

COMPETENCY STANDARDS - A MEASURE OF THE QUALITY OF A WORKFORCE

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ABSTRACT:

Competency Standards are increasingly being used by professions and governments to define the qualifications required for professionals to practise in a discipline. They define a range of levels of competency and the capabilities that are assumed to be achieved at these levels. Competency is the ability to apply knowledge and skills to produce a required outcome. It is the ability to perform activities within an occupation; to function as expected for employment; and the ability to do a job under a variety of conditions, including the ability to cope with contingencies. The paper will refer to cases in several countries in the fields of surveying/geomatics and spatial information systems experts, to demonstrate the rationale for developing competency standards and the procedures for their development.

1. INTRODUCTION

Competency Standards are used by professions and governments to define the qualifications required for professionals to practise in a profession or discipline. They are usually listed at different levels according to the capabilities of the individual and are defined independently of the education standards, the assumption being that a combination of education and experience will enable professional to progress through the various levels of competency. Competency standards provide recognition that a person has demonstrated professional excellence and continues to maintain the high standards of his/her profession. They assist employers to satisfy themselves that a candidate for employment is suitably qualified. As well as gaining the qualification, professionals are usually required to continue to maintain or improve their level of competency by undertaking approved continuing profession development.

Competency is the ability to apply knowledge and skills to produce a required outcome. It is the ability to perform activities within an occupation; to function as expected for employment; and the ability to do a job under a variety of conditions, including the ability to cope with contingencies. Competency cannot be directly observed and hence it has to be inferred from indirect evidence and hence is performance based. Competency is defined by a set of standards, which define the level of attainment at various levels. The benefits of competency standards are that they can test the effectiveness of training, improve recruitment, identify training gaps, lead to improved efficiency, productivity, worker safety and employee retention.

The paper will give the rationale and processes for development of competency standards and give some examples of these standards, the routes to competency in several English speaking countries for the fields of surveying/geomatics, photogrammetry and remote sensing, and spatial information systems experts.

2. EDUCATION AND TRAINING

It is well established that universities are responsible for education, which is the development of knowledge. Education has long term aims, by providing essential background knowledge in such topics as the sciences, engineering, fundamentals of adjustments of observations, and computing, and in some cases, the humanities. Universities also provide some level of skills training, but in most cases, these skills will become out-of-date within a relatively short time period. Examples of such skills are instrument use and software operations which must be taught to students to enable them to function in their profession when their education has been completed, but due to the development of technologies, will become obsolete in a short time. Vocational training institutions will devote more time to skills training or skills formation and less time on the provision of background knowledge. Skills development has shorter term aims than education. The proof of the adequacy and effectiveness of education and training systems are the competency of the graduates when they enter the profession. However, since education has long term aims, the proof of the efficiency of education will be whether the graduate can adapt to new technologies over several decades while he/she is employed in the workforce.

3. COMPETENCY

Competency is expected to develop from the three components over an employee's lifetime, comprising education, training and experience. Certifying a certain level of competency is separate from what is described variously in different countries as legal registration or licensure, which is legally enforceable registration of an individual by a regional jurisdiction, aimed at protecting the community against incompetent or fraudulent operations by individuals without adequate qualifications. There are many examples of legal registration of licensure throughout the world. Certification of competency is undertaken by an individual for official recognition by one's colleagues and peers that he/she has demonstrated professional integrity and competence in their field. Employees will bring to

their employment, their basic education and skills, but their 'competency' will be based on their education and the experiences that they gain from working within the profession. Competency is developed from on-the-job training, based on an exposure to a range of activities that test the employees' ability to cope with a variety of different situations. Such experience improves an employee's ability to handle new problems and situations. As employees gain experiences, their ability to cope with unusual circumstances improves and therefore they reach a higher level of competency. Developing competency is typically based on a prescribed level of training.

Competency based training is designed to help people achieve the required outcomes, whatever the particular task the individual is requested to undertake. Such training is intended to avoid theoretical training and concentrate on skills formation, so that once the training is completed the graduates have the necessary skills to do the work required of them. The training must therefore be based on a set of competency standards

4. COMPETENCY STANDARDS

The measurement of competency comprises individual units of competency, which cover a broad area of work that can logically stand-alone. They are detailed documents that specify the functions performed by an enterprise or industry at certain levels or 'units', and are written in a special format that can be used to assess/determine outcomes

4.1 A Unit of Competency

A unit of competency can be described by its function or purpose. The steps that have to be performed to achieve an outcome and the means of demonstrating that it has been performed satisfactorily should be described, as well as the conditions under which the function will be performed. The description will also include knowledge and skills that a person needs to perform the task and the means of assessing whether a person can perform the task.

4.2 Benefits of Competency Standards

Competency standards can test the effectiveness of training, improve recruitment, identify training gaps which should lead to improved efficiency, productivity, worker safety and employee retention. As well, they can be used to develop enterprise practices and procedures, for performance management, and quality management system for licensing purposes. Training packages may replace formal education and training systems in certain circumstances.

4.3 Levels or Stages of Competency

A number of professional organizations prescribe competency in terms of several levels or stages. The advantages of having such levels is that a professional can progress from the initial level of achievement soon after graduation to senior positions in employment, where he/she would undertake management and supervisory roles and have had experience in a broad range of activities in his/her professional life. Paths from one level to the next should also be developed. These will normally involve the types of documented supervised experience, the range of continuing professional development, and agreement to abide by the code of ethics.

5. EXAMPLES OF COMPETENCY STANDARDS

Competency standards have been established in a number of English speaking countries, including United Kingdom, USA, Canada and Australia. The requirements of these standards vary according to the conditions set by the relevant organization. Competency may be compulsory or voluntary, while the continuation of an individual's recognition of competency may require regular attendance at conferences, courses or training programs, referred to as continuing professional development (CPD).

5.1 United Kingdom

The Royal Institute of Chartered Surveyors in UK has extensive documentation on competency for chartered and technician levels of competency, covering many pathways within the general area of geomatics, including remote sensing and photogrammetry, mapping and spatial data capture and presentation. Competencies are defined at three levels of attainment:

Level 1 – knowledge and understanding

Level 2 – application of knowledge and understanding

Level 3 – reasoned advice and depth of technical knowledge.

As well, there are three categories of competencies:

Mandatory competencies – the personal, interpersonal, professional practice and business competencies common to all pathways and compulsory for all candidates.

Core competencies – the primary competencies of the chosen pathway of the professional.

Optional competencies – a set of competencies selected by the candidate from a list defined for the particular pathway.

The documents also describe the knowledge and skills required of each level. For example, in remote sensing and photogrammetry, the following are listed

Level 1 Demonstrate knowledge and understanding of the principles of remote sensing and photogrammetry (both aerial and terrestrial).

Level 2 Apply the professional's knowledge and be aware of scales, camera and satellite principles and different data capture techniques. Understand and undertake procedures for routine data capture, and analyse and/or adjust/transform data. Use standard industry software.

Level 3 Provide evidence of fit-for-purpose advice on client requirements. Identify and assess client specifications. Use advanced industry software and advise on data transfer and/or format.

Each of these levels is described in further detail. All candidates, on all routes and all pathways, must achieve the defined level of the mandatory competencies. These competencies are a mix of the professional practice, interpersonal, business and management skills that are considered common to, and necessary for all chartered and technical surveyors. The processes are defined in the documentation. Candidates are informed that they must reach the required level in a logical progression and in successive stages.

Each professional is expected to plan and achieve professional development, comprising a minimum of 48 hours' professional development for each 12 months' structured training.

5.2 USA

The American Society for Photogrammetry and Remote Sensing (ASPRS) provides certification for three areas, namely Certified Photogrammetrist (ASPRS), Certified Mapping Scientist, Remote Sensing (ASPRS) and Certified Mapping Scientist, GIS/LIS (ASPRS). The certification is based on the number of year's experience, credit for some of which can be obtained from formal university courses. As well, the ASPRS requires recertification every 5 years, based on evidence of activities that demonstrate the individual's continued involvement in the industry and has attended conferences, courses etc to maintain his/her level of competence.

5.3 Canada

The Canadian Remote Sensing Society has developed a program for certification of Remote Sensing Scientists and Mapping Scientists in photogrammetry or GIS. This certification is similar to the process described previously for ASPRS, including recertification.

5.4 Australia

Competency standards are defined for a large number of occupations throughout Australia and can be searched through the National Training Information Service (NTIS). As well, many professions in Australia have developed procedures for assessing competence, such as The Institution of Engineers Australia (IEAust), the Institution of Surveyors (ISA) and the Spatial Sciences Institute.

Institution of Engineers Australia The IEAust has a two stage system of competency, Stage 1 being the graduate level and for stage 2, the competency embodies both practice competencies relevant to a field of engineering and an occupational category. Persons who are Stage 2 competent are 'practice-experienced' and are capable of working autonomously under general direction in normal operating environments. Articulation from stage 1 to stage 2 requires furtherance of both knowledge and experience. The decisions are based on individual interviews by qualified engineers who have had a wealth of experience in the field of the applicant. Recently this process has undergone a quality assurance process to ensure that it satisfies the required standards.

Spatial Sciences Institute Australia The recent formation of the Spatial Sciences Institute (SSI) covering the spatial sciences in Australia including remote sensing and photogrammetry, has also led to the establishment of its certification process. There is a requirement for 10 years equivalent work experience, credit for a large part of which can be reduced by prior formal

education. To remain certified, a professional must undertake regular continuing professional development, comprising an average of 20 points per annum over a 4 year period. This is equivalent to an average of approximately 6-7 days in professional development activities each year.

6. CONCLUSIONS

In many English speaking countries, professionals in the spatial information industry are encouraged to gain certification to demonstrate their competency in their chosen profession. While this process is not compulsory in most organisations, the organisations believe that it is increasingly important for their members to gain certification and to advance through the levels of competencies. The beneficiaries of competency standards are: an employee, who can demonstrate his/her abilities to a prospective employer; the employer who can appoint staff of documented qualifications; and the community at large, since high standards are being set for the overall performance of a professional.

Continuing professional development is seen as an essential aspect of ensuring that professionals maintain the currency of their knowledge and skills to undertake tasks in an increasingly complex society. It is certainly advisable for all young professionals to undertake certification and to maintain their competency through continuing professional development throughout their careers.

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