International Cost Estimating and Analysis Association: An Introduction

Megan Jones
ICEAA Executive Director
History

Industrial Estimating Society of San Diego
1960

PRICE Users Group
1977

National Estimating Society
1966

Institute for Cost Analysis
1981

International Society of Parametric Analysts
1978

Society of Cost Estimating & Analysis
1990

ICEAA 2012

www.iceaaonline.com/about/origins-of-iceaa
Mission Statement

The International Cost Estimating and Analysis Association is a 501(c)(6) international non-profit organization dedicated to advancing, encouraging, promoting and enhancing the profession of cost estimating and analysis, through the use of parametrics and other data-driven techniques.
ICEAA’s official training course material

User-friendly training resource
Organized into 16 interactive modules within five general subject areas
Covers all topics tested in the CCEA® exam
Designed to facilitate self-study and study in small groups or can be used effectively in a classroom environment

www.iceaaonline.com/cebok
CCEA® and PCEA® Certification

• Provide professional credentials that set the standard for the entire cost estimating and analysis community

• Offer employers and individuals a means of distinguishing and achieving excellence. Certification serves as a measure of an individual’s mastery of the basic and intermediate knowledge in cost estimating and analysis

• Strengthen the individual’s and their organization’s ability to produce quality cost estimates and analyses

www.iceaaonline.com/certification
Certification Exam: Two Parts

Take Part 1 Only for PCEA
foundation knowledge
practical application

PCEA®

Candidates who pass part 1 will be awarded the PCEA designation regardless of experience level.

Take Parts 1 & 2 for CCEA:
advanced analysis

PASS TO ATTAIN

2-5 years cost estimating experience:
Awarded CCEA® when 5 years experience met

PASS
With

5 or more years cost estimating experience

ATTAIN

To be awarded CCEA, candidates must pass both parts of the exam and have 5 years of cost estimating (or related) experience.
ICEAA's PCEA® and CCEA® exams can now be taken online using any computer with an integrated webcam and microphone.

The browser-based testing software only requires an extension to deploy the virtual AI proctor that monitors your test.
## CCEA® and PCEA® Certification

**CCEA®**  
ICEAA’s Primary Professional Certification  
Valid for five years  
Renewable Through Points System  
Requires Passing Parts I & II of the Exam

**PCEA®**  
ICEAA’s Apprentice-Level Certification  
Valid for three years  
Requires Passing Part I of the Exam  
Renewable by Exam Re-Take Only

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<th><strong>Join ICEAA (/year)</strong></th>
<th>$ 95</th>
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<tr>
<td><strong>Complete the CCEA® Application</strong>*</td>
<td>$ 300</td>
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<tr>
<td><strong>Purchase &amp; study CEBoK®</strong></td>
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<td><strong>Total Investment:</strong></td>
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*For applicants taking their exam online. Offline paper exams fees are subject to a 20% surcharge to cover shipping, printing, and other coordination.

www.iceaonline.com/certification
More certification questions?

www.iceaaonline.com/certificationfaq
ICEAA Workshop Archives

Read abstracts and download presentations from past events:

www.iceaaonline.com/archives

12 years of papers and presentations!
Our weekly webinars are free for both members and non-members.

Webinars are recorded and featured on our YouTube page for later viewing.

Each webinar counts as 1 hour of training towards CCEA® certification renewal.

www.iceaaonline.com/dls
When signing up for ICEAA membership, Active Military may choose the Student Membership rate. Rather than the usual transcript required to qualify for this rate, send us a PDF of an email from your commanding officer, supervisor, or manager verifying your current military status.

Upon approval of your completed PCEA or CCEA exam application, you will receive a discount code to be used towards your exam fees.
See the value of ICEAA membership for yourself

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<td><strong>Receive one</strong></td>
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**INTRODUCTION TO MACHINE LEARNING FOR COST ESTIMATORS**

**Dr. Christian B. Smart**

**Kimberly Roye**

**October 1 • 12 noon**

**ICEAA MEMBERS:** $25

**ICEAA**

**NON-MEMBERS:** $100

RECEIVE A FREE YEAR OF MEMBERSHIP WITH $100 PURCHASE

www.iceaonline.com/qed
Software Cost Estimating
Body of Knowledge: past, present, and future

Dr. Christian B. Smart
Introduction

• ICEAA has maintained a Cost Estimating Body of Knowledge (CEBoK) for a long time, which serves as the foundation for its certification

• While there is a CEBoK module on software cost estimating, ICEAA recognizes that
  
  • Software is an ever-increasing portion of total systems cost
  • There are unique aspects of software cost estimating that merit special attention to this subject

• Recognizing these facts, ICEAA decided to develop a Software Cost Estimating Body of Knowledge (SCEBoK) and plans to finish the initial version in early 2021

• This briefing provides an overview of SCEBoK
2015: Established the Software Cost Estimation Training and Certification Steering Committee with ICEAA, Nesma, and IFPUG

2016: Started the Software Certification Curriculum Working Group in 2016 to identify important topics, structure a table of contents for a software cost estimating curriculum

2017: First appearance of the content that would become the Software Cost Estimating Body of Knowledge. Seven software estimation training sessions featured at the ICEAA Professional Development & Training Workshop in Portland, Oregon, USA

2018: 14 Software CEBoK Training offerings at the 2018 ICEAA Workshop
ICEAA and Nesma sign a MOU committing to continue the project
16 Software CEBoK training offerings at the 2019 ICEAA Workshop
The same training is offered October 2019 at the IWSM-Mensura Conference in Haarlem, Netherlands
ICEAA begins negotiating contracts to accelerate the effort using paid v. volunteer contributions
ICEAA has partnered with the U.S. Defense Acquisition University (DAU) to use their existing course materials, known as BCF-250: Software Cost Estimating, as one of the foundations for SCEBoK.
ICEAA partners with the U.S. Defense Acquisition University (DAU) to use their existing software cost estimating course materials as one of the foundations for SCEBoK (along with previously-presented software training slides and other sources)

Establishes the ICEAA SCEBoK Review Group (ISRG) to collaborate and best develop an industry and globally accepted product

Contracts a project manager to integrate the source material with ISRG feedback to create a written, readable SCEBoK body of knowledge and a series of PowerPoint slides to use when training SCEBoK content
Expected Rollout: Early 2021

• First edition will be in PowerPoint format

• Available for learning and instructing

• ICEAA is preparing a standalone specialty certification for Software Cost Estimating, due later in 2021

• Eventual goal to offer an online narrative-format body of knowledge
SCEBoK Target Audiences

- Commercial organizations
- Original Equipment Manufacturers (OEMs)
- Government organizations
- Consulting firms
- Quasi-government organizations (e.g., Federally Funded Research & Development Centers)
- Academic institutions
SCEBoK Goals

SCEBoK will be developed to:

• Ensure content is not biased towards or focused on the US Government or US Department of Defense

• Provide users with an understanding of software estimating that will compliment and enhance cost estimates and analyses

• Factually and objectively present all software sizing methods to allow users to draw their own conclusions about the merits of any given method

• Provide guidance to the essential considerations in software cost estimating
SCEBoK and CEBoK®

SCEBoK will be a specialty version of ICEAA’s Cost Estimating Body of Knowledge (CEBoK®)

- Fundamental cost estimating lessons will not be repeated in SCEBoK
- SCEBoK will only be available as an add-on purchase to CEBoK
  - References and links will cross between core CEBoK lessons and SCEBoK modules
Lessons 1-6 (subject to change)

Lesson 1: Software Cost Estimating Overview

Why software cost and schedule estimating is important

Lesson 2: Software Development Paradigms

Explore each software development paradigm with descriptions and considerations
Lesson 3: Preparing the software estimate

Step 1: Definition & Planning (includes Scope)
Step 2: Data Collection, Normalization, and Analysis
Step 3: Estimate Formulation
Step 4: Risk & Uncertainty Analysis
Step 5: Documentation & Presentation
Lesson 4: Tools and Techniques to Streamline the Software Estimate

- Developing a CER
- Software Schedule Estimating
- OTS tools for developing software estimates

Lesson 5: Software Maintenance

- Definition of software maintenance and why it is important
- Primary software maintenance cost drivers
- Methods of estimating software maintenance
- Software obsolescence
Lesson 6: COTS & ERP Software Costing Considerations

- Description of COTS software and its importance
- Primary COTS cost drivers
- Best practices in COTS projects
- Description of ERP and its importance
- Primary ERP system cost drivers and estimating techniques
Why is Software Cost Estimating Important?

Software is increasingly embedded (in everything)

Future factors for brand differentiation:

- Infotainment features requiring "plug and play" capabilities
- Autonomous capabilities including sensor-fusion algorithms as a complement to hardware
- Safety features based on "fail-operational" behavior
- Software will move further down the stack to hardware (smart sensors)
- Stacks become horizontally integrated
- New layers will be added to the stack

1 Including operating system in status quo.
Why Cost and Schedule Growth Occur

Numerous Reasons, Both Internal and External


OPTIMISM
Innate bias - Planning Fallacy
Project managers are risk-seeking

COST, SCHEDULE, TECHNICAL MISALIGNMENT
Like a three-legged stool, all need to be consistent in order for a project to balance

MOORE’S LAW
Exponential growth in technology Paired with projects that take a decade or longer to complete means that either there is a continual requirements update process, or the product is obsolete on delivery

BLACK SWANS
Unpredictable, rare, unprecedented events that have a huge impact

LAKE WOBE GON
Project managers and staff are not like the children of Garrison Keillor’s fictional town – they are not all above average

Source: Christian B. Smart, Solving for Risk Management: Understanding the Critical Role of Uncertainty in Project Management
Types of software estimates (1 of 5)

Software-intensive program

Investment:
- Program/project management
- Systems engineering
- BPR/ Change management
- System Development
- System Procurement
  - Hardware
  - Software
- System level integration & test
- System deployment/implementation

Operations & support (O&S)
- Help desk/service desk support
- Technology refresh/upgrade
- System maintenance

Software life cycle (example)

- Investment
  - Plan (sourcing, business case, governance)
  - Develop and/or procure
    - Software development estimate
      - Req → implementation
    - Software procurement estimate
- Integration
- Deployment
- Operations & Support (O&S)
  - Help desk, licenses, hosting, etc.
- Software maintenance
- End of life

1. Standard IT LCC WBS V5 from US Department of Homeland Security
2. O&S contains continuation of many investment categories + those new ones listed here... See definitions in notes
2. Elements of both Predictive and Adaptive/Agile: Incremental (1 of 2)\(^1,2,3\)

- Complete requirements are defined upfront and allocated to increments for development.
- Design, implementation, verification (and often, delivery) are allocated to a series of increments ("software builds"), each of which is a waterfall and delivers a portion of software.
- If increments are sequential, then completion of each is a "gate" through which the project must pass before proceeding to the next increment; successive waterfalls.

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1. Adapted from the DAU Glossary definition for the Incremental Approach (referenced by DoD Instruction (DoDI) 5000.2) and
2. An example for the Incremental Development Paradigm is available [here](https://example.com).
3. As noted on the previous slide, we categorize the Incremental paradigm as "Adaptive/Agile" in this lesson because of the opportunity for each increment to influence the requirements, quality, etc. of the subsequent increments. In cases where the increments are concurrent or rigidly defined, it may be more appropriate to categorize it as a Predictive paradigm.