COMPETENCY BASED TRAINING:
VISIBLE AND INVISIBLE COMPETENCIES

Competency isn't only about what we can see. It's also about what we can't see. In this article, **Katrien Peeters** outlines the structure of competency and some implications for selection and training.

KEY POINTS

- Skills and knowledge are sometimes called visible or surface competencies. Skills may be cognitive or psychomotor. Knowledge may be explicit or tacit. Skills and knowledge are basically teachable.

- Attitudes are not directly visible but have a strong influence on someone's competence. They are more or less constant, or else change very slowly.

- This has implications for selection, training design, and assessment.

Over the last few decades, organisations have been confronted with continual changes in different domains such as technology, the social and cultural environment, and the economy. This has put increasing focus on continuous training and development, especially in knowledge-based industries. Investing in competency is a prerequisite to survive and achieve success.

Figure 1: The more and less visible aspects of competency

If you compare the amount and type of information presented to an air traffic controller today with even only 15 years ago, the difference is significant. Technology, procedures and route networks are expanding, resulting in different and more complex working methods, and with little margin for error.

"Competency-based training helps to bridge the gap between what is taught in training and what tasks will be performed 'on the job'."

According to ICAO, competence may be described as a person's ability to act in a self-organised manner and to be creative in situations not previously encountered. ICAO encourages the development of competency-based training for air traffic controllers. Competency-based training helps to bridge the gap between what is taught in training and what tasks will be performed 'on the job'.

As described in DOC 9868 PANS-TRNG, competency-based training makes use of a systematic approach whereby the air traffic controllers' competencies and their performance criteria are defined. Competencies are learned one by one and only when a competency or combination of competencies is mastered, the training will move on to the next learning block. If a student has been trained and masters all different competencies, he or she will be able to perform as an air traffic controller, and can be called a competent air traffic controller.

It is a student-centred training approach, focusing on what the trainee must be able to do after completing the training. Each component of a competency based training is designed, monitored and adjusted as deemed necessary, while bearing one thing in mind: the result. Training plans are therefore developed based on clearly defined learning results, including observable behaviour derived from an analysis of the learner's tasks. Personal judgement and subjectivity are minimised, creating a more positive learning environment.

But we must pay attention to the structure of competency. Some elements of competency are easy to see, and so are easier to train and assess or evaluate. Other elements are hard to see, but we must pay attention to them.

The visible: Skills and knowledge

Skills and knowledge are sometimes called visible or surface competencies. Skills are activities that are mastered well and are often teachable. A skill
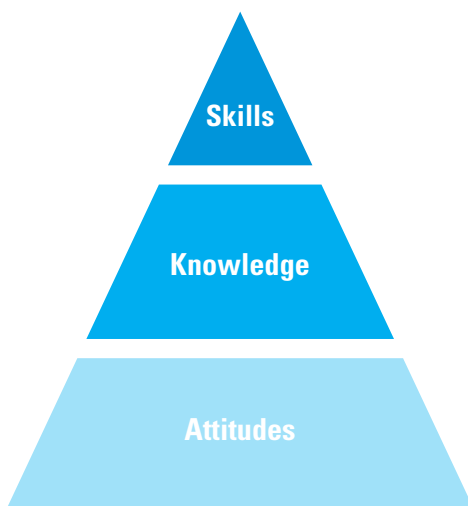
is the ability to do something well and may be acquired through the application of knowledge, practice and experience. Skills are developed over time and with practice. Often, complex tasks that are new to the controller are initially seen as cognitively demanding. However, as they become more practised, some of these cognitive processes become 'automatised' and so the skills require less effort to perform. In terms of ATC, this gives the controller the capability and the capacity to find solutions to more difficult situations.

Skills can be divided into cognitive and psychomotor skills. Cognitive skills are thinking skills that are needed to carry out any tasks from the simplest to the most complex. These skills have more to do with how we learn, remember, problem-solve and pay attention rather than the knowledge itself. Psychomotor skills are those that enable a person to make coordinated movements, perform manual tasks and carry out physical activities.

Knowledge on the other hand is information that is acquired through experience and/or education, and is also basically teachable. Knowledge could be divided into explicit and tacit knowledge. Explicit knowledge is formalised and codified and is sometimes referred to as 'know-what', e.g., ATCO rules and regulations. Tacit knowledge refers to knowledge that is largely experience-based and is sometimes referred to as the 'know-how', e.g., making an efficient sequence.

Katrien Peeters has worked in the operational environment as assistant, TWR and ACC controller at Brussels Airport and Canac. During her work as deputy flow manager she came into contact with the training environment as a theoretical instructor. Until recently, Katrien worked as Training and Human Performance Manager at Belgocontrol. She will shortly take up a position within the EUROCONTROL Maastricht unit training team.
katrien.peeters@eurocontrol.int
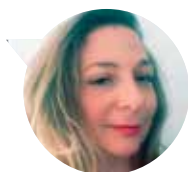
The invisible: Attitudes

Attitude is the state of mind of a person towards different issues. It describes a person's predisposition such as values, tendencies or orientation. Attitudes are not directly visible but have a strong influence on someone's competence. They are more or less constant, or else change very slowly.

For ATCOs, attitudes towards issues such as safety, adherence to regulations, working with others and responsibility is a significant factor in the achievement of competence and the safety of air traffic.

Implications for selection and training

This structure of human competence must be kept in mind when starting to think about developing training and certainly also during the selection procedure.

Ensure that attitudes are covered by the selection procedure

Since attitudes are more difficult to change and develop, candidates with the required attitude and personality traits must be identified during the selection process. This will affect the success rate and cost-efficiency. Candidates must have the ability to study the relevant theory and develop the associated practical skills. But the invisible part must be adequate in order to start training.

Training design must integrate skills, knowledge and attitudes

Training must be designed in such a way that those three levels of learning and development are covered. ICAO states:

"Although individual tasks can be broken down into a list of observable performance criteria, competence is only achieved when the controller successfully integrates the skills, knowledge and attitude required into an overall performance." (ICAO 2014)

Use pre-tests

On some occasions it can be a great help to measure the present level of knowledge or skills from trainees by using a pre-test. The results help you define where to focus in the training.

Use learning blocks to build training

By dividing the practical training into learning blocks with relevant tasks and milestones, skills with a strong foundation will be built. The risk of having gaps in the training is reduced when describing overall objectives, specific objectives and its associated performance criteria in advance.

Be transparent about the training trajectory

Transparency about the training trajectory and the student's learning curve will enable the student to be more prepared before a training session, boosting his/her motivation.

Focus on expecting the unexpected

Trainees must be able to perform in a safe and adequate manner as well when confronted with unfamiliar situations. They must be able to use their competencies and common sense at all times, and not freeze when an unexpected situation arises.
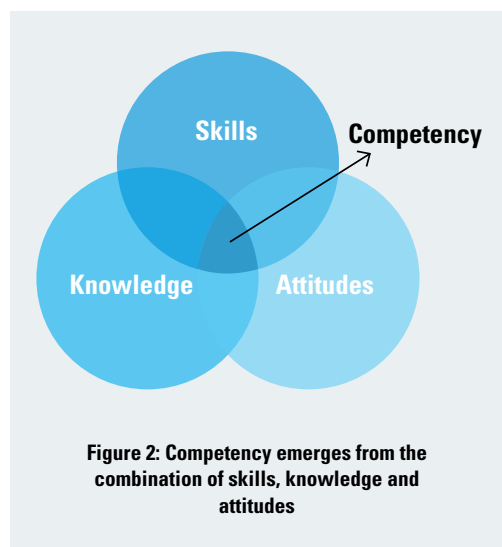

Figure 2: Competency emerges from the combination of skills, knowledge and attitudes

As ICAO stipulates:
"Competency includes the ability of a person to formulate solutions for complex and/or difficult situations, including those situations that they are experiencing for the first time. For the air traffic controllers, they need to be able to deal with these situations effectively and at the same time ensure that it is done in a safe and secure manner." (ICAO 2014)