Principles Should Underlie Standards and Best Practices

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This position paper addresses the fourth issue submitted to the panel members: the identification of roles for national and international bodies and what actions should they undertake to advance “best practices” in software engineering.

In the fifty-odd-year history of software, various methods and techniques, methodologies and tools have been proposed to facilitate the development and maintenance of software responsive to needs. Most have proved to be more specific to the then current state of technology than was understood at the time. As a result, many have subsequently been shown to be less universally applicable than originally intended. Despite a plethora of conferences and workshops over recent decades, and numerous periodicals, books and courses, software engineering continues to lack a set of universally recognised fundamental principles [1]. Indeed, relatively few researchers have pursued this important subject in comparison with other research tracks in software engineering [2].

It is widely considered that practice standards in software engineering should be based upon observation, recording and consensual validation of implemented “best practices.” This strategy has resulted, though, in the development of a corpus of standards that are sometimes alleged to be isolated, unconnected and disintegrated, because each standard performs a local optimisation of a single observed practice [3]. The identification of a set of fundamental principles of software engineering could provide a broad and rich framework for establishing relationships among groups of practice standards.

The relationship among general engineering principles, software engineering principles, software engineering practice standards and implemented “best practices” of software engineering can be characterized in the following manner. It is believed that a body of fundamental principles for some branches of engineering has been recorded. Software engineering principles would, in the general case, be regarded as specialisations of these principles.

The software engineering principles would then play the role of organizing, motivating, and explaining the software engineering practice standards. Implemented practices should be based upon those practice standards.

Working from the specific toward the general, software engineering practice standards would be recordings and idealisations of observed and validated “best practices.” The software engineering principles would be abstractions of the practice standards. Furthermore, software engineering principles might be candidates for generalisation to the status of general engineering principles.

This position paper therefore advances that:

- A “best practice” should be supported by one or more fundamental principle.
- International standards bodies should develop practice standards from implemented “best practices.” In addition, these standards bodies and indeed the entire industry need to be much more stringent in requesting that the “betterness” of these practices be supported by strong empirical evidence.
- In reference to the title of the panel, academia can notably aid in the advancement of software engineering “best practices” on two fronts: by the identification of a set of fundamental principles of software engineering, and in the collection of empirical evidence supporting practices that are viewed as being a “best practice”.

References