

DRAFT Minutes of SWECC Meeting on January 28, 1999, in Austin, Texas

Recorder: Mark Ardis

**Present: Mark Ardis, Doris Carver, Dennis Frailey, Karl
Reed, Leonard Tripp, Laurie Werth (proxy for Linda
Northrop)**

Summary of Resolutions (details found in the sequel):

Resolution 1 - Division of Responsibility between Body of Knowledge and Education Projects - The SWEBOK Project will be responsible for identifying knowledge areas unique to software engineers, SWEBOK and the Education Project will jointly identify knowledge areas in other disciplines, and the Education Project will identify authoritative references in those other disciplines.

Resolution 2 - Cooperation between Body of Knowledge and Education projects - The two projects will plan and budget for joint activities where appropriate.

Resolution 3 - Priority for Education Project - The undergraduate curriculum model should contain the core content of the software engineering field.

Summary of other Motions:

Endorsed SWEBOK as a SWECC project.

Charged Education Project to prepare a proposal in keeping with resolutions 1, 2, and 3.

Attachments:

History of SWECC

Overview of Software Engineering Standards

Report on SWEBOK Project

Overview presentation given to Texas Board of Prof. Engineers

Overview of SWECC

White paper by Dennis Frailey on Cooperation

Agenda (as executed):

8:30 - 9:20 Introductions and Logistics

9:20	- 10:15	Overview and History of SWECC Project
10:15	- 10:20	Break
10:20	- 11:15	Relationships between SWECC and others
11:15	- 11:25	Plans
11:25	- 12:45	Lunch Break
12:45	- 1:00	Plans (continued)
1:00	- 1:10	Revisit Agenda
1:10	- 3:00	Plans (continued)
3:00	- 3:10	Break
3:10	- 3:40	Plans (continued)
3:40	- 3:55	Overview of Software Engineering Standards
3:55	- 5:00	Report on SWEBOK Project
5:00	- 5:20	Responsibility Areas
5:20	- 5:30	Future Plans
5:30		Adjourn

Acronyms:

ACM	Association for Computing Machinery
ASEE	American Society for Engineering Education
CS	IEEE Computer Society
EC	Executive Committee of SWECC
IEEE	Institute of Electrical and Electronics Engineers
KA	Knowledge Area (in SWEBOK)
NCEES	National Council of Examiners for Engineering and Surveying
SEN	Software Engineering Notes
SIGSOFT	ACM Special Interest Group on Software Engineering
SWE	Software Engineering
SWEBOK	Software Engineering Body Of Knowledge

SWECC	Software Engineering Coordinating Committee
TCSE	Technical Council on Software Engineering

1. Introductions and Logistics

This was the first meeting of the Software Engineering Coordinating Committee (SWECC), a joint activity of the ACM and the IEEE Computer Society (CS). The meeting began with self-introductions of all present:

- Leonard Tripp (Chair, CS)
- Dennis Frailey (Vice-chair, ACM)
- Mark Ardis (ACM SIGSOFT)
- Doris Carver (CS Education)
- Karl Reed (CS TCSE)
- Laurie Werth (proxy for Linda Northrop, ACM Education)

We agreed that important decisions of SWECC would be captured as Resolutions. Each resolution would be prepared in written form by a sponsor. All resolutions passed by SWECC would be published in the minutes. Creation and completion of projects will be done by resolution. Other procedures for the committee will unfold over time.

Mark Ardis agreed to be the recorder for this meeting. Future recorders will be chosen by self-nomination or rotation.

We agreed to the agenda as planned.

2. Overview and History of SWECC Project

Leonard Tripp presented an overview of SWECC. (See slides in Overview of SWECC.) The charter of the committee is to "foster and maintain software engineering as a professional computing discipline". It was created as a joint effort of ACM and IEEE CS as a successor to the previous Joint Committee to Establish Software Engineering as a Profession.

Although some of the stimuli for the creation of SWECC were the recent action by ABET to establish software engineering accreditation and the recent action of the Texas Board of Professional Engineers to license software engineers, both technical societies consider SWECC to be an international effort.

The Executive Committee (EC) of SWECC consists of the attendees of this meeting (except that Laurie Werth was attending as a proxy for Linda Northrop). The EC is authorized to propose projects, such as the Software Engineering Body Of Knowledge (SWEBOK) Project. However, the sponsoring technical societies must approve all

projects.

Key events of SWECC are an annual activity report, an annual budget projection, and an annual financial report. The EC will meet at least once per year, with two meetings currently scheduled for 1999. The next meeting will be held in Montreal, Canada, on July 13, 1999.

A context diagram (slide 7 in Overview of SWECC) relates several proposed projects of SWECC:

- Guide to SWEBOK
- SWE Model Curriculum
- SWE Performance Norms
- SWE Code of Ethics

Each of these projects is to be coordinated with the others, and each of them will be of value to the software engineering community for such purposes as defining software engineering education programs, defining software engineering accreditation criteria, and defining what software engineering is to regulatory and legislative bodies. For example, the SWE Performance Norms project will be a primary input to a software engineering professional licensing examination. In the US, licensing is the province of individual State agencies, such as the Texas Board of Professional Engineers, but these agencies generally use a common set of examinations and they rely on technical societies to define the bodies of knowledge and performance norms that serve as a basis for defining the content of these examinations. In addition, they often require that applicants receive a degree in their discipline from an accredited program. Such programs will often follow a model curriculum posed by the technical societies.

In the US, licensing of professionals varies from state to state, but most states use a similar process for any given discipline. For example, in order to be licensed as a professional engineer, each applicant must:

1. obtain an appropriate bachelor's degree from an ABET accredited engineering program
2. pass a Fundamentals of Engineering exam, consisting of a morning exam on general engineering topics, and an afternoon exam on a specialty area (such as software engineering)
3. spend at least four years practicing their discipline under the supervision of a licensed engineer
4. apply for a license, including submission of references
5. pass a specialty area exam, such as safety-critical applications.

In practice, most states use an exam prepared by the National Council of Examiners for

Engineering and Surveying (NCLEX-ES). These exams are prepared from a set of Performance Norms that are supplied by the appropriate technical societies. The American Society for Engineering Education (ASEE) plays an important role in influencing NCEES to create exams.

We decided that coordinating and cooperating with organizations like ASEE and NCEES was important to our effort.

Leonard continued his presentation with some of the history of the "Joint Committee", which began in 1993. (See slides in History of SWECC.) Much of this history is contained in the Final Report of Joint IEEE Computer Society and ACM Steering Committee for the Establishment of Software Engineering as a Profession.

One of the lessons from the earlier effort was that it required more work than could be expected from volunteers only. That is, some support for funding projects, such as the body of knowledge project, would be needed.

The earlier project produced a code of ethics that was approved by both the ACM and the Computer Society in 1998. It also started an effort to define an undergraduate curriculum. It was recommended that these efforts continue to their next logical steps. It was also recommended that the effort continue to cooperate with the Texas Board of Professional Engineers.

3. Relationships between SWECC and others

We then proceeded to discuss the relationships between our effort and organizations such as ASEE, NCEES, etc. The objective was to identify liaisons between our activities and these other bodies. Although we started to identify liaisons, we did not complete this task. Leonard Tripp took an action item to prepare a list of liaisons by major categories for review by the EC.

A question that arose during our discussions was the proliferation of "certificate" programs by various computer organizations and the need to provide guidance to the public on the role of these in comparison to college degrees, accreditation, and licensing. This discussion led to the concept of possible certification of specialties in software engineering. For example, in medicine one first obtains a license to practice medicine, but additional certifications to practice specialties (e.g., internal medicine, general surgery, orthopedics) can be granted by the appropriate medical board. Might safety-critical software be such a specialty deserving certification? Dennis Frailey took an action item to prepare a white paper on this subject for review.

4. Plans

Our next topic was future plans for SWECC. Much of this discussion focussed on the difficulties of preparing a description of a body of knowledge, the mechanics of preparing licensing exams from such a description, and the relationship of a model curriculum to these efforts.

The body of knowledge (SWEBOK) project has solicited funding of \$30,000 each from about ten organizations, most of which have been identified and roughly half of which have already agreed to participate and have initiated funding. These ten (which include government agencies, corporations in various economic sectors, and the two sponsors of SWECC - ACM and IEEE CS) are organizations for which the quality of software is a major concern. Their willingness to fund the project was an indication of the importance and relevance of the SWEBOK work to the software engineering community. The ten will serve as an Industry Advisory Board, which will provide a check on the relevance of the work.

Once the body of knowledge is identified, a set of performance norms (sample questions) is prepared by volunteers. Such a project will be proposed for SWECC when it is appropriate. Although the volunteers are not paid, some modest living and travel expenses would be reimbursed. The future project will have to identify a funding source for these expenses.

In addition to SWEBOK, a project that SWECC wants to start soon is the development of a model curriculum for software engineering. We spent some time discussing the objectives of such a project, and its relationships to other activities. It was clear that there are many possible software engineering curricula and, inspired by the "curriculum 91" model, we envision a number of alternatives resulting from this effort. However a clear objective was that the core content of software engineering, as defined by the SWEBOK project, would be contained in all such curricula and that the initial work in this area should include definition of at least one curriculum that would meet high technical standards that might qualify for accreditation and prepare students for licensing examinations, if and when these are established. Resolution 3 characterizes our initial charge to the group that will formally propose this project over the next several months.

Dennis Frailey proposed two resolutions concerning the relationships between a model curriculum project and the SWEBOK project. (See Resolution 1 "Division of Responsibility between Body of Knowledge project and Education project" and Resolution 2 "Cooperative activity between SWEBOK and Education Projects" at the end of these minutes.) Both resolutions were passed by the EC. A white paper describing the motivation for these resolutions is included as an attachment.

Karl Reed proposed a resolution to the effect that any such model curriculum contain the core content of software engineering. (See Resolution 3 "Undergraduate Curriculum Model", at the end of these minutes.) This resolution was passed by the EC.

Finally, we discussed a document release process. It was agreed that the Chair and Vicechair of the EC would issue reports, minutes and general information about SWECC. Project deliverables, such as final reports, would be issued by the EC.

5. Overview of Software Engineering Standards

Leonard Tripp gave an overview of software engineering standards activity as introductory material for the SWEBOK discussion. (See Overview of Software Engineering Standards.) Much of the SWEBOK effort has followed the same process as

used by international standards organizations. The code of ethics effort, which culminated in a successful code of ethics after an extensive community review, also followed a similar process.

6. Report on SWEBOK Project

Leonard Tripp gave a report on the SWEBOK project. (See attachments [Report SWEBOK Project](#) and [Overview presentation given to Texas Board of Prof. Engineers.](#))

This project was started in December 1997 as a joint effort of the IEEE CS and the University of Quebec at Montreal after the "Joint Committee"'s body of knowledge project reached a point where it could not make further progress. As mentioned earlier, the SWEBOK will be used by the model curriculum project and by the project that identifies performance norms. It is also intended to be a resource of general use to many others, such as practicing software engineers, students, and educators.

The result of the first phase was a strawman version of a Guide to Software Engineering Body of Knowledge. An Industry Advisory Board reviewed this document and provided suggestions for the next phase of the project. One of the main requests was to collapse a large set of Knowledge Areas (KAs) down to a more reasonable number. The resulting baseline list has ten items:

- Software Requirements Analysis
 - Software Design
 - Software Construction
 - Software Testing
 - Software Maintenance
 - Software Configuration Management
 - Software Quality Analysis
 - Software Engineering Management
- Software Engineering Infrastructure
 - Software Engineering Process

This list is subject to revision as a result of the work of the second phase of the SWEBOK effort. The Industrial Advisory Committee and the Panel of Experts are expected to influence the content of the final list. The EC discussed a number of areas where revisions might be made. Karl Reed raised the issue of the role of the history of software engineering in the proposed KAs. Mark Ardis took an action item to raise this issue to SWEBOK.

In the next phase a KA specialist will be selected to draft each KA description (Version

0.1). Each description will include an overview of the area, a set of performance norms, and a list of references. Each description is expected to be about twenty pages long.

A panel of experts will review the draft descriptions and make suggestions for the next version (Version 0.5). Teams with specific focus (e.g., small industrial practice, large industrial practice, education, regulatory and government agencies, research, and others) will review that version. Each focus team will have a review captain who will be responsible for coordinating reviews across all KAs. The result of editing to accommodate those reviews will be Version 0.7. Finally, a large body of reviewers will participate in the final review phase. This group will be selected along demographic lines suggested by the members of the Industry Advisory Board. The last version of the KAs produced after this review will be Version 0.9, which will be made widely available for comment by the public.

A key part of the SWEBOK project is that the process and all intermediate versions will be totally open for comment by the public. The overall schedule for SWEBOK is:

- KA 0.1 -- 1 st Quarter 1999
- KA 0.5 -- 2nd Quarter 1999
- KA 0.7 -- 3rd Quarter 1999
- KA 0.9 -- 4th Quarter 1999

As mentioned earlier, funding for this project is provided by the Industry Advisor Board. With ten equal shares of \$30,000 each, the project appears to be adequately funded.

One of the concerns of EC members was to assure that there is a wide opportunity for participation by knowledgeable members of the technical societies. It was agreed that the panel of experts should include nominees from the technical societies. Karl Reed and Mark Ardis took an action item to draft a list of experts for the EC. In addition, the special review teams will include technical reviewers recommended in many cases by the technical societies.

Since review plays an important role in the SWEBOK process, Karl Reed took an action item to find suitable means of motivating reviewers to participate. One mechanism for inviting reviewers will be to publicize a call in ACM SIGSOFT Software Engineering Notes and in the publication of IEEE-CS TCSE. Mark Ardis took an action item to place a call in a future issue of SEN.

Another concern was the interaction of the education community with the SWEBOK effort. The resolutions brought forward by Dennis Frailey (see resolutions _1 and _2) address many of these concerns, but there may be other opportunities to cooperate. The educational representatives, Doris Carver and Laurie Werth (acting for Linda Northrop), took an action item to invite their respective organizations to participate in SWEBOK.

The EC endorsed SWEBOK as a SWECC project.

7. Responsibility Areas

We reviewed the main projects and other significant activities of SWECC to assign each activity to at least one member of the EC. The following assignments were identified:

SWEBOK	Leonard Tripp
Education	Dennis Frailey
Publicity	Karl Reed and Linda Northrop
Liaison with Standards	Leonard Tripp
Liaison with National Bodies	Leonard Tripp

We expect other responsibilities to be identified after reviewing a more complete liaison list.

8. Future Plans

The last items we discussed were the creation of a web page for SWECC, and future meetings.

Both technical societies have begun planning for the web page. A target date of February 15 has been set for initial deployment. The first version will have an introduction, a document register, and a brief description of related activities. Later versions will include a history of activity and a possible chat room.

A related issue of visibility is the production of letterhead and business cards for SWECC. We noted an action item for this but failed to assign it.

We agreed to meet by teleconference during the week of April 12, 1999, probably on the 13th or 14th. We also acknowledged that the next face-to-face meeting would be in Montreal on July 13, 1999.

9. Resolutions Passed by SWECC EC

Resolution 1: Division of Responsibility between Body of Knowledge project and Education project

Sponsor: Dennis J. Frailey

The body of knowledge project and the education project shall divide responsibilities for identifying the body of knowledge as follows:

- The BOK Project shall be responsible for the identifying the knowledge areas that are unique to software engineers and, within each knowledge area, identifying and providing reference material to definitive sources on the topics that are essential to a software engineer.

- The **BOK** Project shall be responsible for identifying other disciplines that contain knowledge areas that are important for a software engineer.
- The BOK Project and the Education project shall be jointly responsible for identifying those knowledge areas within other disciplines (computer science, computer engineering, math, science, etc.) that are necessary for a software engineer.
- The Education Project shall be responsible for identifying and providing authoritative references for the topics within each knowledge area from "other" disciplines that are necessary for software engineers.

Resolution 2: Cooperative activity between SWEBOK and Education Projects

Sponsor: Dennis J. Frailey

Each project shall have at least one annual review of its progress, to which the other project(s) and SWECC shall be invited to send representatives. Furthermore, for those responsibilities that are joint, the projects shall plan and budget for appropriate joint activities and shall keep SWECC and the other projects informed of these.

Resolution 3: Undergraduate Curriculum Model

Sponsor: Karl Reed

The undergraduate curriculum model should contain the core content of the software engineering field. At a minimum, a program that implements the model should meet accreditation standards, and a student who graduates from the program should be prepared to pass a fundamentals of software engineering licensing exam.

10. Action Items

The following action items are assigned. Due dates are noted where known.

- Prepare white paper on specialties. [Dennis Frailey] [3/31]
- Prepare liaison list by major categories. [Leonard Tripp] [2/28]
- Bring "History of Software Engineering" as an issue against the list of KAs to

SWEBOK Project. [Mark Ardis]] ? • Technical representatives will invite their respective societies to participate on the panel of experts of SWEBOK. First action will be to compose a list of potential candidates to send to SWECC EC. [Mark Ardis and Karl Reed] [?]

- Find motivation for reviewers of SWEBOK. [Karl Reedl [?]

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- Education representatives will invite their respective societies to participate in SWEBOK.
IDoris Carver and Laurie Werth] [']
- The recorder will distribute the minutes of this meeting to SWECC. I Mark Ardis [2/51
- The recorder will post the minutes of this meeting to the web site when it is rcady. [Mark Ardis]
[']
- Design and produce letterhead and business cards for SWECC. [? I I `.'
- Set the date for a teleconference meeting during the week of April 12. I Leonard Tripp] [?]
- Meet in Montreal on July 13, 1999.

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