

PROFESSIONAL ENGINEERING BODY OF KNOWLEDGE BACKGROUND INFORMATION (TALKING POINTS)

August 6, 2014

Note: This document is intended primarily for NSPE leaders and members who have opportunities to write, speak, and answer questions about the EBOK.

What is the Professional Engineering Body of Knowledge (EBOK)?

“The Engineering BOK...is defined as the necessary depth and breadth of knowledge, skills, and attitudes required of an individual to enter practice as a professional engineer in responsible charge of engineering activities that potentially impact public health, safety, and welfare.... In broad terms, knowledge is what one knows in a fundamental sense, skill is what one is able to do with what one knows, and attitude is how one responds to a variety of situations.”
(See Chapter 2, p. 9 of the EBOK report)

Why did NSPE create the EBOK?

The EBOK was “undertaken in support of the Society’s vision, mission, and values and in recognition of the need to proactively prepare for and participate in continuous changes in technological, social, cultural, political, and economic conditions.”
(See Executive Summary, p. 4)

For whom did NSPE create the EBOK?

Prospective and current engineering students, their parents, and advisors; the general public; engineer interns and professional engineers; engineering mentors and supervisors; employers; engineering and other faculty; accreditation leaders; and licensing and certification boards.
(See Chapter 2, pp. 9–10)

How did NSPE do it?

(See Chapter 1, pp. 7–8)

- The Licensure and Qualifications for Practice Committee started the project in 2011.
- The process was transparent and inclusive.
- The LQPC conducted a webinar and invited input from individuals and organizations from within and outside of NSPE.
- The LQPC sought and received input. Although the process wasn’t perfect (could not contact every stakeholder and some did not respond), the committee considered and tried to accommodate all input.
- The NSPE Board of Directors unanimously approved the EBOK in October 2013.

What is the “heart” of the EBOK?

The “heart” of the EBOK is 30 capabilities, which define “what an individual is expected to know and be able to do by the time of entry into professional practice in a responsible role. A given capability typically consists of many and diverse abilities.” (See Chapter 4, p.13)

The 30 capabilities are introduced in Table 1 (See Chapter 4, pp. 14-18) and they are detailed in Appendix D (See pp. 28-58).

How can the EBOK be used?

The EBOK can be useful, in a variety of ways, to various members of the profession and those with whom they interact; it is not an abstract concept. The EBOK is a thought-provoking foundation on which professionals prepare for and build careers and from which they communicate about their profession to others.

More specifically, consider the following 10 ways that the EBOK serves engineers and stakeholders in the engineering community:

1. Offers **prospective engineering students**, their **parents**, their **teachers/advisors**, and the **general public** a glimpse of the importance of engineering (e.g., guiding principles in Appendix B); indicates the breadth of knowledge and skills required to practice engineering (e.g., key attributes in Appendix C and the capabilities); and suggests the breadth of opportunities offered by an engineering career (e.g., sum of the preceding).

Engineering faculty who host or otherwise assist with student recruitment may find the guiding principles and key attributes helpful in explaining the future of the engineering profession and describing the profile of a successful engineering student and practitioner. The breadth and depth of the principles and attributes could help to dispel inaccurate stereotypical thinking.

2. Assists **engineering and other faculty** in designing curricula, creating and improving courses, arranging cocurricular activities, and teaching and counseling students.

In planning the next offering of one of their courses, a professor might review the 30 capabilities and find that one or more could be integrated into the course in such a way so as to reinforce the course and expand student knowledge and skill. For example, consider Capability 21, Communication, for which one example ability is “Plan, prepare, and deliver an oral presentation with appropriate visual aids, handouts, and/or support materials.” After reading and thinking about this, a professor might, regardless of the course he or she is teaching, decide to experiment with having each student present one short presentation during the course. This could enable each student to learn more about a course topic, share it with others, and obtain a useful speaking experience.

3. Provides **current engineering students** with a framework within which they can understand the purpose, plan the completion, and measure the progress of their studies. In that spirit, an engineering faculty member might ask students to download the *Engineering Body of Knowledge* and compare its content to their completed and planned coursework and co- and extra-curricular activities. Students might benefit by seeing the engineering profession’s knowledge-skills-attitude umbrella under which they are studying engineering.

4. Gives **accreditation leaders** guidance for developing appropriate education criteria. For example, the EBOK may be useful to ABET’s Engineering Accreditation Commission in its discussions of Criterion 3, which describes the minimum knowledge and skills that engineers in all disciplines are expected to attain through baccalaureate education.

5. Informs **employers** about what they can expect in terms of basic knowledge, skills, and attitudes possessed by engineering graduates and suggests to **employers** their potential role, in partnership with individual entry-level engineers, in helping them attain the levels of achievement needed to enter the practice of engineering at the professional level.
6. Provides **engineer interns** with a comprehensive list of capabilities to assist them in evaluating the existing and desired breadth and depth of their engineering experience.
7. Offers engineering **mentors and supervisors** a template to assess the breadth and depth of experience being gained by engineer interns, and assists in focusing on additional areas of experience that may be required.
8. Provides **licensing boards** with an improved ability to evaluate the capabilities of engineers in professional practice, which are needed to meet the engineering profession's responsibility to protect public health, safety, and welfare.
9. Encourages specialty **certification boards** to build on the EBOK in defining their desired mastery level of achievement.
10. Offers **members of NSPE and other engineering societies** a resource for committee, subcommittee, and task force work.

What is NSPE doing now in phase 2?

Broadly speaking, NSPE is widely sharing the EBOK to stimulate future-oriented thinking by all engineering stakeholders with the hope that it leads them to make changes within their areas of responsibility and influence. (See Chapter 5, p.19, for starters)

- Expect a wide range of receptions. However, to date, NSPE representatives are seeing many signs of acceptance and encountering very little resistance.
- For those who have input regarding portions of the EBOK, NSPE regards the EBOK as a living document and seeks helpful suggestions for a possible second edition.
- NSPE also wants to keep all stakeholders engaged—keep them at the table—because discussion is fruitful.
- What are we asking for? We ask engineers, and others who have a stake in engineering, to read the *Engineering Body of Knowledge* and:
 1. Think about what the EBOK might suggest that they do differently in the future; and
 2. Provide input to NSPE about how the report could be improved if a second edition is produced.
- NSPE is committed to:
 1. Recording all written input;
 2. Reading and considering it—the input can inform our on-going presentations and discussions; and
 3. Considering all of it if we start working on a second edition.

Possible messages:

- First edition;
- A BOK for all engineers—an Engineering BOK;
- This is U.S. engineering's first attempt to articulate a common, pan-engineering BOK;

- Future-oriented in that, while current engineering practice may require many of the EBOK capabilities and some engineers exhibit those capabilities, more engineers will need to acquire more capabilities or be more adept at those they already have;
- Widespread support—bring disciplines together; off-set “splintering”;
- General enough to be applicable to all engineering disciplines, specific enough to be useful to any discipline;
- Accommodates the unique education and practice aspects of any engineering discipline;
- Does not advocate a master’s degree or 30 hours beyond a bachelor’s degree for licensure;
- Does not tell any discipline how to “design” the role and content of education and/or experience;
- Does not tell anyone to do anything—except please **read** the report and **think** about the ideas presented relative to your areas of responsibility and opportunity and share your views with NSPE;
- A strength of the EBOK is that it does not advocate an agenda or seek a specific, quantifiable outcome. The EBOK is offered in the spirit of encouraging thoughtful thinking and discussion by various engineering stakeholders; and
- EBOK report is available as a free pdf at:
<http://www.nspe.org/sites/default/files/resources/nspe-body-of-knowledge.pdf>

Related Initiatives within NSPE:

- Investigate impacts, if any, on Position Statement 1752, “Engineering Education Outcomes,” which advocates inclusion of more professional practice topics in engineering education;
- Review other policies/position statements for possible impacts; and
- Determine connection(s) to NSPE’s Race for Relevance initiative. Under this initiative NSPE is delving into many aspects of its operations and seeking improvement. The EBOK initiative may be able to connect with/support some aspects of the Race for Relevance.

Looking ahead to a possible second edition:

- Invite input about the first edition, in writing;
- Direct comments to NSPE General Counsel Arthur Schwartz at aschwartz@nspe.org; and
- We are logging inputs for possible later use

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