

A plan to identify the body of knowledge of software engineers

Committee for the Establishment of Software Engineering as a Profession

Software Engineering Institute, Friday December 10, 1993

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1.0 Recommendation

1.1 The body of knowledge, will be defined piece by piece, through surveys.

1.2 Structures to define body of knowledge

1.2.1 Categories of components of knowledge Static knowledge or dynamic knowledge; things we do):

Generic,	specific to SE
mathematics	software analysis
science	software architectures
engineering science	computer systems

1.3 First identify and classify components of knowledge under static/dynamics knowledge (primary). Then use level of knowledge (secondary) cognitive domains; how well (life cycle) things); (things you do as an engineer) Define list of main categories (e.g., analysis, architecture, systems, process). Define terms in list. Provide examples Knowledge (lowest then moving higher) Comprehension Identify components of knowledge under each listed category. Limit to a small number of components. Provide definition for each component Application

Analysis

Synthesis

Evaluation (highest)

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- 1.4 Surveys might differ across domains. For example, within Software Architectures there are many domains.
Super domains also exist, e.g. Embedded systems, Support for human activities
- 1.5 Survey #1 is to identify components ie. things all Software Engineers "should know" under various categories static/dynamic knowledge)
These are 2- questions: know at entry level? Know at expert level?
Preliminary survey can ask people to review inferior and add additional components. This preliminary Survey is just for debugging the real survey end will be **lim** to a small group (30 - 40 participants) to allow confirming survey results with participants.
Set aside components that fall below some threshold (votes).
- 1.6 Survey #2 is to identify level of knowledge required for components identified and classified by survey #1. Before, large ballot, do a pilot involving a few hundreds of participants that agree to work with us. Should also ask for comment. Could also do serial sampling many times before doing the larger sampling. After revision, if necessary, conduct mass balloting. Probably thousands of participants. *Primarily we are* concentrations on industry. but other organization can provide *input*. Try to do surveys with different populations from different areas,
- 1.7 Liter survey?
Pick up set-aside component and classify by "domains"
Ask the question what SE should know now or in 10 years (idea)

2.0 expected result from survey 1

Result from Survey I is a table with a list of component **above** a cut. These are topics that all software engineering should know when they first start working after a few years of experience, Topics *are clustered under* major categories (type, of knowledge)

Table 1:

	Apprentice	Journeyman/Master
	Entry Level	
Software Analysis_topics:		
topic; 1	X	
topic 2		X
Software Architecture topics:		
topic 1		
topic 2	X	
		X
Computer Systems topic.		
topic 1		X
topic 2	X	X
Software Process topics:		
topic, 1		
topic 2		X
		X

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3.0 Expected result fro survey 2

result from Survey 2 is an augmented table with the components identified in the first survey but now asking about the level of knowledge acquired at entry or after a few years of experience. The levels of knowledge are: Knowledge (K), Comprehension (C), Application (Ap), Analysis (An), Synthesis (S), and Evaluation (E)

Table 2:

[illegible]

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4.0 Sketch of survey #1

4.1 Theme: "Identify what Software, Engineers should know today, nor at some future time"

4.2. Contents

Category Analysis Topic I title, and
definition Topic 2 title and
definition

Leave blank for suggested additional topics during test version'

Category: Architecture

Topics

Category.,- Systems

Topics.....

Category., Process

Topics,

...

4,3 Audience a small representative sample of companies and domains. About 4t1-5C1
people far test version, hundredth for real version Survey **addressed** to s specific
point of contact (not occupant

5.0 Sketch of Survey #2

5.1 Theme: "How will should Engineers know these topics today, not at 8011'1C future time.'

5.2 Contents

Category: Analysis

Topic 1

Topic 2

Category: Architecture

Topics

Category: Systems

Topics-,

Category Process,

>Topics-,, (e.g. Software, configuration Management)

53 Audience

Target to a wide audience of hundredths *fir teak version, thousands for real* ver inn

Controlled groups survey individuals

surveys companies urge

companies small companies

5.d Sample Topic far Survey #2

Levels of knowledge !'or Software Configuration Management (SCM) topic

11r, Software Engineer shall be able to define SCM The Software Engineer shall be able to execute a SAM plan. The Software Engineer *shah be able to create a SCI plan*. The Software Engineer shall he able to participate in CCB The Software Engineer 001 be famailiar with the use of at least arse source of cede control system,

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6.0 Resources and Schedule

6.1 resources

Clerical - SEI

Editorial - SEI Task Force + *Steering Committee* + *Interested* volunteers

Survey Design/Analysis - IBM (Pat)

6.2 Schedule

6.2.1 Identify survey designers by (1/15/94?)

6.2.2 Complete literature: search (candidate list of components and categories) by 2/15/94

6.2.3 identify group to test survey #1 (30 to 40 participants) by 2/15/94

6.2.4 Draft survey #1 (components of knowledge) by 3/15/94

6.2.5 Survey designers start work on survey #2 (format, audience, etc.) by 3/15/94

6.2.6 Conduct test survey #1 between 3/15/94 and 5/1/94

6.2.7 Conduct revised survey #1 (hundreds) between 5/1/94 and 6/5/94

6.2.8 Draft survey #2 (levels of knowledge) by 8/1/94

6.2.9 Conduct test survey #2 hundredth between 10/1/94 and 12/1/94

6.2.1 Ballot survey #2 thousands by 1/1/95

Addendum'

The following changes were suggested to the plan after the first draft was circulated for comments by the participants

Participants at the December 10 meeting, Since not all participants have had a chance to comment the changes they are not yet incorporated in the body of the report.

7.1 Separate the Journeyman/Master levels of expertise. Define a Journeyman as a software engineer with 5+ Years of experience and a Master as a software engineer with 14+ years of experience. During the meeting these two categories were lumped together for the survey each will have a separate column.

7.2 Refine survey #1 to ask "when does the software engineer first learn the topic". The original question was ambiguous because an "X" under Apprentice would imply "W" under the other two levels of experience. In Survey #1 there should be at most 1 "X" per topic row, Survey #2 is different because it asks for level of knowledge at various levels of experience i.e., there could be multiple "X" in a topic row (e.g., Comprehension as Apprentice, Analysis as journeyman ~ Evaluation as Master)

7.3 The schedule sketched at the meeting had errors. Some necessary tasks were not

Industry Task Force Milestone Chart

Task Descriptions

Preliminary Activities

1)Identify Survey Designers

-1/15/94

2)Complete candidate list of components
and categories-2/15/94

Survey #1

1)Identify group to test survey #1

(30-40 participants)-2/15/94

2)Draft Survey #1-(components of
knowledge)& mail-3/15/94

3)Collect test survey #1, revise and
mail(hundredths)-5/1/94

4)Complete Analysis of test survey #1,
revise and mail(hundredths)-6/15/94

5)Collect survey #1-8/1/94

6)Complete Analysis of survey #1-9/15/94

Survey #2

1)Survey Designers start work on survey #2

(format ,audience etc.)-3/15/94

2)Draft Survey #2(levels of knowledge) and
mail-9/15/94

3)Collect survey # 2(hundredths of participants)-
11/1/94

4)Complete analysis of survey #2, revise, and ballot
(thousands of participants)-1/1/95.