

# Occupation and Learning Process

WEEK 3 - Occupation Standards and Competencies

University: Rwanda Polytechnic - Tumba College

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# Warm up

- In 3 minutes, make pairs as you sit and discuss on Occupation Standards and why they must be linked with Competencies.
  - Do you recall the word Competency and Competence. Discuss in pair and let us share in 2 minutes with the entire class.
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# Objectives

At the end of this session, students will be able to:

1. Understand and explain the competence concept and terminologies
  2. Understand the Occupation Standards and profile
  3. Locate the competencies related to the sector of technical Services
  4. Understand mapping
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# Rationale

- This session provides Learners with a clear understanding of competence-based education by exploring key concepts and terminologies, particularly within Rwanda's higher learning context.
  - It introduces occupational standards as benchmarks for professional performance, aligned with the Rwanda Qualifications Framework (RQF), ensuring academic programs meet labour market demands.
  - Learners will identify core and general competencies relevant to technical service sector and understand how they are embedded in curriculum design.
  - Finally, the session explains mapping as a strategic process aligning occupational standards with competencies and learning outcomes, enhancing curriculum coherence, graduate employability, and quality assurance across institutions.
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# 1. Competence and related terms

- **Competence** is conceptualized as: Description of work task or job outputs, the possession and application of knowledge, skills and right attitudes to perform work activities to the standards expected in the workplace, a person's ability or skills and knowledge that he possesses, ability to achieve a task.
  - Competence/ competences are broad capacities, the ability to do the required things to the required standard. (What is Competence? A Shared Interpretation of Competence to Support Teaching, Learning and Assessment, Cambridge University Press & Assessment, Cambridge Assessment, 2021.)
  - Though both having similar meanings, competence and competency are used in different contexts.
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# 1. Competence and related terms cont'd

- Competency is conceptualized as: Description of behaviour, description of performance of a task in an industry with its elements such as knowledge, skills and attitudes, description of how things must be done and at what level.
  - Competency/ competencies are narrower, more atomistic concept used to label abilities or episodes. (Competence and Competency – What Is the Difference?, Centranum Performance Management Systems, Centranum Ltd., 2023.)
  - Competence is a state of the successful achievement of one or more competencies.
  - A competence continuum can contain a competent/non -competent boundary, as well as levels of learning towards and beyond that initial level of competence.
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# 1. Competence and related terms cont'd

- Competences/Competencies are classified as: Specific, General and Complementary. Specific and general are also called core competences/ies.
- Competence being the ability to integrate and apply contextually-appropriate knowledge, skills and psychosocial factors (e.g., beliefs, attitudes, values and motivations) to consistently perform successfully within a specified domain; it means that having the knowledge or skill is not enough but being able to apply it effectively in the real world, consistently and appropriately in each context.

(What is Competence? A Shared Interpretation of Competence to Support Teaching, Learning and Assessment, Cambridge Assessment, Cambridge University Press & Assessment, 2021, Page 5.)

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# 1. Competence and related terms cont'd

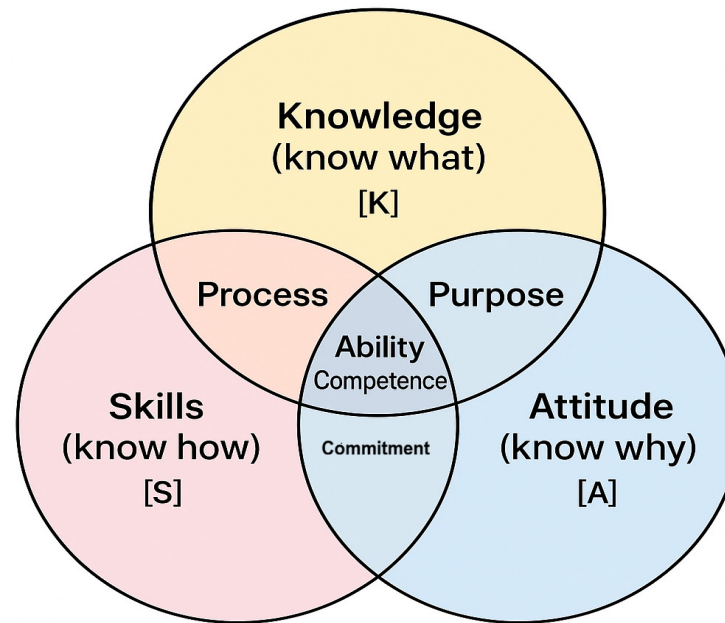
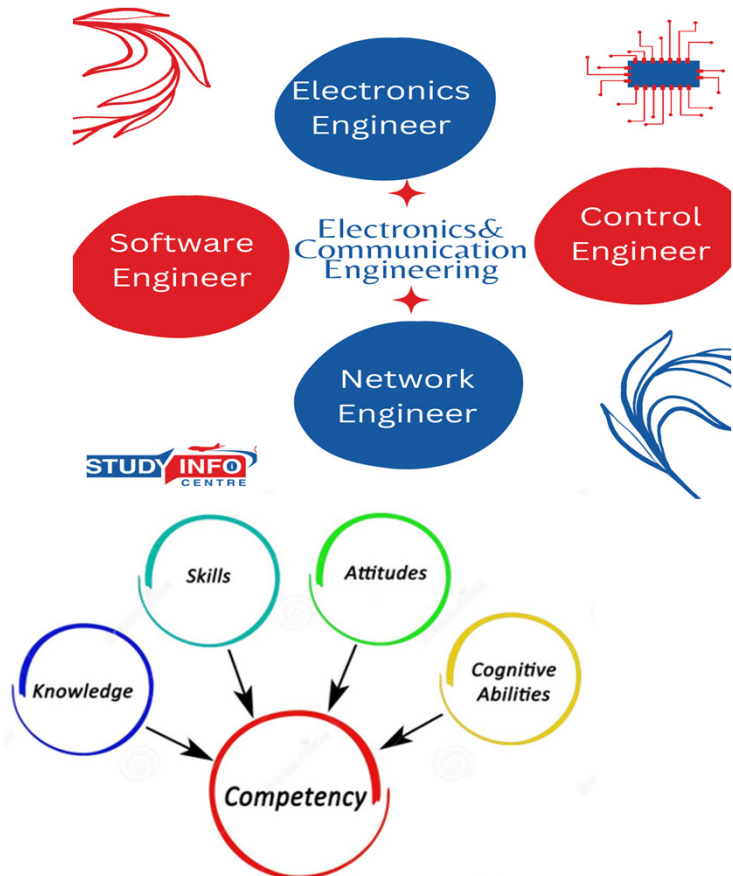
- Knowledge: The information, theory, or experience that underpins a particular role, industry, field of study or work, which is comprised of facts, concepts, practices and theories.
  - Skills: The practical, learned ability to perform a specific task or solve a problem. Also, actions (e.g., physical, cognitive), which involve applying knowledge that may be tacit or explicit.
  - Abilities: The latent capacity to learn and perform, often inherent.
  - Aptitudes: Inherent qualities or traits that describe and define an individual.
  - Attitude/Personal Traits: The psychological factors, values, and behaviours that affect performance and learning. Also, coherent patterns of tendencies about something or someone that shapes behaviour.
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# 1. Competence and related terms cont'd

- Performance: The actual demonstration of competence in a work or job setting.
  - Demonstrated Competence: Competence that is shown through actual performance or evidence of tasks being completed correctly.
  - Context refers to the specific situations, environment, domain, tasks and settings in which the competence is used.
  - Domain refers to the broad area of study, thought or activity that the competence is part of such as a broad area of knowledge, academic discipline, occupation or social life.
  - Beliefs are assertions that an individual accepts as true and holds with confidence and conviction. (What is Competence? A Shared Interpretation of Competence to Support Teaching, Learning and Assessment, Cambridge Assessment, Cambridge University Press & Assessment, 2021, Page 11-12.)
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# 1. Competence and related terms cont'd

(Job Profiles Available After Electronics and Communication Engineering, Study Info Centre Editorial Team, Study Info Centre, 2023.)



(What Is Control Competency?, Dreamstime Editorial Team, Dreamstime.com, 2023.)

## 2. Occupation Standards

- Occupation standard is the competences that a person must possess to be able to perform and be productive in the world of work.
- It is composed of units of competence that define a particular scope of work resulting in a product, service or decision. It is developed by industry experts or practitioners who are in the industry for so many years.
- Its major components are information about the work and the worker such as, what workers should be able to do on job like work function and each activity per work function as well as performance indicators associated to tasks and roles in certain occupation, the KSA an individual needs to perform the work described by each work function along with the key activities and performance indicators.

(Developing Occupational Standards: A Manual for TVET Practitioners, International Labour Organization (ILO), ILO Publications, 2015, pp. 12–15.)

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## 2. Occupation Standards cont'd

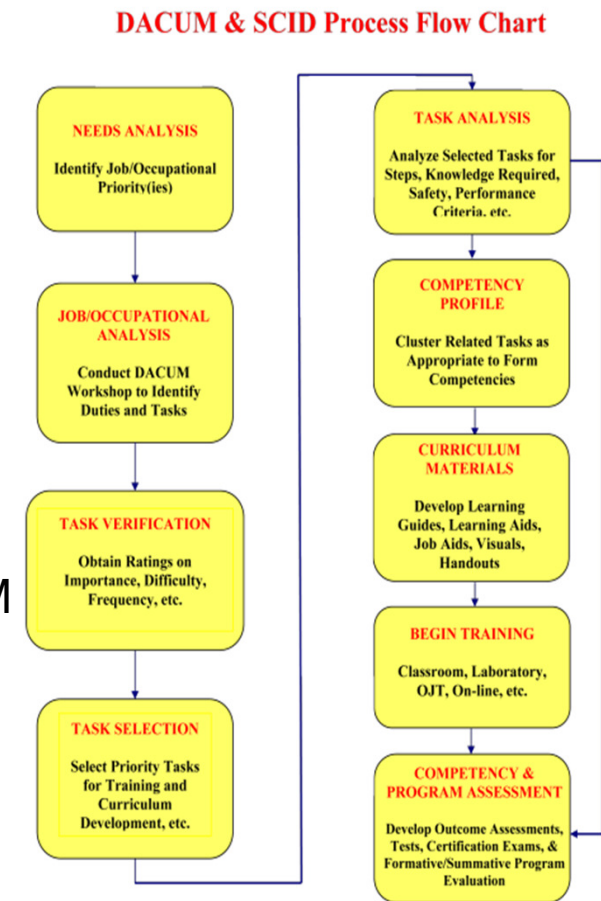
- These are related to factors such employability skills, attitudes and knowledge with broadly applicable competences such as working in team, work planning, quality application as well as technical skills, attitudes and knowledge competences that tend to be specific to an industry concentration such as working process, materials, use of tools and equipment, etc.
  - Occupational Standards are related with the training Standards as the work performed at the workplace and the training that a person needs to take to perform the work respectively: World of employment and World of education.
  - Occupational Standards are related with the Curriculum as competences to be achieved during training and are described in curriculum with their materials needed (resources and assessment) to be studied up to the certification.
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## 2. Occupation Standards cont'd

- **Occupation description:** An Electronics and Telecommunication Technologist is a person responsible for firmware development and maintenance, repair electronics equipment or systems to ensure proper functioning, replace defective components or parts, using hand tools and precision instruments in Power Control System, Hardware, Telecommunication systems and other related activities in various places such as Homes, Industries, Telecommunication companies, Banks, Schools, Hospitals, Supermarkets, performing a range of tasks related to business services alone or with others under supervision.
  - DACUM is a process of Curriculum Development defined as Develop A Curriculum.
  - CBE emphasizes outcomes: what learners can do in real-world settings. Similar with the Competency-Based Curriculum (CBC) used HLIs and TVET institutions of Rwanda. DACUM informs Job Title, related Duties and associated tasks per duty.
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## 2. Occupation Standards cont'd

- DACUM is a job analysis method that involves skilled workers identifying tasks, duties, and required competencies. It is an approach to develop occupational standards, which feed directly into curriculum design.
- SCID builds on DACUM by translating job analysis into structured curriculum components; modules, assessments, and instructional materials. Rwanda's TVET and HLIs apply SCID principles when developing programs aligned with the Rwanda Qualifications Framework (RQF). (Competency-Based Education (CBE), DACUM and SCID: A Comparison of Processes and Outcomes, Norton, Robert E., UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training, 2000, pp. 1–12.)



## 2. Occupation Standards cont'd

- Possible jobs related to the qualification of Electronics and Telecommunication

Technologist described by the experts/skilled workers in the DACUM chart:

- ✓ Traffic Light Technician
  - ✓ Circuit Board Technician
  - ✓ Electronic Cash Processing Machine Technician
  - ✓ Electronic Hardware Technologist
  - ✓ Power Control System Technologist
  - ✓ Electronic Firmware Technologist
  - ✓ Security System Technologist
  - ✓ Electronics Maintenance Technician
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## 2. Occupation Standards cont'd

- ✓ Telecom Lab Technician
  - ✓ Radio Operator
  - ✓ TV and Sound Operator
  - ✓ Industrial Automation Technologist
  - ✓ IoT Technologist
  - ✓ Radio Access Network Technologist
  - ✓ Networking Technologist
  - ✓ Radar and Navigation Aids Technologist
  - ✓ Fiber Optics Technologist
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# 3. Competencies

- The information about competencies should be clearly provided in the curriculum document to guide developers provide specific content related to the competencies in line with the Performance indicators.
  - Core Competencies are essential, foundational skills, knowledge, and attitudes an individual, team, or organization must possess to perform effectively. They represent the primary strengths or capabilities that central to success in each role or field.
  - They are fundamental and non-negotiable as tasks cannot be completed effectively without them.
  - They are directly linked to mission or core functions, transferable as often applied across various roles or contexts and serve as the basis for performance standards in education, training, or organizational strategy.
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### 3. Competencies cont'd

- Complementary competencies are additional, supportive capabilities that enhance performance of core competencies by adding value and improving efficiency, innovation, or collaboration, but they are not the essential minimum required for success.
  - Supportive and specialized due to strengthening core competencies but cannot replace them, they provide competitive advantage by differentiating individuals or organizations, often context-specific or tailored to a particular project, industry, or role as they facilitate adaptability in dynamic environments.
  - Core competencies form the foundation, while complementary competencies build upon and enhance that foundation.
  - Both present, individuals become more adaptive, innovative, and competitive.
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## 3. 1. Complementary competencies

- Complementary competencies at Level Six (L6 Y1&Y2).

1	CCMHE601	▲ Develop Effective Occupational Health and Safety Programs	3
2	CCMEN601	▲ Communicate using pre-Advanced English at the Workplace	3
3	CCMOL601	▲ Describe the Occupation and Learning Process	3
4	CCMDS601	▲ Utiliser le Français Élémentaire dans le Métier	5
5	CCMPE601	▲ Apply Professional Ethics	3
6	CCMTM601	▲ Manage Team	3
7	CCMKN601	▲ Gukoresha Ikinyarwanda cy'Umukangurambaga	5
8	CCMCS601	▲ Apply Advanced Computer Skills	5
9	CCMMB501	▲ Manage Business	5
10	CCMRM601	▲ Develop a Research Proposal	6

- The figure is a screenshot taken from the curriculum of Level Six. © Rwanda Polytechnic (RP) 2020.

## 3. 1. Complementary competencies cont'd

- Complementary competencies at Level seven (L7 or Y3).

1	CCMEN701	▲ Apply Workplace Environmental Management	3
2	CCMEN701	▲ Apply Advanced English at Workplace	3
3	CCMEN701	▲ Utilise Français intermediaire dans le metier	3
4	CCMEM701	▲ Kutumia Kiswahili wastani kazini	3
5	CCMMB701	▲ Apply Business Monitoring, Evaluation and Auditing	3
6	CCMRM701	▲ Apply research methodology	3

- The figure is a screenshot taken from the curriculum of Level Seven. © Rwanda Polytechnic, 2020.

## 3. 2. Core competencies

- Core competencies are composed of General and Specific competencies. The following figure illustrates competencies at Level Six (L6 Y1&Y2).

	No	Code	Core competencies	Credit
GENERAL	1.	ETTEP601	▲ Apply Physics Fundamentals	8
	2.	GENFM601	▲ Apply Fundamental of Engineering Mathematics	8
	3.	ETTTD601	▲ Apply Technical Drawing	5
	4.	ETTCD601	▲ Apply Electronic Computer Aided design	8
	5.	ETTCC601	▲ Apply Data Structure and Algorithm using C	8
	6.	PHYEW601	▲ Apply Engineering Electromagnetism and Wave Optics	10
	7.	GENAM601	▲ Apply Advanced Engineering Mathematics	9
	8.	ETTFT601	▲ Apply Fundamental of Telecommunication	12
	9.	ETTMM601	▲ Apply Microprocessor and Microcontroller	8
	10.	ETTDE601	▲ Apply Basic of Digital Electronics	6
	11.	ETTFE601	▲ Apply Fundamentals of Electronics	8

- The figure is a screenshot taken from the curriculum of Level Six. © Rwanda Polytechnic (RP) 2020.

## 3. 2. Core competencies cont'd

- Core competencies are composed of General and Specific competencies. The following figure illustrates competencies at Level Six (L6 Y1&Y2).

12.	ETTEC601	▲	Apply Fundamentals of Electrical Circuits	8
13.	ETTPE601	▲	Apply Fundamentals of Power Electronics	8
14.	ETTES601	▲	Develop Firmware for Embedded Systems	10
15.	ETTEH601	▲	Develop Electronics Hardware Product	12
16.	ETTRT601	▲	Operate Radio &TV Broadcasting	10
17.	ETTB601	▲	Operate Broadcasting Towers	8
18.	ETTCT601	▲	Maintain Cell phone System and TV Receiver	12
19.	ETTSS601	▲	Install and Maintain Security System	12
20.	ETTMC601	▲	Maintain Computer System	8
21.	ETTAI601	▲	Integrate at Workplace Environment	30

- The figure is a screenshot taken from the curriculum of Level Six. © Rwanda Polytechnic (RP) 2020.

## 3. 2. Core competencies cont'd

- Core competencies are composed of General and Specific competencies. The following figure illustrates competencies at Level Seven (L7 or Y3).

	No	code	Core competencies	Credit
	1.	ETTEP701	▲ Perform final year project	20
	2.	ETTIA701	▲ Conduct Industrial Attachment Program (IAP)	30
SPECIFIC	3.	ETTIA701	▲ Apply Industrial Automation Technics	10
	4.	ETTIT701	▲ Develop IoT Systems	12
	5.	ETTRT701	▲ Install RAN and Transmission Equipment	8
	6.	ETTRN701	▲ Operate Radar and Navigation Aids	8
	7.	ETTCN701	▲ Apply Computer Networking	10
	8.	ETTFN701	▲ Install fibber optic network	8

- The figure is a screenshot taken from the curriculum of Level Seven. © Rwanda Polytechnic, 2020.

## 3. 3. Competencies at BTech Level, L8/Y4

- Apply research methodology
  - Manage personal work priorities and professional development
  - Apply machine learning technology
  - Plan and optimize Telecommunication networks
  - Develop smart embedded systems
  - Apply signal processing techniques
  - Apply core network technologies and security
  - Manage Electronics and Telecommunication Technology project
  - Design and manufacture an electronic device
  - Conduct Capstone Project
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## 3. 4. Possible jobs at BTech Level, L8/Y4

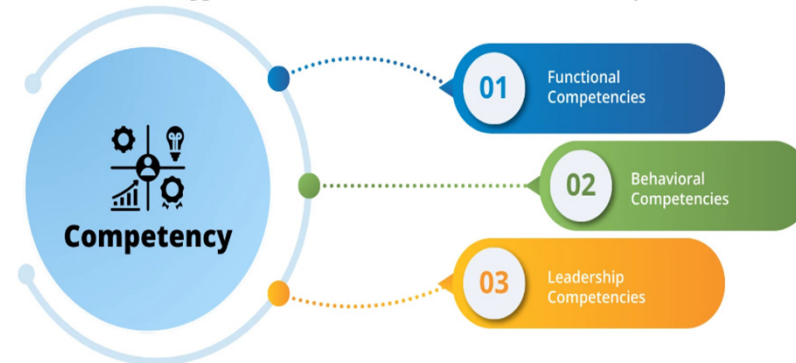
- Radio Transmission Engineer
  - Fiber Optic Transmission Engineer
  - Core Network Engineer
  - Base Station Subsystem Engineer
  - Internet Protocol Planning Engineer
  - Radio Access Network (RAN) Engineer
  - Electronics Engineer
  - Network Security System Officer
  - Network Planning and Optimization Engineer (NPO Engineer)
  - Quality Assurance Engineer
-

## 3. 4. Jobs at BTech Level, L8/Y4 cont'd

- Satellite Communication Engineer
  - Radar Surveillance and Communication Engineer
  - Embedded systems Engineer
  - Signal Processing Engineer
  - Electronic Hardware Engineer
  - Electronic firmware Engineer
  - IoT Engineer
  - Telecommunication Radio planner
  - Transmission planner
  - TV Engineer
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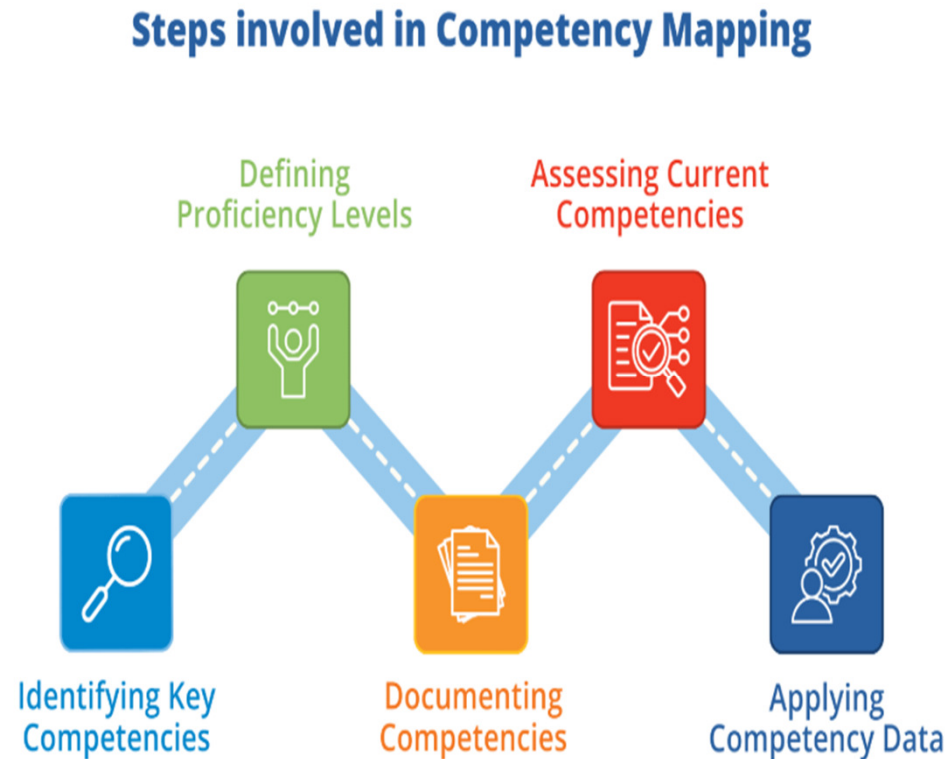
# 4. Mapping

- Competency mapping is a process that identifies the key competencies: skills, knowledge, abilities, and behaviours that are necessary for superior job performance.
- Competency mapping plays a central role in talent management by providing a clear understanding of the competencies required for individuals to excel in their roles. (Job of Work Analysis in Competency Mapping, CHRMP Editorial Team, Certified Human Resource Management Professional (CHRMP), 2023.)



## 4. Mapping cont'd

- Here, job analysis feeds into competency mapping and roles are broken into tasks, responsibilities, and required behaviours. Thus, job function links to specific KSA, which are then mapped to performance standards to ensure that workforce development aligns with actual job demands and organizational goals.



(Job of Work Analysis in Competency Mapping, CHRMP Editorial Team, Certified Human Resource Management Professional (CHRMP), 2023.)

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# 4. Mapping cont'd

## The Role of Work Analysis in Competency Mapping



Lays the Foundation for Competency Mapping



Aligns Skills to Real Job Needs



Supports Differentiated Performance



Guides Talent Decisions

## Methods of Conducting Work Analysis for Competency Mapping

Interviews with Job Incumbents and Supervisors

01



Direct Observation

03



Workshops and Focus Groups with Subject Matter Experts (SMEs)

05



02

Surveys and Questionnaires (e.g., PAQ)



04

Document Analysis



(Job of Work Analysis in Competency Mapping, CHRMP Editorial Team, Certified Human Resource Management Professional (CHRMP), 2023.)

# References

- What is Competence? A Shared Interpretation of Competence to Support Teaching, Learning and Assessment, Cambridge University Press & Assessment, Cambridge Assessment, 2021.
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# References cont'd

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