

'WHAT IS A 'SUBJECT MATTER EXPERT'?'

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What is a 'Subject Matter Expert'?

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1. INTRODUCTION

Most industries have 'subject matter experts' – an authority in a specific topic, with deep knowledge of that topic. An 'SME' will be a specialist in specific competencies; therefore, they can advise in these competency areas, detail the key elements of these competencies, and also assess staff to determine if they meet these competencies.

In the engineering world these specialists are usually referred to as a subject matter expert or a 'competent person'. This short article defines and describes a subject matter expert.

2. 'EXPERT'

It is a sad, statistical, fact, that half of us are above average, and half of us are below average at our jobs. But within the 'above average' group we have 'experts'. These experts will have knowledge beyond that of the ordinary worker in their respective field due to their education, training, length and type of work experience, publications, awards, and peer recognition. There are various definitions of 'expert' in the literature:

- an experienced person;
- one instructed by experience;
- one who has skill, experience, or extensive knowledge in his calling or in any special branch of learning; □ very skilful;
- having much training and knowledge in some special field;
- excelling above all others in that special field of knowledge or capability; and, □ able to be relied upon to give the correct answer.

Consistent terms are high levels (or extensive) 'skill', 'knowledge' and 'experience':

- 'Skill' is the ability to perform mental and physical activities acquired or developed through training or experience [1];
- 'Knowledge' is a body of information applied directly to the performance of a task [1]: it is understanding gained through experience or study [2]. Conversely, experience is the knowledge that comes from personal involvement. It is important to differentiate between data (facts), information (a collection of facts), and knowledge (what we know). As Einstein said, *'Information is not knowledge. The only source of knowledge is experience'*.
- 'Experience' is work activity accomplished under the direction of qualified supervision, but excluding time spent in organised training programmes [3]. This will include years of experience, level of experience, and type of experience. Experience is the process of obtaining knowledge and skills in a workplace from doing and/or participating in relevant projects.

A combination of skills, knowledge, and experience is known as 'competence', Figure 1 [4,5,6]. Competence can be described as *'the combination of training, skills, experience and knowledge that a person has and their ability to apply them to perform a task safely'* [7]. Other factors, such as attitude, can also affect someone's competence.

The conclusion is that an expert must have extensive training, skills, knowledge, and experience in his/her competency. This will mean an individual must invest time in becoming an expert as *'experts are always made, not born'* [8]: top performers in a profession study and practice extensively and continuously for 10 to 25 years to reach their position [8].

This length of time is a major investment for both the expert and any organisation helping with their development, but it is not wasted: experts will be amongst the top people in a company, involved in the more complex jobs. Research shows, in highly complex jobs, the top 10% of staff produce 80%

more than average and 700% more than the bottom 10% [9]. This is partly down to the continuous commitment shown by top staff: with the same amount of practice, a long-term committed member of staff will outperform a short-term committed member of staff by 400% [9].

We now know what an 'expert' is, but we will now look closely at a 'subject matter expert' (SME), as engineering standards and regulations often ask for an SME.

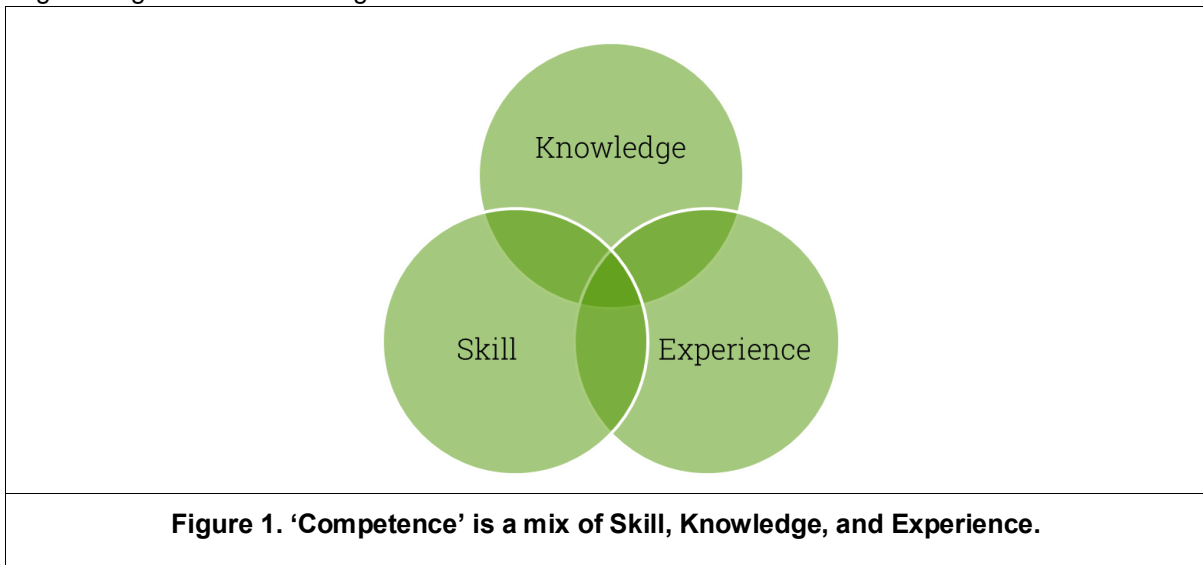


Figure 1. 'Competence' is a mix of Skill, Knowledge, and Experience.

3. 'SUBJECT MATTER EXPERT'

3.1 Definition

A 'subject matter expert' (SME) is often quoted in the literature, standards, and regulations. The USA Department of Transportation defines a 'subject matter expert' as [10]... *'An individual recognized as having a special skill or specialized knowledge of a process in a particular field, or of a piece of equipment.'*

3.2 SME Development

SMEs develop their expertise over a long period of time, maintaining a continuous study and connection in their field of expertise, including publishing books or articles on their topic, and transferring knowledge [11,12], although some caution is needed with older engineers: *'Old-timers have the wisdom... but are at risk if they don't keep up with the scientific and technical knowledge of the profession.'* [13]. Expertise can decline with experience, unless the expert is constantly undergoing training [8]. This means a subject matter expert must have continuous learning. A 'competent person' [14] *'... should have such practical and theoretical knowledge and actual experience of machinery or plant which he has to examine, as will enable him to detect defects or weaknesses which it is the purpose of the examination to discover and to assess their importance in relation to the strength of the machinery or plant in relation to its function.'* Another definition is [15] *'A person who has acquired through training, qualification, and experience, or a combination of these, the knowledge and skills that enable the person to safely and effectively perform the task required.'*

Clearly, an SME, or a competent person, must have demonstrable:

- education;
- training;
- skill;
- practical and theoretical knowledge; and,
- experience (see Section **Error! Reference source not found.**).

Skill, knowledge, and experience are defined above. Training is defined as [10]: *'An educational or instructional process (e.g., classroom, computer-based, or on-the-job) by which an individual's knowledge, skills, and his/her capacity to do or act, physically and/or mentally, are improved'*.

3.3 SME Qualification

An SME will need to prove that he/she has the necessary education, training, knowledge, and experience. This means he/she has to show he/she is 'qualified'. 'Qualified' means that an individual has been evaluated and can perform the tasks required [16], and 'qualification' is defined as [3]: *'demonstrated and documented knowledge, skills, and abilities, along with documented training and/or experience required for personnel to properly perform the duties of a specific job or task'*.

'Demonstrate' is defined as *'provide tangible evidence'* [17]. This emphasises the importance of documenting training and experience, and record-keeping.

3.4 Recognition and Continuous Learning

A true SME will be well known by others in his/her field, and will focus on his/her subject rather than him/herself. They will be honest, and know their limitations (but be able to improvise), share their knowledge freely (including teaching), and be continuously learning [18].

4. COACHING AND MENTORING

SMEs will be/have been under an expert teacher (coach) [8], supported by a mentor who ensures the individual is receiving the correct coaching. This background will mean an expert will know the importance of coaching (guided learning aimed at improving performance), and mentoring (personal advice, related to the development of an individual), and be willing to coach and mentor other individuals.

5. COLLECTIVE EXPERTISE

A competent person can be a body of people who collectively possess the necessary competencies [19]. A company does not require all its staff to be competent at everything; an 'organisation' can be competent. For example, an organisation will need a group of competencies to operate safely, but a group of staff can meet individual competencies - collectively, they make the organisation competent. It is reasonable to apply this collective responsibility to subject matter experts.

6. DEEPER AND WIDER...

Companies will have 'subject matter experts' (SMEs): these are individuals recognised for their special skills and knowledge in a particular field. But there are two other categories of experts who can be even more business-critical for an organisation:

- 'Deep smarts' [20] are individuals who have expertise, amassed through years of experience, which helps them make wise, swift, tactical, and strategic decisions. They are not necessarily SMEs, or high 'IQ' staff, or obvious key staff. The 'deep smart' introduces 'wisdom' (wisdom is knowledge plus values) into a company, and gives the 'smart' decisions.
- 'T-shaped experts' [21] have a deep, (the vertical part of the 'T') knowledge in their own expertise (hence they are/have been an SME), but also have broad (the horizontal part of the 'T') knowledge of general business issues and other departments and disciplines. Individuals with only a broad knowledge (the horizontal part of the 'T') retain facts and figures (e.g., they are good at pub quizzes!), and understand these facts and figures, but have little interest in delving deeper into these facts and figures [22]. The 'super' SMEs are the SMEs that also have this depth and breadth.

7. WHO ASSESSES THE SMEs?

It is easy to measure the performance of top athletes and sportspeople: their performances can be timed, weighed, counted, etc.. It can be difficult to measure expert performance in professions.

The deep smarts and T-shaped experts (see above) offer wisdom as well as wide and deep expertise, and will be able to assess SMEs. There are also SMEs that emerge as leaders amongst other SMEs. These leaders will be SMEs who have published books (by credible and relevant publishers) and papers, been identified as a leader by a reputable organisation (e.g., ASME), have extensive teaching/training experience, etc.. All these are tangible evidence of someone credible to assess SMEs.

8. ROLE IN BUSINESS

SMEs have specific knowledge that makes them valuable to their organization, and are well-known and respected in their fields. They are the 'go-to' authorities on a particular topic, but their expertise, creativity and integrity can be used effectively in leveraging sales and marketing [23].

Intellectual property (brand name, inventions, etc.) can be the key differentiator in many sectors of business, and is often a company's most valuable asset; for example, the Apple brand is valued at \$170billion which is 21% of the company's recent market value of \$806 billion [24].

Intellectual capital, or corporate knowledge, is an 'intangible' business asset, but is also a key part of a company's value, particularly if it is selling people services (e.g., consultancy). These types of businesses will rely on key staff to both attract customers (marketing), impress customers (sales), and deliver a quality product (delivery). Subject matters experts are often these key staff: they may often only be involved in the delivery phase, but they are crucial to business success, and are a highly valuable asset.

9. LEGAL PERSPECTIVE

The legal responsibilities of professionals are covered in Reference 25: it states that all professions have a duty to provide their services in a manner consistent with the 'standard of care' of their professions. A good working definition of the 'standard of care' is from USA law [26]: *'that which is commonly possessed by members of that profession or trade on good standing. It is not that of the most highly skilled, nor is it that of the average member of the profession or trade, since those who have less than median or average skill may still be competent and qualified'*.

This is reasonable, and applies to the 'typical' worker: it does not apply to the 'highly skilled'; i.e., the subject matter expert. Clearly, there will be higher expectations with a subject matter expert. A legal definition of a subject matter expert is [27]: *'a person with direct knowledge of what is done in the job, what knowledge, skills, abilities and other characteristics are required, and the general background of persons who are able to do the job successfully...'*

10. SUMMARY

A subject matter expert has specialist skills, knowledge, and experience in a particular field [10, 28, 29]. This skill/knowledge/experience is acquired over many years, and must be demonstrable and documented, Figure 2: this means the SME must be qualified [30] in the competencies they practice.

The SME will be continuously learning, and have their expertise recognised by their industry and peers, which gives further support to their credibility.

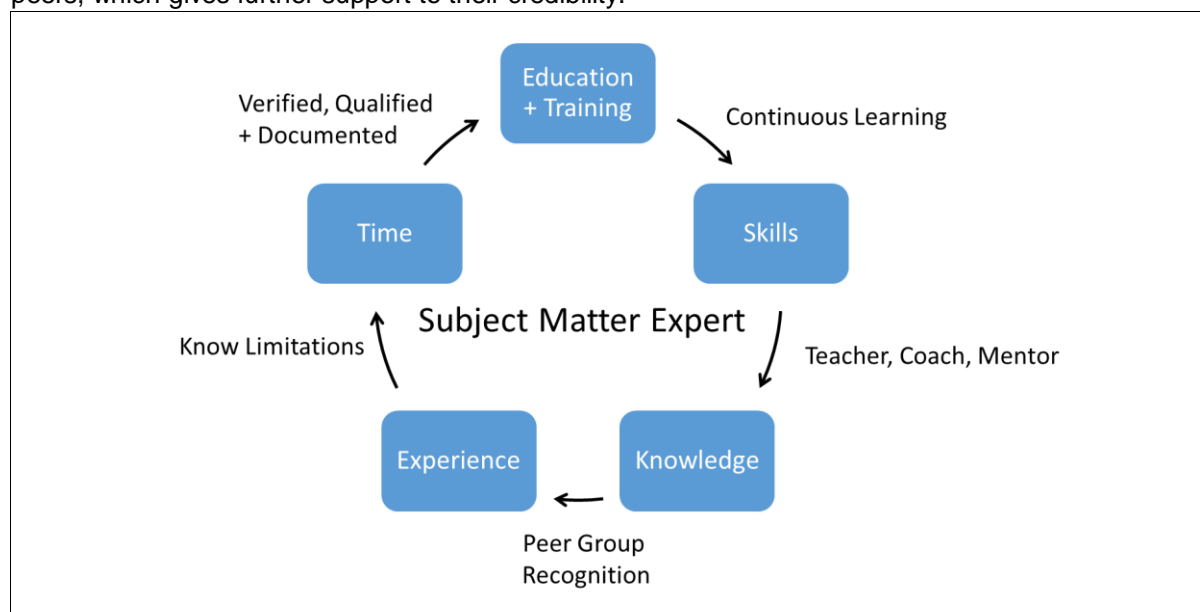


Figure 2. Characteristic of a Subject Matter Expert.

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