SWEBOK KA #8: Software Engineering Process

The Software Engineering Body of Knowledge (SWEBOK) features 11 knowledge areas (KAs). The eighth KA is Software Engineering Process. The Software Engineering Process KA is focused on the definition, implementation, assessment, measurement, management, change, and improvement of the software life cycle processes. It includes four topics, as shown in Figure 1. These topics are Process Implementation and Change, Process Definition, Process Assessment, and Process and Product Measurement.

The Process Implementation and Change topic focuses on organizational change. Two main types of process infrastructure are used: Software Engineering Process Group and the Experience Factory. The software process management cycle consists of four activities: establish process infrastructure, planning, process implementation and change, and process evaluation. Models for process implementation and change include the Quality Improvement Paradigm and the IDEAL model.

The Process Definition topic covers the types of process definitions required for a project. Software life cycle models provide a high-level definition of the development phases. Software life cycle processes are more detailed than life cycle models. Notations for process definitions include data flow diagrams, statecharts, and IDEF0. Process adaptation is important to meet local needs. Automation supports the execution of the process definitions.

The Process Assessment topic discusses assessment methods and models. Process assessment models include ISO/IEC 15504, CMMI, Bootstrap, and ISO 9001. Process assessment methods include CBA-IPI, SCE, and SCAMPI.

The Process and Product Measurement topic addresses the aspects of software engineering measurement. Process measurement refers to the collection, analysis, and interpretation of quantitative information about the process. This includes size measurement, structure measurement, and quality measurement. Quality of measurement results is essential for the measurement programs to provide effective and bounded results. Software information models are built for the purposes of analysis, classification, and prediction. Process measurement techniques are used to analyze software engineering processes and to identify strengths and weaknesses. Analytical techniques include experimental studies, process definition review, orthogonal defect classification, root cause analysis, statistical process control, and personal software process. Benchmarking techniques assumes that if a less-proficient organization adopts the practices of an excellent organization, it too will become excellent. It involves assessing the maturity of an organization and its processes.



Figure 1. Breakdown of Topics for the Software Engineering Process Knowledge Area