Analysis of Software Process Assessment Methods’ Design from Engineering Design Perspective

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Introduction

Current status of SPA field

- Device new SPA methods
- Conduct case studies to test SPA methods and present results and findings
- Discuss success and failure factors related to assessment and improvement initiatives
- Compare between different SPA methods

Study Focus

- This work aims at improving the maturity of SPA methods design process by aligning it with the engineering design process
- Accordingly, This study forms the starting point to analyse the SPA methods from engineering viewpoint (Top-down view)
View 1: Software Process Improvement

Software Development Process → Assessed by → SPA methods → To initiate → SPI

Standardize the software development process

→ Produce high quality product
View 2: SPA Process Improvement

SPA methods → Engineering design principles → Improvements

Assessed by

To initiate

Standardize the SPA methods design process
Vincenti stated that:

- A complicated technology can often be regarded as a device
- Designing a new device is mostly based on a vicarious model
Vincenti’s classifications can be used as an analytical tool to study the coverage of different engineering topics with other domains such as software engineering.

Vincenti stated that the six categories are complete while the details and contents for each of them are not.

Vincenti stated that the six main classifications are not entirely exclusive since some items of knowledge can embody the characteristics of more than one category.
Vincenti’s Classifications for Normal Engineering Design Process

- Fundamental Design Concepts
  - Operational Principles
  - Normal Configuration

- Criteria and Specifications

- Theoretical tools
  - Mathematical Methods
  - Intellectual Concepts

- Quantitative Data
  - Descriptive Knowledge
  - Prescriptive Knowledge

- Practical Considerations
  - Process Instrumentalities
  - Procedures
  - Ways of thinking
  - Judgmental Skills

- Design Instrumentalities
Analyses Results

SPA method design criteria based on fundamental design principles

- Identify Process reference model.
- Identify Process assessment model.
- Define business needs before assessment.
- Make use of previous assessment reports.
- Refer to the organizational documents and reports while preparing for the assessment.
- . . . etc
Analyses Results - Continued

SPA process design criteria based on criteria and specifications

- Specify the number of processes to be assessed.
- Specify the processes to be assessed.
- Define the scale and limits used to assess the process.
Analyses Results - Continued

SPA method design criteria based on theoretical Tools

• Specify the theoretical tools used to select the processes to be assessed.
• Specify the theoretical tools used to define the rating process.

SPA method design criteria based on quantitative data

• Specify what Data/indicators are used to determine the scale for each process.
Analyses Results - Continued

SPA method design criteria based on practical considerations

- Specify how the processes to be assessed are selected.
- Specify the target scaling level for the organization.

SPA method design criteria based on Instrumentalities

- Define the sub divisions of the assessment process.
Conclusion & Future work

SPA methods, as a device, can be studied from an engineering viewpoint based on Vincenti’s classifications.

The resulted design criteria are vital for designing SPA methods.

The resulted design criteria can be used as guidelines to direct the design process of the SPA method.

Further design criteria can be explored and added to the collected criteria.
Thank you...