Revision of the SE 2004 Curriculum Model

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SUMMARY
Software Engineering 2004: Curriculum Guidelines for Undergraduate Degree Programs in Software Engineering (SE 2004) [1] is one volume in a set of computing curricula adopted and supported by the ACM and the IEEE Computer Society. In order to keep the software engineering guidelines up to date the two professional societies began a review and revision project in early 2011. This special session will present the results of the review, present a first draft of the revision, and provide time for discussion and input from the computing education community.

Categories and Subject Descriptors
K.3.2 [Computers and Education]: Computer and Information Science Education – Computer Science Education.

General Terms
Management, Human Factors.

Keywords
Software Engineering; Curriculum model; SE 2004

1. OVERVIEW
This section provides key information points for the session:

Objective of the session: This session will present the first draft of a revision to the SE 2004 curriculum model. The session is important because it will provide an update to the computing education community and an opportunity for community discussion and input on the revision.

Session outline: The session will begin with a summary of the curriculum model review results. This will be followed by a summary of the first revision draft. These presentations should take about 30 minutes in total. The other 45 minutes will be used for questions, discussion, and audience input.

Expectations: The audience for this presentation is the set of computing educators who teach software engineering topics. While the SE curriculum model addresses entire BSSE degrees, it is highly relevant for computing programs that have an SE minor, and all computing degrees that incorporate SE topics in other Computer Science or other computing degrees.

Suitability for a special session: A special session will be particularly useful to report on the revision effort to the computing education community and to encourage broad input from that community.

The remainder of this paper provides a brief summary of the review and revision phases of this project.

2. REVIEW
The first phase of the project was a review of SE 2004. The charge for the SE2004 Review Team was as follows:

1. Conduct a "consultation process" to collect information and opinion from the principal curriculum stakeholders (industry and academia) about the need for modification of the curriculum model (body of knowledge, curriculum architecture, pedagogy, infrastructure, etc.).

2. Analyze and assess the results of the consultation process to determine the type and extent of change needed.

3. Prepare a report for the IEEE-CS Educational Activities Board and the ACM Education Board including recommendations concerning a) the type and extent of revision needed to SE2004, b) an estimate of the amount of effort needed, and c) a proposed schedule for the recommended revision.

The team first constructed a comprehensive list of stakeholder groups from academia, industry and government. Groups included accredited academic programs, special interest groups, and software engineering programs in several countries. We were especially interested in identifying people from industry or government who had an interest in software engineering education. We established a community portal page on the Ensemble Computing Portal website [2]. This provided a convenient place to advertise our survey, and it placed us near other curriculum efforts that have portals there.

We created a survey on SurveyMonkey to collect feedback about the current state and use of SE 2004. The first part of the survey asked about the respondent's background and familiarity with SE 2004, while later sections asked about specific sections of the guidelines. We allowed respondents to skip some of the more detailed questions about the Software Engineering Education Knowledge (SEEK) section if they felt unprepared to answer those. Respondent background data was important to us, as we were concerned about reaching stakeholders across a wide spectrum of occupations and localities.

We received about 480 usable responses from 42 different countries. The majority of survey participants were from North America, even though we worked hard to recruit responses from...
other parts of the world. We sent email to hundreds of potential participants in Central and South America, Europe and Asia as part of our publicity campaign. Most of the respondents had graduate degrees. This is not surprising, since our main stakeholder group consists of faculty at colleges and universities. We asked respondents about their role in software engineering education, and the set of responses indicated good representation of both educators and practitioners. Table 1 lists the breakdown of roles.

<table>
<thead>
<tr>
<th>Role</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>134</td>
</tr>
<tr>
<td>Researcher</td>
<td>88</td>
</tr>
<tr>
<td>Software Developer</td>
<td>156</td>
</tr>
<tr>
<td>Administrator</td>
<td>26</td>
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<tr>
<td>Retired</td>
<td>13</td>
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<tr>
<td>Other</td>
<td>60</td>
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<tr>
<td>Not Answered</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1. Role of respondents

A key element of SE 2004 is the structure of the SEEK. We asked survey participants about the overall structure and about specific sections. Most participants agreed that the Knowledge Areas were still relevant.

We received useful feedback from some respondents about the relative percentage of time that should be spent on individual topics within knowledge areas. For example, respondents felt that more time should be spent on requirements fundamentals within the Software Modeling and Analysis area.

We also asked about elements that were missing from the SE2004 Curriculum Guidelines or from the SEEK. There were a few trends, especially the incorporation of more modern software development methods, and a need for more emphasis on security. Additional details of the survey result will be presented in the special session.

3. REVISION

Based on the results of the survey of constituents, we found that the overall structure of SE 2004 is sound and does not need to be changed. The SEEK was found to need only minor revisions. The areas of revision identified include:

- agile methods: these have become more popular and successful
- security: increasingly important as more services are exposed to attack
- service-oriented computing: these have become more popular and important

A revision plan was created by the review group and accepted by the two professional societies. The revision group began work in August 2012, with a target of creating an internal draft by December, 2012. The goal is to revise that draft primarily within the group and have a first draft for public review by the time of SIGCSE 2013. That draft will be presented at this special session and be the focus of discussion and request for input.

Other curriculum revision efforts are being conducted concurrently with SE 2013. Two of particular interest are CS 2013, a revised set of guidelines for computer science curricula, and the Guide to the Software Engineering Body of Knowledge (SWEBOK) [3], which is undergoing review of recent updates. We expect to work closely with members of both of those projects.

4. REFERENCES

