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Executive Summary

This report summarizes the activities of the ACM Education Board and the Education Council in FYE 2011 and outlines priorities for the coming year. Major accomplishments for this past year include the following:

- Identifying strategic directions for the Education Board and the Education Council and a set of immediate priorities. The latter include supporting the ongoing development of CS 2013, supporting the AP initiative and the related CS10k project, supporting an initiative in computing education with ACM India and addressing issues on statistics gathering (extending Taulbee).
- Having obtained funding from NSF and running a Summit in Computing Education in Washington in June 2009, ideas relating to the formation of a new Computing Education Coordinating Council had been developed. At an initial meeting, this group was renamed PACE (Partnership for Advancing Computing Education) and this is about to be launched.
- Continuing the work on reversing declining enrollments in computing disciplines and in the process fostering a positive image of computing among young people
- Supporting K-12 activity and the Two-Year College Education Committee, the latter now being referred to as the Committee for Computing Education in Community Colleges (CCECC for short)
- Supporting work on a new computer science volume, now referred to as CS 2013
- Completing a master’s degree report on master’s-level curricular guidance
- Investigating the desirability of embarking on reviews of the current Software Engineering and Computer Engineering volumes, namely SE 2004 and CE 2004
- Broadening international participation in computing education activities; in particular the Education Board took some tentative steps towards having a high profile computing education conference in Europe
- Enhancing the effectiveness of the Education Board and Education Council
- Increasing our visibility within the community
- Agreeing to certain time limits for membership of the Education Board

Challenges for FY 2012 include further development of many of last year’s activities:

- Continuing to evolve arrangements associated with the development of both the Education Board and the Education Council
- Supporting the development of CS 2013
- Continuing to support K-12 activity and the related CS10k project
- Increasing international activity in particular considering supporting and progressing an initiative from ACM India
- Supporting the Committee for Computing Education in Community Colleges and in particular its IT initiative
- Supporting the launch and the development of PACE
- Considering interim reviews of publications in both software engineering and in computer engineering in conjunction with the Computer Society
- Creating a publication to provide master’s-level curricular guidance to the community
- Increasing web-based support for the community to keep them more involved with curriculum development
- Supporting steps to gather statistics for all computing institutions, along the lines of the annual Taulbee report
- Progressing arrangements for making adjustments to the membership of the Education Board
- Further extending the leadership role of the Education Board and the Education Council
Section One

Summary of FY 2011 Activities

1.1 Education Board Strategic Priorities

At the ACM Council meeting in October 2010 there had been considerable discussion about many aspects of computing education. It was suggested that the Ed Board might give find benefit in giving consideration to the identification of a set of strategic priorities for their work. The Education Board duly considered this at its meeting in Seattle on 10th and 11th December 2010.

Any discussion about strategic priorities had to be seen in the context of the Charter of the Education Board, namely

The ACM Education Board – its Charter

Scope
The general scope of the Education Board is to promote computer science education at all levels and in all ways possible. The Board will be an executive-like committee overseeing the Education Council and will initiate, direct, and manage key ACM educational projects. This includes activities such as the promotion of curriculum recommendations, the coordination of educational activities, and efforts to provide educational and information services to the ACM membership.

The Board will oversee the work of the Education Council. This body will include representatives of all ACM committees concerned with accreditation, curricula, aid to educational institutions, and other educational activities.

1.1.1 Strategic Objectives

The following were identified as strategic objectives for the Education Board (and these were later agreed to by the Education Council at its meeting in Miami in February 2011):

- To provide a focus for ACM activity and leadership in the general area of computing education
- To support be ACM’s strategic objectives through activities and initiatives in computing education; this includes providing support for ACM’s various Councils
- To understand the education related needs and aspirations of ACM members – students, academics, practitioners (and their managers) and employers - and to respond appropriately on behalf of ACM
- To provide leadership for the computing community in curricular development and curricular guidance; the community is to include all levels of education (specifically including K-12 and Two-Year College activity) with the emphasis being on higher education
- Where possible to act on behalf of the computing community to increase the status and standing of computing education
- In recognising ACM’s role as an international organisation, to understand the differing needs of the international community and to address these in Education Board and Education Council considerations
- To organise and manage meetings of the Education Council, to keep the Council members up-to-date with significant developments and generally to manage the work of the Council
- To approve ACM appointments to education-related bodies such as ABET, and to keep informed about and engage in significant related activity

1.1.2 Current Priorities

At the Seattle meeting of the Education Board, it was further agreed that there was a need to provide a focus for current activity. It identified the following as priority areas

- Support for the effort to produce the next Computer Science volume, referred to as CS 2013
• The Advanced Placement initiative and the related CS10k project, i.e. the challenge of producing for the US 10k teachers properly qualified to teach to the new curriculum
• Certain international initiatives; in particular an initiative involving India was being considered

It was also felt that thought should be given to gathering statistics about the uptake and state of computing in all institutions of higher education; currently the Taulbee report addresses this but for only selected (the top research) institutions.

1.2 Education Council activities

1.2.1 Updating the membership of the Education Council / Board

The Education Board and the Education Council have been in existence now since 2006. At the time of the formation of the new bodies, there was a mandate from on high to introduce new blood, to have younger folk involved, etc. so as to refresh the Board and Council. To some extent that happened and this has been very successful. Yet within the education community there is a need to gain experience and confidence prior to “making a difference” and so it is not always easy to find appropriate young blood.

For the record, it is important to emphasize that the positive aspects of the last reorganization have been:
• The reduction in the size of the Education Board
• The inclusion of representatives from industry
• Accompanying the above, an Education Board that is now engaged and operating well
• An Education Board that does act well in relation to the Council
• An Education Council that is consulted and kept informed
• Education Council meetings that are welcomed and enjoyed

It is essential to keep the Board and the Council fresh and alive: Last year it seemed timely, having gained experience of the present arrangements, to embark on a modest adjustment to the membership of the Education Council, and that has happened. In its present incarnation, the Education Council is internal to ACM and contains representatives of all significant educational interest within ACM. Thus:

• All members of the Education Board are automatically members of the Education Council
• Those SIGs with significant educational activity have a formal representative on the Education Council
• There are representatives of CSTA, the Two-Year College Education Committee, the Education Policy Committee
• Certain ABET representation is included
• Certain people are included because of the distinctive contribution they make to computing education (e.g. NSF Distinguished Educators)
• Additional SIG and other representatives are included
• In the interests of continuity, a certain proportion (say 50%) of the present Education Council membership excluding Education Board members has been retained.

In making decisions about the phrase “significant educational activity,” activity such as an education strand or theme within an annual conference would qualify, or the existence of an education officer. For this purpose Lillian Israel’s activity chart could be referenced. This includes SIGCSE, SIGITE, SIGPLAN, SIGGRAPH and SIGCHI. To clarify the above, it would be natural to expect more than one member of some SIGs (e.g. SIGCSE) to be a member of the Education Council although one would be identified as the formal representative of the SIG. The membership of the updated Education Council is included in Annex A.

Membership of the Education Board itself had still to be addressed; that is a delicate matter and it has formed part of the considerations of the Board during this year. Ultimately the Education Board took the important step of agreeing that membership of the Board should be limited to at most two terms of three years.
1.2.2 The Miami meeting

In accord with the arrangement (entered into at the EC budget meeting in February 2007) that there should be one Education Council meeting each eight months approximately, there was a single meeting of the Education Council in FY 2011. The eighth meeting of the Education Council and it took place at the Hyatt Regency Miami Hotel in Miami, Florida on 6th and 7th February 2011. As was clear from the earlier meetings, the energy level of the Education Council is always extraordinarily high. The participants share a continuing sense of urgency about the state of computing education and a strong commitment to improving the situation, and this includes attracting more students to the field and taking steps to heighten the profile of the area.

In planning this meeting, the following goals were identified, namely to:

- To engage with the proposed strategic objectives that the Ed Board has been discussing, and to highlight more short term tactical objectives
- To provide an update on certain new initiatives, to ensure that a number of ongoing activities are being properly supported by the Ed Council and to initiate actions as appropriate. The Ed Board sees the following three initiatives as priorities for the Council for the near future (in no particular order): supporting CS 2013, fostering the success of AP / CS10k project and initiating and supporting certain international initiatives (in particular in India)
- To plan future work activity towards specific deliverables

The final program included presentations on: ACM itself, ACM’s Education Policy Committee; certain curriculum-related reports; developments regarding AP Computer Science by Jan Cuny; the Two-Year College Education Committee by Beth Hawthorne.

A popular feature of Education Council meetings is the panel session. On this occasion and in line with immediate priorities, the theme was the AP /CS10k project; the panelists involved were Owen Astrachan, Jan Cuny, Dan Garcia, Larry Snyder and Chris Stephenson joined by phone. The aim was to share best practice but also find out how the ACM and the Education Council in particular can better help and support the AP work. The session was generally regarded as excellent.

1.3 The Future of Computing Education Summit

At recent meetings of the Education Council there had been considerable debate about the outcomes of the Future of Computing Education Summit (FoCE). The report on this appears at:

http://www.acm.org/education/future-of-computing-education-summit/

The Education Board had completed all its required actions following the Vancouver meeting of the Education Council. These included providing input on the concept of a coalition of professional bodies, identifying the five main bottlenecks to progress, addressing cooperation with industry, and looking at impact factors.

Much of the ensuing discussion then focused on the concept of a coalition of professional societies and the role that such a grouping may play; importantly, John White was included in the subsequent discussion and provided a very valuable perspective on a number of issues. There were concerns that the new body might conflict in its aims with those of the Education Board, the Computer Society, and other professional bodies. After discussion, the view was taken that the new body should be seen to take on a role not already filled by existing established bodies; without this, it would have difficulty in receiving support.

Various proposals were produced. Ultimately, there was encouragement for the proposed new body to focus on information gathering, coordinating, connecting, and encouraging but not to take on responsibility for such matters as curriculum development. It would also subsume all the action items emerging from the FoCE itself.

1.3.1 PACE – Partnership for Advancing Computing Education
An outcome of this discussion was a proposal to set up a Computing Education Coordinating Council, CECC for short. An inaugural meeting of CECC took place in Washington DC on 26th April 2011. The member organizations present were ACM, the Association for Information Systems (AIS), the Computer Society (IEEE CS), the Computer Science Teachers Association (CSTA) and the National Center for Women & Information Technology (NCWIT). Harriet Taylor and Joe Urban were also present as representatives of NSF. From the ACM John White, Cameron Wilson and Andrew McGettrick were present as well as Mark Guzdial, Heikki Topi and Jane Prey – the latter three had done much of the background preparatory work in conjunction with Tom Hilburn from IEEE Computer Society.

At the meeting it was felt that CECC, as a name for the organization, lacked buzz and aspiration. Accordingly the new name PACE emerged, and a draft constitution was discussed; later this was agreed. See Annex B. There was general agreement by all attending organizations (ACM, AIS, CSTA, IEEE-CS and NCWIT) on the purpose, structure and start-up activities for PACE. However, there were some items needing further interaction and settlement.

Following this meeting, all five of the present institutions agreed to be founding members of PACE. The Administrative Director will be Mark Guzdial and he will have responsibility for coordinating the growth and development of PACE. The chair of the PACE Board of Directors (one from each of the five founding organizations) is Lecia Barker (NCWIT) with Andrew McGettrick (ACM) as Vice-Chair.

To provide a brief overview of PACE:

- **Goals and Objectives**
  - High quality, diversity, and capacity of the computing workforce
  - High quality of computing education at all levels
  - Increased stability of enrollments at levels compatible with demands
- **Membership provides opportunities to**
  - Advance the state of computing education
  - Share strategies and innovations
  - Build partnerships to support and enhance current and new initiatives
  - Reduce expense and increase impact

**1.4 Supporting K-12 computing efforts**

**1.4.1 Developments involving AP**

The ongoing discussions about the AP Computer Science exams are important for computing in the U.S. A decision had been made by the College Board in Spring of 2008 to discontinue the AB exam (a second exam in computer science) from May 2009 on the grounds of small numbers of students taking the exam and its overall impact on minority students. So to be precise, from May 2010 there has been no AB exam; only the AP Computer Science A exam is now available. Owen Astrachan, Mark Guzdial, Dan Garcia, Deepak Kumar, Eric Roberts and Larry Snyder in conjunction with Chris Stephenson and Michelle Hutton from the Education Council have been active in providing advice and guidance to the College Board on the best way forward as far as future computer science exams are concerned. Jan Cuny (Education Council) has been a key player in guiding and promoting these developments.

Following extensive consultation and discussion, a new AP curriculum has been devised. See http://csprinciples.org/ It is based on seven ‘big ideas’ - and these have been recently revised - namely

1. **Creativity**: Computing is a creative activity.
2. **Abstraction**: Abstraction reduces information and detail to facilitate focus on relevant concepts.
3. **Data**: Data and information facilitate the creation of knowledge.
4. **Algorithms**: Algorithms are used to develop and express solutions to
computational problems.

V. Programming: Programming enables problem solving, human expression and creation of knowledge.

VI. Internet: The Internet pervades modern computing.

VII. Impact: Computing has global impacts.

During 2010-11 a first phase of piloting the new course took place. Five sites had been selected, with Dan Garcia and Larry Snyder involved in separate activities. For the second phase of piloting in 2011-12 some nine sites have been selected (with both Georgia Tech and Stanford University being involved)

Following the initial piloting, the College Board sought attestations from universities, in support of the new exam and the outcome of this would be crucial to the ongoing work and the wider acceptability of the new exam.

Much is captured in a memo from Larry Snyder to members of the Education Council:

I'm writing to thank all of you who pitched in to push the AP Computer Science Principles "attestation process" forward. The effort closed Friday and, it has been extremely successful! For once the community didn't circle the wagons and shoot inward. Recall that we asked departments four questions:

a) Is this college level work?
b) Would your department give students credit for it?
c) Would your department offer an equivalent course?
d) Would your department give placement to successful students?

By my records 100 North American departments agreed with at least one of those, and most agreed with several. A list of schools that also agreed to allow their names to be used is here http://csprinciples.org/attestation.php though it may not be fully up to date. Equally gratifying is that the endorsements came from every type of department -- large, small, public, private, etc. -- demonstrating that AP CS Principles is a concept the whole community embraces. There can be no doubt that Ed Council efforts helped! Thank you very much! – LS

1.4.2 Additional Considerations

Fostering a positive image of computing among young people

One of the factors contributing to the enrollment crisis has been that young people do not see today’s programs of study in computing as being sufficiently attractive or offering attractive career opportunities. The reasons given for this loss of interest in the popular press include the phenomena of offshoring and outsourcing, a poor understanding of the discipline among the general public, problems with the teaching of the discipline in high school, inadequate attention to the achievements of the discipline, and a lack of diversity in the field that reduces its appeal to women and minorities. These factors are complex and interconnected. The Education Board and Education Council have continued to analyze the situation to try to gain a better understanding of the dynamics and relative importance of these issues.

Grady Booch gave an inspiring keynote address at SIGCSE 2007, in which he talked about the need to rediscover the wonder and awe of computing and to make its joys more evident to the next generation. At SIGCSE 2008 in Portland, at SIGCSE 2009 in Chattanooga, at SIGCSE 2010 in Milwaukee and again at SIGCSE 2011 in Dallas, Texas, members of the Education Board put forward a submission for a special panel session that would build on this. Their session on the general topic of Rediscovering the Passion, Beauty, Joy and Awe: Making Computing Fun Again have attracted considerable audiences and they were typically deemed to be one of the successes of these conferences.
**Curriculum considerations**

It has seemed clear that any action plan related to computing education needs to include a campaign of some kind to foster positive images of the discipline among young people. That campaign would have to involve developing new curricular offerings that hold greater appeal and greater promise. It will be important over the next several years to continue to experiment with different models intended to increase the attractiveness of the discipline. It is unlikely that any single model or any single remedy will meet the needs of all students. Individual members of the Education Board / Council have developed ideas in this regard and they are experimenting in order to gain a better understanding of the factors that shed light on the situation or contribute to success. The metrics for success in this endeavor must include both increased admissions and increased retention rates in degree programs.

**1.5 Report from the Committee for Computing Education in Community Colleges**

Dr. Elizabeth K. Hawthorne provides the following report on the activities of the ACM Committee for Computing Education in Community Colleges (CCECC), formerly the Two-Year College Education Committee (TYCEC) for the period July 1, 2010 - June 30, 2011.

**CCECC (www.acmccecc.org) MEMBERSHIP:**

**Members**
- Elizabeth K. Hawthorne, CCECC Chair; Senior Professor, Union County College; ehwalthorne@acm.org
- Robert D. Campbell, CCECC Vice-Chair; VP for IT CUNY Graduate Center; rcampbell@gc.cuny.edu

**Associate Members**
- Deborah Boisvert, Executive Director, BATEC Center for IT, University College, University of Massachusetts Boston, MA
- Robert Deadman, Asst Vice-President of Business, Computing Technology and Logistics, Ivy Tech Community College, Indianapolis, IN
- Sierra Hampton, Manager of Exam Development, Citrix Systems, Inc., Ft. Lauderdale, FL
- Margaret Leary, Professor, Information Technology, Northern Virginia Community College, Annandale, VA
- Dan Myers, Academic Programs Manager, Citrix Systems, Inc., Castle Pines, CO
- Lance Perez, Professor, Electrical Engineering, University of Nebraska, Lincoln, NE
- Michael Qaissaunee, Associate Professor, Engineering & Technology, Brookdale Community College, Lincroft, NJ
- Anita Verno, Associate Professor, Information Technology, Bergen Community College, Paramus, NJ
- Jason Wertz, Assistant Professor, Computer Science, Montgomery County Community College, Blue Bell, PA
- Christopher Wu, Associate Director, Mid-Pacific ICT (MPICT) Center, San Francisco, CA
- Kim Yohannan, Academic Alliance Manager, EMC Corporation, Franklin, MA

**Emeriti Members**
- Karl Klee
- John Impagliazzo
- Joyce Currie Little
- Dick Austing

**PURPOSE:**

The Committee charter and purpose is as follows. The ACM Committee for Computing Education in Community Colleges is the standing committee of the ACM Education Board concerned with computing education at associate-degree granting colleges and similar post-secondary institutions throughout the world. The Committee advises the Education Board as directed on all issues concerning curriculum, pedagogy and assessment, and engages in advocacy and policy for this sector of higher education.
The CCECC achieved the following milestones in FY11 (July 1, 2010 – June 30, 2011):

- Concluded the NSF-funded Strategic Summit on the Computing Education Challenges in Community Colleges with final report to NSF.
- Produced and widely disseminated the report of findings from the Strategic Summit on the Computing Education Challenges in Community Colleges – www.acmccecc.org/summitreport
- Submitted project proposal to ACM Education Board for development of associate-degree curricular guidelines in Information Technology. The two-phase project was approved with budget still pending.
- Participated in the CS2013 steering committee curricular development project.
- Formal adoption of Committee By-Laws and a new Committee name – Committee for Computing Education in Community Colleges (CCECC) – by the ACM Education Board - www.acmccecc.org/committee/operatingprinciples.aspx
- Established new committee structure and appointments of associate and emeriti members - www.acmccecc.org/committee/History.aspx - as replacements for retiring members Karl Klee and Anita Wright.
- Completed implementation of the next phase of CAP Space, an online repository of curricula, assessment and pedagogy resources – www.capspace.org.
- Established Facebook presence, www.facebook.com/ACMccecc, with 33 likes.
- Produced a brochure announcing the 20th anniversary of the Committee along with new CCECC name. Color brochure mailed to all community college computer science and 3 information systems department chairs and distributed at conferences - www.acmccecc.org/committee/CommitteeFileUploads/2011CCECCbrochure.pdf
- The brochure mailing (mentioned above) included a pointer to an online survey about the types of computing programs offered in community colleges - www.acmccecc.org/survey/
- Collaboration with colleagues and dissemination of information through participation in a variety of conferences, including the NSF ATE PI Conference 2010, SHGCSE 2011, ITiCSE 2011, the League for Innovation in the Community College 2011, AACC annual convention 2011, Faculty of the Future Conference 2011, and CISSE 2011.
- Promotion of internationalization of CCECC work by presenting at the ITiCSE 2011 conference.
- Visited two more NSF ATE centers as part of our outreach efforts: MPICT (San Francisco) - www.mpict.org and CSEC (Tulsa) - www.cseonline.org.
- Communication with colleagues via a featured column in the ACM Inroads publication, Community College Corner.
- Ongoing communication and outreach efforts with Chris Stephenson, Executive Director of CSTA– http://csta.acm.org/
- Invited to participate in the NSF-funded Interdisciplinary Computing Working Group
- Continued participation on the ACM Education Policy Committee and other advocacy efforts on behalf of computing education in the community college sector.
- Presentations to the ACM Education Council and support for the goals and objectives of the ACM Education Council and Board through a variety of synergistic activities.

1.6 Updating the computing curricula guidelines

With five volumes of curricular guidelines now published as well as an Overview volume, it was necessary to demonstrate ACM’s commitment to keeping these curricular models up-to-date. The following sub-
sections offer additional comments about how that work proceeded in each of the major areas.

1.6.1 General strategy

Within the Education Board there had been a dialogue on whether the current five-volume strategy employed within CC 2001 remains appropriate. The concept of the five-volume series has now received acceptance within the community and has had a considerable impact. To alter this after just five years would be risky. It could have the possible effect of creating unnecessary confusion at a time when these ideas are becoming accepted. Accordingly, it was felt that the five-volume idea should be retained for the next few years at least.

1.6.2 Computer science – Towards CS 2013

The CS 2013 work is a joint activity involving ACM and the IEEE Computer Society, with ACM taking the lead in line with an agreed memorandum of Understanding between ACM and the Computer Society. Work on this has proceeded apace under the leadership of Mehran Sahami (Stanford) and Steve Roach (UT, El Paso). The following notes are heavily based on slides, etc from the CS 2013 group.

A Steering Committee is in place; it consists of

ACM
Mehran Sahami, Chair (Stanford)
Andrea Danyluk (Williams College)
Sally Fincher (Univ. of Kent, UK)
Kathleen Fisher (Tufts University)
Dan Grossman (Univ. of Washington)
Beth Hawthorne (Union County Coll.)
Randy Katz (UC Berkeley)
Rich LeBlanc (Seattle Univ.)
Dave Reed (Creighton)

IEEE-CS
Steve Roach, Chair (UT, El Paso)
Ernesto Cuadros-Vargas (Universidad Católica San Pablo, Peru)
Ronald Dodge (US Military Academy)
Robert France (Colorado State)
Amruth Kumar (Ramapo College of NJ)
Brian Robinson (ABB corporation)
Remzi Seker (U. of Arkansas, Little Rock)
Alfred Thompson (Microsoft)

The Education Board has agreed to a charter with the Steering Committee, namely:

To review the Joint ACM and IEEE/CS Computer Science volume of Computing Curricula 2001 and the accompanying interim review CS 2008, and develop a revised and enhanced version for the year 2013 that will match the latest developments in the discipline and have lasting impact.

The CS2013 task force will seek input from a diverse audience with the goal of broadening participation in computer science. The report will seek to be international in scope and offer curricular and pedagogical guidance applicable to a wide range of institutions. The process of producing the final report will include multiple opportunities for public consultation and scrutiny.

In their early work, the Steering Committee sent out a questionnaire (December 2010) to some 1500 US department chairs/directors of undergraduate education and around 2000 international departmental chairs to gather views and to gain reactions to earlier curricula efforts, in particular CS 2001 and the interim volume CS 2008, but also to receive suggestions for new topics and knowledge areas. Some 201 responses were received. In March 2011, a presentation was also made at SIGCSE 2011 in Dallas,
Texas. The high-level themes emerging for CS 2013 are described by the Committee as:

- “Big Tent” view of Computer Science
  “Outward” looking view of the field
  Able to bridge to multi-disciplinary work (“Computational X”)
- Managing curriculum size
  CS2001 reduced total required hours from CC’91
  Aim to not increase required hours from CS2001
- Course exemplars as opposed to stylized courses
  Pointers to existing courses that incorporate knowledge units
  Not creating a set of reference classes
- Be aware of institutional needs
  Variable goals, resources, and constraints

The principles being adopted for CS 2013 are described as;

1. Identify essential skills and body of knowledge for CS undergraduates.
2. CS is a rapidly changing field, drawing from and contributing to variety of disciplines. Must prepare students for lifelong learning.
3. CS2013 is serving many constituents, including: faculty, students, administrators, curricula developers, and industry.
4. Curricular guidelines must be relevant to a variety of institution types (large/small, research/teaching, 4-yr/2-yr, US/int’l)
5. Provide guidance for level of mastery for topics, and show exemplars of fielded courses covering topics.
6. Provide realistic, adoptable recommendations that support novel curricular designs, and attract full range of talent to field.
7. Should include professional practice (e.g. communication skills, teamwork, ethics) as components of undergraduate experience.

The planned schedule envisaged for the production of the CS 2013 report is seen as:

- August 2011: 2nd in-person meeting of steering committee
  Incorporate community feedback
  Finalize draft of Body of Knowledge
- December 2011: (Preliminary) Strawman draft of CS2013
  Outcomes/knowledge units lead; curriculum/pedagogy follow
  Circulate for comments to community
  Present at SIGCSE-2012 and other venues
- Winter/Summer 2012: Committee meetings
  Continue incorporation of feedback
  Further hone report
- Fall 2012: Stoneman draft of CS2013
  Refined Ironman draft of CS2013 available at SIGCSE
- Summer 2013: Final CS2013 Report

1.6.3 Two-year College IT Activity

In recent months there has been a wish to press ahead with a two-year college volume on IT. After much to-ing and fro-ing, the CCECC has formed a group to undertake the work and importantly it involves members of SIGITE; moreover, a plan has been devised to press ahead with this.

The team that has been assembled is:

- Deborah Boisvert, University of Mass. and SIGITE member
- Rob Deadman, Ivy Tech Community College System and SIGITE member
The plan for the Development of Associate-Degree IT Curricular Guidelines is set out below:

The proposed **IT curricular guidelines** envisions IT education and skills in the context of curricular pathways within various career domains and identifying forward-looking curricula, assessment and pedagogy that serves the targeted audience. The proposed **IT curricular guidelines** would be influenced and formulated by a broad-based consortium of participants.

**Phase I – Research for associate-degree IT guidelines**

Deliverables: report of preliminary investigation to the Chair of the ACM Education Board. Participants include: CCECC members; representatives from NSF ATE centers, SIGITE, IEE-CS, Canadian Information Processing Society (CIPS); business, industry and government.

Inputs include:
- The associate-degree curricular guidelines from 2000 at [www.capspace.org/committee/CommitteeFileUploads/acmguide.pdf](http://www.capspace.org/committee/CommitteeFileUploads/acmguide.pdf), which recognizes three different IT tracks: networking services, Internet/web services, and user support services
- ACM IT volume ([www.acm.org/education/curricula/IT2008%20Curriculum.pdf](http://www.acm.org/education/curricula/IT2008%20Curriculum.pdf)); draft two-year IT guidelines from SIGITE
- “Digitally Enhancing America’s Community Colleges: Strategic Opportunities for Computing Education,” report of findings from NSF/ACM Strategic Summit ([www.capspace.org/summitreport](http://www.capspace.org/summitreport))
Process:
- The CCECC is gathering information on IT programs offered in community colleges, such as networking, cyber security, game development and web development. See www.acmccecc.org/survey.
- Use a variety of modern collaboration and communication strategies for this consultation: web/email communication, surveys, individual academic and industrial contacts, etc.
- Collect information and opinion from the principal curriculum stakeholders (industry and academia) about the need for a CCECC IT volume (BOK, curriculum architecture, pedagogy, infrastructure, etc.). Of particular interest would be:
  - the extent to which CCECC courses in information technology possess meaningful articulation pathways with 4 year college programs, and
  - the collection of information and opinion about the value and usefulness of the four year volume in the community college setting.
- Analyze and assess the results of this research activity.
- Prepare a report that describes the process, analysis and assessment of the information collected and makes recommendations concerning the following:
  - The type and extent of guidance needed for CCECC IT programs
  - An estimate of the amount of effort and a proposed schedule
  - Commentary on the extent to which articulation with the four year IT volume is desirable

Phase II – Development of associate-degree IT guidelines

Deliverables: two iterative drafts (strawman and stoneman) with community review to produce the final curricular guidelines
Process: with approval from the ACM Education Board:
- Recruit appropriate participants for this curricular development effort based upon Phase I findings.
- Develop initial draft (strawman) for community review.
- Incorporate this initial feedback to develop next version (stoneman) for further community review.
- Incorporate this final feedback to produce the final curricular report.
- Disseminate associate-degree IT guidelines.

1.6.4 Computer Engineering and Software Engineering

The question had arisen about updating curricula guidance published in 2004, for both Computer Engineering (CE) and Software Engineering (SE). Two small teams, joint with the Computer Society, were set up to consider the usefulness and desirability of undertaking such an exercise. A charter for each was agreed with the Education Board and the teams are due to report in the near future; indeed the CE review group has already reported.

Charges to these review groups:
- 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 (BOK, curriculum architecture, pedagogy, infrastructure, etc.). Of particular interest would be the collection of information and opinion about the value and usefulness of CE2004 (SE2004). It is recommended that the RTF use a variety of methods for this consultation: web/email communication, surveys, individual academic and industrial contacts, etc.
- Analyze and assess the results of the consultation process to determine the type and extent of change needed.
- Prepare a report for the IEEE-CS Educational Activities Board and the ACM Education Board. The report should describe the consultation process, present an analysis and
assessment of the information collected, and makes recommendations concerning the following:

- The type and extent of revision needed to CE2004 (SE2004).
- An estimate of the amount of effort needed (e.g., number of volunteers and total hours) and a proposed schedule for the recommended revision.

- We would appreciate an interim status report after three months of work and the final report after six months.

The CE Review Task Force consisted of

Computer Society: Eric Durant (Milwaukee School of Engineering, lead), Mitch Thornton (SMU) and Tim Wilson (ERAU)

ACM: Susan Conry (Clarkson), John Impagliazzo (Hofstra) and, to a much lesser extent, Andrew McGettrick

The SE Review Task Force consisted of:

Computer Society: (lead) Mark Ardis, (Stevens Institute of Technology), Greg Hislop (Drexel University), Mark Sebern (Milwaukee School of Engineering)

ACM: Joanne Atlee (University of Waterloo, Canada), Dave Budgen (University of Durham, UK), Renee McCauley (College of Charleston)

1.7 Master’s degree initiative

1.7.1 Master’s report

Part of the motivation behind this initiative has been the attention being given to master’s programs in many countries. In Europe, for instance, the Bologna agreement has spawned considerable interest in and attention to master’s programs. However, worldwide, there is ever greater attention to the effectiveness of degree programs and to mutual recognition of qualifications across the globe. Given the ACM leadership position in computing education, it was deemed important that ACM should seek to provide guidance in this area.

This master’s initiative is a joint activity involving members of the Education Board and Education Council working with members of the IEEE Computer Society. The team involved is: Lillian Cassel (chair), Michael Caspersen, Gordon Davies, Art Pyster, Kevin Scott, and Heikki Topi.

The findings of the group included the following:

- Master’s Programs exist in large numbers, and they vary greatly; recently the CRA Bulletin highlighted the fact that in 2005 graduates from master’s programs in computing had risen by some 11%
- There should be a wider dissemination of knowledge about these programs
- There was a need for the group to gain a broader understanding of the reasons for these different programs.

The report was considered at the Vancouver meeting of the Education Council and received very positive feedback. A small number of matters remained to be addressed.

1.8 International activity

1.8.1 European efforts

The Informatics Education Europe series of conferences had stalled as a result of an effort to host a meeting in 2010 in Rome; the number of papers elicited was below the threshold needed to proceed.
The Education Board sought to re-launch these conferences through the auspices and with the support of ACM Europe.

At a meeting between ACM Europe and Informatics Europe (the latter being essentially a group formed from the heads of Computing departments throughout Europe) there was discussion about computing education in Europe and agreement that there was a need for a high profile and highly prestigious computing education conference in Europe. This would serve to pull together the computing education community within Europe and provide them with a much needed forum for exchanging views and experiences as well as tracking new developments.

It was agreed to raise the issue with SIGCSE, who had responsibility for ITICSE; it was important not to have conflict with ITICSE and to have an event that was European in character. The attention of SIGCSE would also be drawn to the fact that, as well as ACM Europe there was ACM India and ACM China and these Councils may wish to host similar conferences.

Members of the Board / Council have also been involved in:

- monitoring the activities of Informatics Europe
- keeping a close eye on accreditation developments within Europe. There has been an EU funded project called the Euro-Inf project managed by ASIN in Germany with main partners the University of Paderborn and the University of Applied Sciences in Hamburg in Germany and involving CEPIS in Brussels. The main purpose of this project has been to devise criteria for the accreditation of degrees in Informatics across Europe, both at the undergraduate level and at the master’s level. Education Board / Council members were involved in this in an international advisory capacity and were present at the major meetings. This has given rise to EQANIE, the European Quality Assurance Network in Informatics Education and the work of that is being based on the outputs from Euro-Inf.
- monitoring activity leading to the signing of the Seoul Accord. A number of countries (South Korea, US, UK, Canada, Australia and Japan) have been developing criteria for the mutual recognition internationally of accreditation activity. This was intended to mirror for informatics the Washington Accord for engineering. The groups originally involved were: the Accreditation Board for Engineering Education of Korea, ABET, the BCS in the UK, the Canadian Information Processing Society, the Australian Computer Society and the Japan Accreditation Board for Engineers. At the first general meeting of the Accord held in meeting in Kyoto, Japan on 20th June 2009, two additional members were added: the Hong Kong Institution of Engineers and the institution of Engineering Education Taiwan. Importantly Joe Turner, member of the Education Council acts as its chair.
- following an initiative from the Education Board, Bobby Schnabel, chair of ACM’s Education Policy Committee was invited to make a presentation at the AGM of the Council of Professors and Heads of Computing in the UK (in Belfast on 19th April, 2011) on pre-university computing; the Royal Society in London is currently conducting an inquiry into the topic of Computing in Schools (i.e. pre-university education).

1.8.2 Developments related to India

Following discussion, an interesting proposal has been received from ACM India (via Mathai Joseph, ACM Council member) seeking support from the Education Board for activity that would contribute towards the improvement of CS education in India. That is a considerable undertaking given the size and scale of the problems.

In view of the nature of this and the other links with ACM India, the Education Board involved John White in these discussions. Much thought had to be given on the right way for ACM to proceed and this took time. However, a group from the Education Council (Mark Guzdial, Alison Clear and Andrew McGettrick) has now been identified to take this forward. Progress is being made and discussions are ongoing.

Mathai and his colleagues from ACM India have a clear-ish view of what they want, and see their ideas
developing initially through discussions locally (i.e. locally within India, and even within a set geographic region within India). In part this stems from the fact that they have to get buy-in from local people (who may help with assessment and tutoring) and employers who need to use these courses as an extra differentiator of applicants for employment.

They also see the material as supplementary in some sense, and not conforming to conventional ideas on course development. Initially they do not wish to get involved with syllabuses (or syllabi) and curricula since these are seen as belonging to particular groups within India; political problems ensue and this absorbs large amounts of time and energy. Currently they are thinking of using slides with voice-over.

So how does Ed Board / Ed Council support this? Currently the plan is:

a) to let material be developed locally in India by ACM India
b) for Mathai to come to the next Ed Council meeting (in Denver in September) to air the ideas; by that time he should have the outline of a course ready and this can form the basis of a wide ranging discussion. For instance he hopes and expects that there will be other such courses that can be brought to his attention by Ed Council members and can be used; he does not want to see India taking on this in isolation.
c) to then seek Ed Council involvement and interest
   - in reviewing or advising on the material
   - in discussing assessment ideas and regimes, and possibly being involved in an assessment activity
d) to plan a workshop in India for September 2012, this being modeled to some extent on an earlier meeting of the Education Board in Qatar but (very tentatively) including
   - a presentation on the problems of computing education in India
   - discussions of proposed solutions
   - feedback on some early experiences of the planned initiatives
   - meeting students and having discussions with them
   - having discussions with ACM personnel on this
   - hearing some high profile presentations from ACM folk and Indian colleagues
   - holding discussions with senior government officials
   - the opportunity should be taken to let ACM representatives witness material being taught in some of the Indian institutions.

1.9 Improving Understanding of the Computing Education Landscape

An important role for the Ed Board is to improve our understanding of the computing education landscape, not just in the US but globally. This helps to inform the Board and suggest areas of need and even priority.

In recent years the visit of the Education Board to Qatar provided great insight into many of the issues in the Middle East and was felt to be very valuable. Undertaking the initiative with ACM India is another such exercise.

Within certain institutions in the US there have been some very positive indicators of expanding enrollments. In part, evidence comes from the CRA Taulbee Survey. The Survey is conducted annually to document trends in enrollment, etc and it covers computer science, computer engineering and information sciences in US and in Canada. The most recent survey results were published on April 5th 2011 and can be found at http://www.cra.org/resources/taulbee/ Some highlights include:

- Total enrollments rose in 2010 by some nearly 11% over the numbers in 2009
- This is the third straight year of increases in total enrollment
- Degree production in computer science departments was up by 9%
• Share of degrees granted to females rose to 13.8%, an increase of 2.9% over the 2009 figures

The Taulbee Survey is based on activity in Ph.D.-granting institutions in the U.S. and Canada. Declining enrollments remain of concern, and it is highly desirable to gather reliable statistics for the whole community. The annual Taulbee Report is limited in reach; currently there is no similar source of information about the large number of other institutions. The TauRus project aims to address this.

There was a meeting between Renee McCauley (current chair of SIGCSE), Jodi Tims and Andrew McGettrick at SIGCSE in Dallas. Jodi had received initial funding of $5000 from SIGCSE to work on statistics gathering. She has made contact with CRA and they may help with further work. Also she has incorporated in her later work the earlier study by Michael Goldweber whose results appeared in Inroads, vol 2, no 2, June 2011, pages 38-42 in an article: TauRus – A “Taulbee Survey” For the Rest of US.

Jodi had contacted 1266 institutions, these being four year institutions of a variety of kinds. Each had no PhD granting ability and were not two year colleges. She has information on about 2700 programs these being mainly in the areas of Computer Science, Computer Engineering and Information Systems.

Of the questionnaires sent out (thousands!) she had received only 55 completed responses, and around a further 30 partially completed ones. The period for responding has not yet been closed. Her plan for the way ahead:

• Allow till (something like) end of April for more responses, paying particular attention to trying to get the partially completed responses completed in full
• Then embark on an analysis of the results

It seems that Taulbee (which probably gets about 50% completed forms) had only around 17% responses initially but when institutions saw the impact of the early work they were more encouraged to complete and the situation improved. So for Jodi there is an onus to get (even preliminary) results published and the hope is that this will act as a catalyst for improved responses and even more meaningful results. She will be happy to present these at the next meeting of the Ed Council. (I have agreed that Ed Council will pay for her and Renee to attend).

1.10 Promoting new curricular themes and strategies

The continuing anxieties about the state of enrollments and poor retention rates in some quarters suggest that there continue to be problems with the image and effectiveness of computing education. It is appropriate to continue to address this head-on and to continue to see it as important.

One of the major challenges is to understand in detail the nature of computing education at all levels and to decide how to re-conceptualize computing education in a way that will make it more appealing.

1.11 Enhancing the effectiveness of the Education Board and Education Council

The Education Council has been in existence now since 2006. There have been certain changes, most noticeably the recent changes to the Education Council. Now a process of refreshing the Education Council has been established and that process of change needs to become the norm so that the work of the Council is continually refreshed with an injection of new ideas.

During the year and in response to requests from members of the Education Council about better communications mechanisms, steps were taken to provide updates on computing education matters; in particular the Board has now included a column, called “EduBits,” in the fall edition of Inroads. It is hoped and expected that this will become a regular feature of Inroads.

1.12 Technology and Tools Task Force

The Technology and Tools Task Force, chaired by Education Board member Dan Garcia, with former Education Council members Sally Fincher and Don Bailes, have as their charter: “Promote great teaching by providing the best technology and tools resources for computing educators.” They developed a Web 2.0 website (in its alpha stage): Technology that Educators of Computing Hail
(TECH), initially hosted at http://plonetest.acm.org/techtools/. Dan leads a group of (mostly undergraduate) students at UC Berkeley who work on the site, with the help of 36 volunteer moderators (faculty, graduate students and undergraduates from institutions around the world). Recently, activity has been centered on migrating the site from the Plone-based ACM server to the Drupal-based Ensemble server. The Ensemble-housed TECH site is http://www.computingportal.org/TECH/, but the eventual URL for TECH (which may provide a re-direct to Ensemble) will be: http://tech.acm.org/

Ensemble is a project of Education Board member Lillian “Boots” Cassel and several other faculty, and is described on their About page at http://www.computingportal.org/about:

Ensemble is a new NSF NSDL Pathways project working to establish a national, distributed digital library for computing education. Our project is building a distributed portal providing access to a broad range of existing educational resources for computing while preserving the collections and their associated curation processes. We want to encourage contribution, use, reuse, review and evaluation of educational materials at multiple levels of granularity and we seek to support the full range of computing education communities including computer science, computer engineering, software engineering, information science, information systems and information technology as well as other areas often called “computing + X” or “X informatics.”

The Ensemble site provides a wealth of web 2.0 features, such as commenting, rating, and tagging of resources. It also supports roles, which serve as a reward structure for encouraging participation. Finally, Ensemble has a growing user community, which will be key to the success of TECH. The Beta launch of TECH in Ensemble took place at SIGCSE 2011. The upcoming year will focus on making it very easy for users to suggest a new or update an existing technology resource.
Section Two

Priorities for FYE 2012

2.1 PACE – moving forward

The concept of PACE has now emerged and has been agreed to. PACE has to be seen as serving a useful purpose beyond being just a venue for the various actors to learn to know about each other’s work. It should lead to immediate coordinated action. The types of questions that were identified some time ago by the Education Board and need answers include:

- How do we integrate existing initiatives so that they get the best possible visibility?
- Can there be a comprehensive study that documents lessons learned as a consequence of the recent enrollment crisis in computing?
- How do we transform the results of the study into a form that creates a compelling case that will receive attention in national media?
- Can we find the resources to design and implement a web site or sites so that there is a very high quality interactive and dynamic web presence for the initiative? Ideally the site(s) should bring members of the target audience back repeatedly and have the effect of creating a social network.
- How can a systematic message from the leading companies in the IT industry and other industries be sent out regarding the continued need for professionals with a very strong background in computing?
- Overall, how do we reach the target audience (middle and high school students, college freshmen and their parents; relevant guidance counselors) in a way that genuinely changes their thinking? We might need a national media campaign that would cost a very large amount of money. How can we get this funded?

It is crucial that PACE pursues to completion the actions identified at the time of the original Washington Summit and its aftermath.

2.2 Forthcoming Education Council activities

In the coming FY, there is the opportunity for two meetings of the Education Council. There is a need to build on the success of previous Council meetings, maintain the momentum and address identified action items. The first meeting will take place on 16th and 17th September 2011 in Denver, Colorado. The agenda is currently under consideration but the three topics identified earlier as current priorities will be central to that meeting.

2.3 Supporting K-12 efforts

Building on the success of the brochure

The production of the brochure and the linked web site had been a high profile activity of the Education Board / Council that seemed to have had a wholly beneficial impact. Every piece of feedback has been entirely positive. Although there are indications from the top institutions that there is a recent alleviation of the enrolment problems, it is far too early to make sweeping claims; moreover, there are still indications of considerable problems in other institutions.

There are regular suggestions of updating the brochure and the associated web site. These will be dealt with as they arise. But recently there have been approaches suggesting that a brochure for Computer Engineering would be welcomed. That will be considered in due course.

AP initiatives

Apart from Chris Stephenson being involved, Owen Astrachan, Dan Garcia, Mark Guzdial, Deepak Kumar, Eric Roberts, Larry Snyder and Michelle Hutton are all maintaining an active interest and an
involvement in the ongoing developments of the new AP examination under the leadership of Jan Cuny. All are members of the Education Council. To be more specific Owen Astrachan is one of the Co-PI’s of the Commission and both Chris Stephenson and Mark Guzdial are members of the Commission. Jan Cuny, Dan Garcia, Deepak Kumar and Eric Roberts are members of the associated Advisory Group.

Trials of the initial ideas have taken place, the attestation activity has been successfully negotiated, another more extensive set of trials is about to take place and there is the ongoing problem of supporting the CS10k project. The Board will be considering its next steps following the Denver meeting of the Education Council.

During the coming year the Royal Society in London will publish its report and that will be observed with considerable interest.

Review of CSTA curricula ideas

At the Berkeley meeting of the Education Council it was suggested that, just as other curricula recommendations are reviewed periodically, the same should apply to CSTA proposals. This was agreed. The Education Council will support this as required. In fact CSTA had already begun planning for the revision of their ACM Model Curriculum. That work is nearing completion. CSTA does intend to seek the endorsement of the Education Council once their document is complete.

2.4 Plans of the Committee for Computing Education in Community Colleges (CCECC)

The CCECC plans to pursue the following activities in FY12 (July 1, 2011 – June 30, 2012):

- Complete investigation phase of the associate-degree Information Technology (IT) project with a recommendation to the ACM Education Board by early spring 2012.
  - Appoint working group members
  - Conduct conference call with working group
  - Conduct in-person meetings with working group
  - Write report with recommendation
- Depending upon Ed Board direction begin second phase of the associate-degree IT project along with associated budget.
- Continued participation in the CS2013 steering committee curricular development project.
- Collaborate with CSTA colleagues to produce a poster with IT-related associate-degree programs. This poster will be disseminated nationally in support of CS Ed Week 2011.
- Appointments of additional CCECC associate members.
- Funding for and implementation of the next phase of CAP Space, an online repository of curricula, assessment and pedagogy resources.
- Engagement in a variety of advocacy efforts on behalf of computing education in the community college sector.
- Continuation of our representation on and collaboration with the ACM Education Policy Committee.
- Continuation of support for the ACM Education Council and Education Board goals and objectives
- Continuation of dissemination and outreach activities, including mailings, website enhancements, conference sessions and exchanges with colleagues, as well as continuation of our SIGCSE Inroads column and participating with the ACM Education Council.

2.5 Undergraduate curriculum efforts

2.5.1 Towards Computer science 2013

As reported earlier Mehran Sahami from Stanford University has undertaken the ACM leadership for the CS 2013 effort and in conjunction with Steve Roach from the Computer Society. That work is
progressing well. At the Denver meeting consideration will be given to how the Education Council can best support this activity as it moves forward.

2.5.2 Two-Year College IT plans

The work outlined in section 1.6.3 will proceed. The Education Board will be involved in monitoring progress and in supporting that work.

2.5.3 Software engineering and computer engineering

Work on carrying out an assessment of whether the community would welcome reviews of both the Software Engineering volume and the Computer Engineering volume will be completed. Then the Education Board will need to consider the findings and decide on a way ahead.

2.6 Master’s initiative

The group undertaking this master’s initiative presented its report to the Education Council at its meeting in Vancouver, and the report was well received. The Computer Society has approved the report. A small number of adjustments are still needed (e.g. to check up-to-date details on Bologna) but it is intended that this should be published in the coming year.

2.7 Extending the leadership role

The Education Board needs to continue to be alert to enhancing its leadership role. Beyond the activities already identified, the Education Board will need to consider the possibility of additional curricular developments. The nature and scope of the CS 2013 report will be crucial in this regard.

2.8 International activities

During the next FY existing international activities will be maintained but in addition some new initiatives will take place. In terms of ongoing activity:

- The Education Board will need to respond to the invitation to hold a computing education workshop in India. That is potentially a difficult challenge but it is expected that there will be a positive outcome from extensive discussions due to take place in Denver in September.
- It is expected that there will be a resolution of the discussions concerning the intended Informatics Education Europe re-launch and the associated issue of a high profile education conference for Europe. It is worth noting that there have been expressions of real interest from several quarters and it is clear that there is a computing education community in Europe whose needs have to be addressed. Any new series of computing education conferences has to be put on a sound footing.
- In Europe there is now a permanent accreditation activity based on the results of the Euro-Inf project, namely EQANIE. Members of the Board / Council continue to monitor developments.
- Developments associated with the Seoul Accord (with Joe Turner of the Education Council as chair) continue to be monitored

With these various developments it seems appropriate for the Education Board to take a more strategic view of how it should support computing education globally. The notion of partnering with and supporting the various ACM councils seems highly relevant.

2.9 Promoting new curricular themes and strategies

Addressing the matter of new curricular themes and strategies is central to many of the Education Board / Council activities. In particular, some of the new activity within the Council has this as a central focus and concern. Thus there had been the “First Year” project, the outputs of which are finding expression in the new AP initiative.

As computing becomes more integral to a range of disciplines, it seems likely that computing education will increasingly become more closely tied to education in other areas. These developing connections may develop
in several ways:

- By absorbing aspects of other disciplines into computing, which continues to evolve as a discipline
- By expanding the breadth of training we offer to computing students so that graduates can provide effective support in other areas, including science, engineering, economics, business, and education.
- By encouraging students to take a broader set of electives as part of their overall program of study
- By increasing the number of computing courses designed for students in other disciplines who will require those skills

These developments have the potential to lead to new kinds of degree programs. The outcomes of CS 2013 may well be crucial here.

2.10 Continuing to foster a positive image of computing

The Education Board / Council continue to believe that fostering a positive image of the discipline must remain a central concern. The vision must be appealing and stimulating to the community, it needs to offer advantages over existing possibilities, and it must lead to a measurable benefits in terms of enrollment trends. The Education Board / Council must continue to take the lead in this activity, but it will be important to engage the broader community in this discussion and debate.

It remains important to identify new curricular models and approaches that have proven to be effective in the institutions at which they were developed and then helping to promote the distribution of those new models by developing new curricular recommendations around those themes. The overall success of this endeavor will almost certainly require experimentation with many models, not all of which will succeed individually. The goal is to promote a diversity of strategies and then to let individual institutions choose models that are likely to work well in that environment.

2.11 Understanding the Computing Education Landscape

It will be important for the Board and Council to continue to strive to gain a better understanding of the Computing Education landscape globally. In the coming year the initiative with ACM India will contribute to that. Moreover the September ACM Council meeting will consider how better support for TauRus can be achieved.

2.12 Increasing visibility within the community

Another strategic goal toward increasing the effectiveness of the Education Board / Council consists of promoting public awareness of our work. Increasing our visibility is important:

- The community needs to be informed about the changes that have occurred and the reasons underlying those changes. It is encouraging that members of the Practitioners Board recently sought an update on Education Board / Council activities at a meeting in mid June in San Francisco. That has been viewed very positively and may lead to a closer working relationship between the Boards.
- At a time in which so many people in computing education continue to feel threatened by the possibility of declining enrollments, it is important for the ACM to be seen as an organization that not only cares about the problems but also as one that can marshal the resources necessary to have an impact. By showing support for the community, the ACM will be in a better position to enlist their aid as needed.
- The Education Board / Council need to firmly establish their leadership position and a fundamental aspect of this is being visible and being seen to be active in addressing the problems of the day and providing the necessary support.

These matters can now be addressed more effectively in various ways. There have been presentations at conferences, publication of curricular guidance, etc. But we must continue to address these matters in ways that ensure sustainability.

Acknowledgements
This report has relied heavily on the work of many people – those engaged in CS 2013, the CCECC group and members of the Education Board and Council.

Annex A

Roster of the Education Board and Education Council members (FY 2011)

Education Board
- Andrew McGettrick, Strathclyde University (Chair)
- Lillian Cassel, Villanova University
- Dan Garcia, University of California at Berkeley
- Mark Guzdial, Georgia Tech
- John Impagliazzo, University of Qatar / Hofstra
- Maggie Johnson, Google
- Jane Prey, Microsoft
- Eric Roberts, Stanford University (past chair)
- Larry Snyder, University of Washington
- Heikki Topi, Bentley University
- Yan Timanovsky, ACM Education Manager (since July 2010)
- Lillian Israel, ACM Director of Membership (until October 2010)
- John R. White, ACM Chief Executive Officer
- Chris Stephenson, Executive Director, Computer Science Teachers Association
- Cameron Wilson, Computing Education Policy Committee (and ACM)

Education Council (which also includes the members of the Education Board)
- Owen Astrachan, Duke University
- Marc Barr, Middle Tennessee State University (SIGGRAPH)
- Barbara Boucher Owens, Southwestern University (SIGCSE)
- Jan Cuny, University of Oregon/NSF
- Gordon Davies, UK Open University (retired), liaison for European initiatives
- Peter Denning, Naval Postgraduate School
- Roscoe Giles, Boston University
- Dan Grossman, University of Washington (SIGPLAN)
- Beth Hawthorne, Union County College (CCECC)
- Michelle Hutton, The Girls’ Middle School, Mountain View, CA, President of CSTA
- Lisa Kaczmarczyk, University of California at San Diego
- Deepak Kumar, Bryn Mawr College
- Rich LeBlanc, University of Seattle
- Terry Linkletter, Central Washington University
- Barry Lunt, Brigham Young University (SIGITE)
- Robert McCartney, University of Connecticut (ToCE)
- Ken Martin, University of North Florida, ABET
- Mirella Moro, Universidade Federal de Minas Gerais – UFMG, Belo Horizonte - MG, Brazil
- Barbara Price, Georgia Southern University, ABET
- Eugene Spafford, Purdue University
- Carol Spradling, Northwest Missouri State University
- Mark Stehlik, Carnegie Mellon University
- Josh Tenenberg, University of Washington (ToCE)
- Joe Turner, Clemson University (retired)
- Gerrit van der Veer, Vrije Universiteit Amsterdam, the Netherlands (SIGCHI)
- Patrick Walsh, IBM, ABET
- Cameron Wilson, ACM Education Policy Committee
- Michael Wrinn, Intel
Annex B

Draft Constitution of the Partnership for Advancing Computing Education (PACE)

Article I. Name

The name of the organization will be Partnership for Advancing Computing Education (hereinafter PACE or the Partnership).

Article II. Purpose

The Partnership enables and encourages organizations concerned with computing education to exchange information and collaborate on activities that will advance the state of computing education, address its challenges, and improve its quality. The communication and collaboration will take place at multiple levels of the participating organizations, including top industry and public policy leadership, key computing education leadership, and individual members.

The purpose of PACE is to support the accomplishment of the following goals and objectives of computing education as a field globally: 1) high quality, diversity, and capacity of the computing workforce; 2) high quality of computing education at all levels, and 3) increased stability of enrollments in computing programs at levels compatible with demand.

The ultimate success of PACE will be measured by its ability to advance the state of computing education measured by general reputation, visibility and status in public policy discussions, availability of funding to advance the field, creativity of ideas, innovativeness of program offerings, ability to attract students, ability to support the needs of key employers, etc. As a means of achieving the primary success criteria, the success of PACE can be measured by its ability to enable creative and productive collaboration, to facilitate communication, and improve mutual understanding between active stakeholders within the computing education community.

Article III. Membership

The membership of PACE is open to all organizations globally that (1) as part of their mission are working to advance the field of computing education, (2) are not-for-profit, and (3) do not have education of individual students as their primary mission. The PACE Board of Directors has the authority to determine which of the future applicants for membership in PACE fulfill the criteria stated above.

In this context, computing education refers to all aspects of educating those who wish to learn about computing at all levels including elementary, secondary, postsecondary, graduate, and professional education.
The initial member organizations of PACE are the Association for Computing Machinery [ACM], the Association for Information Systems [AIS], the Computer Science Teachers Association [CSTA], the IEEE Computer Society [IEEE CS], and the National Center for Women & Information Technology [NCWIT]. These organizations have fulfilled all the criteria specified above for a full membership in PACE.

**Article IV. Governance**

**Authority**

PACE shall be governed by a Board of Directors, which has the authority to establish the Bylaws for the PACE, maintain an appropriate committee structure, and administer programs for achieving the purpose specified above in Article II. It shall have preemptive authority in the Partnership matters over all officers, committees, and other bodies created by the Partnership. The Board shall authorize the implementation of its plans by means of suitable budgets, motions, and authority for contracts and expenditures; by creating and staffing positions and committees; by approving appointments; through amendments to the Constitution and Bylaws; and by such other actions as it may deem necessary.

A simple majority of the members of the Board of Directors will constitute a quorum. Provided that a quorum is present, the PACE Board actions will require a simple majority vote of Board of Directors present.

**Composition**

The Board of Directors shall have a minimum of five and a maximum of twelve members, each of whom represents a different member organization. Each member will cast one vote. The initial number of members shall be five, one from each of the founding member organizations; when the Partnership gains additional member organizations, the number of Board members shall increase accordingly until it reaches twelve.

As long as the number of Board members does not exceed twelve, each member organization nominates one Board member for a three-year term. Some of the initial terms will be shorter so that the terms of approximately one third of Board members will expire each year.

If the number of member organizations exceeds twelve, the members of the Board of Directors will be elected for a three-year term from a set of candidates nominated by the member organizations. Each year, the terms of four Board members will expire. Each member organization whose representative’s term is ending or who does not currently have a seat on the Board may nominate one candidate. Each
member organization shall cast a maximum of four votes in support of different individuals. The four highest vote getters each year shall become members of the Board. In the case of a tie, the member of the Board will be determined by a lottery. No Board member shall serve more than two consecutive three-year terms.

If a Board member resigns, the member organization whom the Board member represents shall name a replacement to complete the remaining term.

The Board will have a Chair and Vice-Chair, who is also the Chair-Elect. The Board will elect the Chair and Vice-Chair from among its members. The term of both the Chair and Vice-Chair is one year. They will have to continue to be members of their respective member organizations; in case a PACE officer’s membership in his/her member organization ceases, the officer will have to resign from his/her PACE position. If the Chair resigns in the middle of the term, the Vice-Chair becomes Chair for the remainder of the term, continuing for a full year as originally intended after the term completion, and a new Vice-Chair is elected by the Board. If the Vice-Chair resigns in the middle of the term, a new Vice-Chair is elected by the Board.

**Officers**

PACE will have an Administrative Director, Secretary and Treasurer selected to these positions by the Board of Directors. The officers will be responsible for overseeing the operational day-to-day affairs of the Partnership under the leadership of the Administrative Director. The Administrative Director serves also as a non-voting member of the Board but cannot be the Chair or the Vice-Chair. The Secretary and Treasurer may or may not be members of the Board of Directors.

**Meetings**

The Board of Directors shall hold an Annual Meeting. Additional meetings may be called by the Chair. If one-third of the members of the Board request an additional meeting, the Chair must call it. The Board has the authority to determine the most appropriate ways of conducting its meeting.

**Reports**

For each calendar year, the Board of Directors shall provide an annual report to the member organizations outlining the key activities and accomplishments of the year. The annual report shall be completed by the end of March of each year. The Board of Directors is also responsible for providing an approved activity plan and a budget for each calendar year by the end of the preceding November.
Article V. Financial Matters

The intent is to operate PACE with as low costs as possible. The Partnership will be physically located at the premises of one of the member organizations, and it will receive its financial, technical, and intellectual property protection services from the host member organization.

Article VI. Withdrawal

A member organization can withdraw from PACE at the end of a calendar year by submitting a written notice of withdrawal to the PACE Board at least six (6) months before such withdrawal. Upon withdrawal, the member organization shall forfeit any possible claims to the assets of PACE and shall cease to have any rights or privileges. However, such member shall continue to be liable for any of its obligations to PACE generated until the effective date of withdrawal.

Article VII. Amending the Constitution

Amending the constitution requires an approval by at least two thirds of the members of Board of Directors. In addition, any amendment will have to be ratified by at least two thirds of the member organizations before the changes will go into effect.