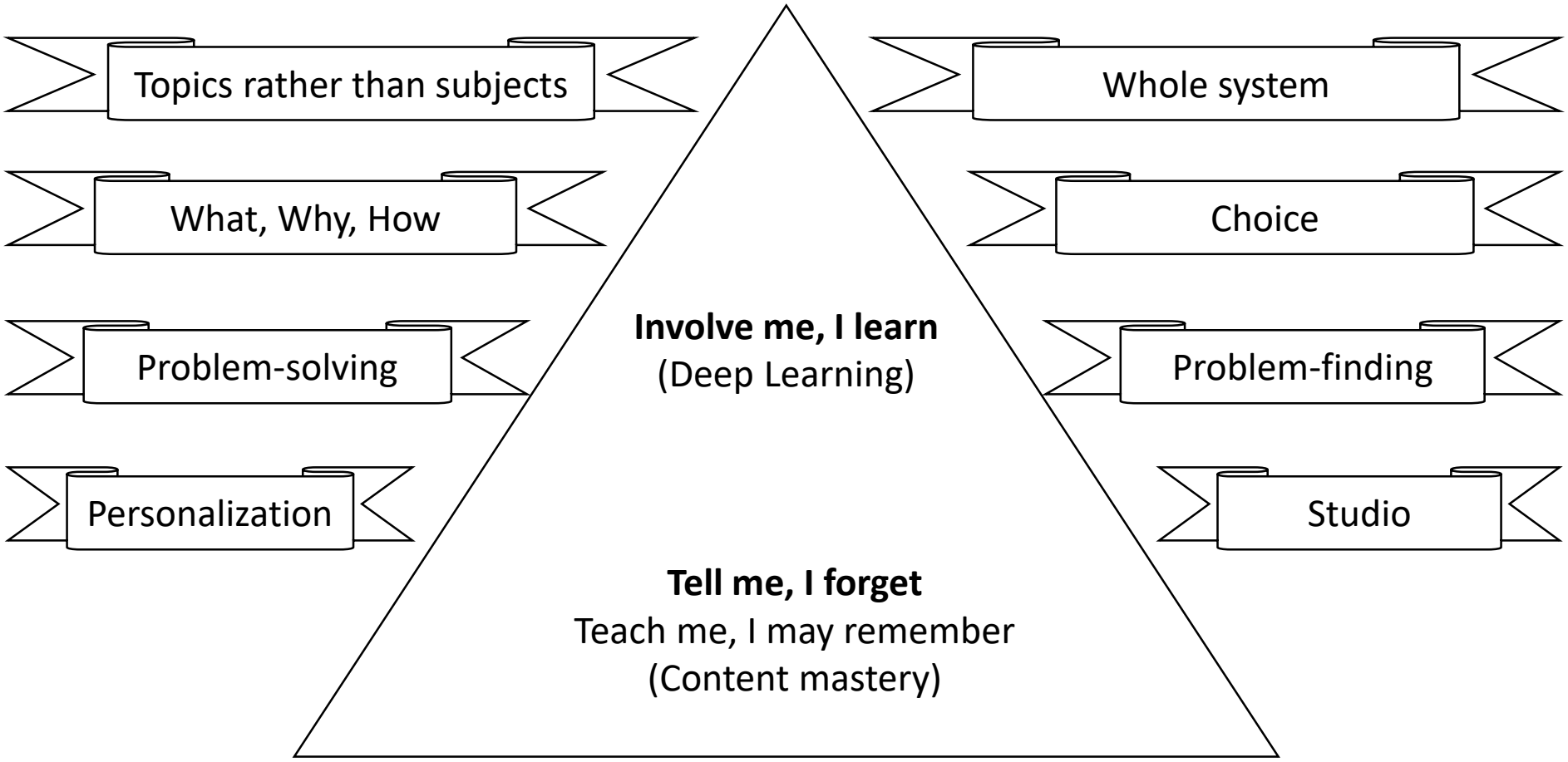


Figure 3. Integration of methodologies for professional practice

Summaries

- What is professional practice?
- Differentiate between knowledge, competence, performance and practice in the design of professional activities
- How does one become professional?
- What distinguishes computing professionals from other professionals?
- What are the principal goal of the professional practice?

Assessment Item 2

- Students will prepare an important document that is required in the professional practice environment.
- For this semester; students will prepare an IP application for software product
- Instructions and requirements will be released in week 3.
- Due date in Week 8.

Assessment Item 3

- Students will prepare an important document that is required in the professional practice environment.
- For this semester; students will write ethics considerations for a research.
- Instructions and requirements will be released in week 5.
- Due date in Week 10.

Assessment Item 4

- Students in groups will conduct research on certain topics in the area of IT professional practices and present their findings to the class.
- Topic of the research will be informed later.
- Instructions and requirements will be released in week 6.
- Report dues in Week 11
- Presentation in Week 11 & 12.

Next Week

- Professionalism and approaches to professional practice
- Combination moral, ethics and law
- Evolution of moral and ethics
- Computing professionals
- Professional Codes of conduct
- Social Impacts of ICT
- Cultural Considerations in ICT
- Understanding and Applying Cultural Standards
- Managing workforce culture
- Key cultural issues impacting e-inclusion.

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