

**ACM Education Board
Annual Report for FYE 2010**

September, 2010

Contents

Executive Summary

1. Summary of FYE 2010 Activities

- 1.1 Education Council activities
 - 1.1.1 Updating the membership of the Education Council
 - 1.1.2 The Vancouver meeting
 - 1.1.3 The Berkeley meeting
- 1.2 The Future of Computing Education Summit
- 1.3 Supporting the K-12 computing efforts
- 1.4 Two-year College Education Committee activities
- 1.5 Updating the computing curricula guidelines
 - 1.5.1 General strategy
 - 1.5.2 Computer science
 - 1.5.3 Information systems
- 1.6 Master's degree initiatives
 - 1.6.1 Master's report
 - 1.6.2 The GSwERC report (since renamed GSwE2009)
- 1.7 Computing education publications
- 1.8 International activity
 - 1.8.1 European efforts
 - 1.8.2 The Qatar visit
 - 1.8.3 Developments related to India
- 1.9 Promoting new curricular themes and strategies
- 1.10 Enhancing the effectiveness of the Education Board and Education Council
- 1.11 Technology and Tools Task Force

2. Priorities for FYE 2011

- 2.1 The Future of Computing Education Summit – moving forward
- 2.2 Forthcoming Education Council activities
- 2.3 Supporting K-12 efforts
- 2.4 Two-year College Education Committee plans
- 2.5 Undergraduate curriculum efforts
 - 2.5.1 Towards Computer Science 2012/13
 - 2.5.2 Software Engineering and Computer Engineering
- 2.6 Master's initiatives
- 2.7 Extending the leadership role
- 2.8 International activity
- 2.9 Promoting new curricular themes and strategies
- 2.10 Continuing to foster a positive image of computing
- 2.11 Increasing visibility within the community

- Annex A Roster of Education Board and Education Council members**
- Annex B Computing Education Coordinating Committee**
- Annex C Towards a Gulf Region Summit on Computing Education**

Executive Summary

This report summarizes the activities of the ACM Education Board and the Education Council in FYE 2010 and outlines priorities for the coming year. Major accomplishments for this past year include the following:

- Having obtained funding from NSF and taken the lead in organizing and running a Summit in Computing Education in Washington in June 2009, ideas relating to the formation of a new Computing Education Coordinating Council, CECC for short (in which the Education Board is playing a leadership role) have now been developed
- 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
- Initiating work on a new computer science volume
- Completing the work on new information systems curriculum guidelines
- Completing a master's degree report and the GSWE2009 report on master's-level curricular guidance
- Promoting new curricular themes and strategies
- Broadening international participation in computing education activities; in particular the Education Board held a very enlightening meeting in Doha in Qatar, and taking some tentative steps in relation to computing education in India
- Enhancing the effectiveness of the Education Board and Education Council
- Increasing our visibility within the community
- Reviewing the charters of the Education Board, the Education Council and the Two-Year College Education Committee

Challenges for FY 2011 include further development of many of last year's activities:

- Supporting the launch and the development of the CECC
- Continuing to evolve arrangements associated with the development of both the Education Board and the Education Council
- Continuing to support K-12 activity and the Two-Year College Education Committee
- Supporting the development of new curricular guidance in computer science
- 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
- Increasing international activity but also developing a strategic view of how to support computing education globally; in particular considering supporting a Gulf Region Summit on computing education and taking an initiative in relation to computing education in India
- Further extending the leadership role of the Education Board and the Education Council

Section One

Summary of FY 2010 Activities

1.1 Education Council activities

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 were two meetings of the Education Council in FY 2010; the first of these (the sixth meeting of the Education Council) took place at the Vancouver Marriott Pinnacle Downtown Hotel in Vancouver, BC, in Canada on 25th and 26th September 2010 and the second (the seventh meeting) took place at the University of California in Berkeley on 21st and 22nd June 2010. 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.

1.1.1 Updating the membership of the Education Council

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
- Accompanying the above, an Education Board that is now engaged and operating well
- A Board that does act well in relation to the Council
- An Education Council that we consult and keep informed
- Ed Council meetings that do seem to be welcomed and enjoyed

It must be essential to keep the Board and the Council fresh and alive: So it seemed timely, having gained experience of the present arrangements, to embark on a modest adjustment to the membership of the Education Council. In particular, the process of asking folks to stand down needed to be handled sensitively for reasons of good people management; for instance, it could imply loss of status. Should any mistakes be made, folks can become very bitter very quickly and yet we will wish to keep them involved.

During recent conference calls the Education Board took the view that we should progress via the route of the original appointment letters. We sought to follow that route, we took great pains to alert the Education Council to this intention, and we sought to phrase all correspondence with the utmost care; for instance, we explicitly left open the door for future involvement. Part of the story must be *not* to raise expectations of everlasting membership at the time of appointment.

There was also a need to identify certain principles upon which membership of the Education Council is based. This would guide selection, but it would also provide a firm foundation and a basis for defending the selection. 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 Council
- 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.

In certain cases SIG chairs did send a nominee back in 2006. A note was sent to the current chairs of these SIGs asking them again to nominate someone for possible inclusion in the Education Council. In addition, the following are included:

- The current Co-Editors-in-Chief of *Transactions on Computing Education* (TOCE), namely Robert McCartney of University of Connecticut (e-mail: robert@engr.uconn.edu) and Josh Tenenberg from the University of Washington (e-mail: jtenenbg@u.washington.edu)
- The current Editor-in-Chief of ACM Inroads, namely John Impagliazzo, of Qatar University (e-mail: John@qu.edu.qa) who is already a member of the Education Board
- Jan Cuny who is heavily involved in the new AP developments and the ongoing related issue of teacher recruitment
- Michael Wrinn from Intel in Portland who is involved in progressing the Parallel Processing effort
- A member of the Education Policy Committee of ACM; this ensures the Council then potentially has representatives of all major education groups within ACM
- Michelle Hutton, as new Chair of CSTA

The membership of the updated Council is included in Annex A. This group met for the first time at the Berkeley meeting of the Education Council in June 2010.

1.1.2 The Vancouver meeting

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

- review the various emerging curricular volumes and provide recommendations to the Education Board; copies of these reports should be passed to Education Council members in advance of the meeting
- become acquainted with the output from the Future of Computing Summit and to provide advice on how ACM should be responding; the report from this should be available prior to the meeting and will be distributed in advance
- provide opportunities for brainstorming and initial idea generation regarding various activities and to plan future work activity towards specific deliverables
- provide the editors of the *Transactions on Computing Education* and *Inroads* with the opportunity to seek interaction with the Education Council hopefully engaging them in various activities that will benefit the publications

Moreover, the Future of Computing Education Summit had given rise to a number of actions and the Education Board / Council had a specific role in several of these, namely The Coalition for Computing Education, research and measurement (top five research questions), industry links, and public relations. These were to form the basis of group activity at the meeting.

The final program included presentations on: ACM’s Education Policy Committee; certain curriculum-related reports, namely the final full review of the Information Systems volume, the master’s report, and the DoD-supported Graduate Software Engineering Reference Curriculum; developments regarding AP Computer Science by Jan Cuny; the Two-Year College Education Committee; presentations by the editors of *ACM Inroads* and *the Transactions on Computing Education*; the Ensemble space.

A popular feature of Education Council meetings is the panel session and on this occasion the theme was international aspects of computing education. The aim was to find out how the ACM and the Education Council in particular can better help and support the international community. After a brief introduction, each panelist gave a brief statement about computing education in their part of the world (i.e., curricular issues, highlights, opportunities, challenges). The floor was then thrown open for questions and discussions. The panelists were as follows: John Impagliazzo, Middle East; Mathai Joseph, India; James McKenney, AACC; Mirella Moro, Brazil and South America; Ted Zhang, China (unable to attend but his views were transmitted to the meeting). The session was generally regarded as excellent.

On Saturday there was a presentation on the Future of Computing Education Summit (FoCE) that had been held in Washington in June 2009. This led to valuable group discussions that focused on the contributions that the Education Council were required to make, based on the Summit outcomes to include:

- The coalition for computing education
- Top five research questions in CS education
- Industry links
- The “other action items” group

Reports were received from all groups, thereby meeting expectations.

1.1.3 The Berkeley meeting

The next meeting of the ACM Education Council took place at the University of California in Berkeley on Monday 21st June and Tuesday 22nd June 2010. At this meeting the new Education Council came together for the first time. In planning the meeting, the following goals were identified, namely to:

- Welcome new members to their first meeting of the Education Council and to provide them with information about the ongoing activities
- To hear about certain new initiatives, to ensure that a number of ongoing activities are being properly supported by the Council, and to initiate actions as appropriate
- To seek to launch the CS 2012 effort
- To provide opportunities for brainstorming and initial idea generation
- To plan future work activity towards specific deliverables

The program contained three sessions: the first morning was set aside to provide updates from various perspectives (and in large part this was a familiarization session for new members); the second session on Monday afternoon was to provide recent developments in curricular issues together with some brainstorming; and the final session on Tuesday morning was devoted to charting the way ahead.

The initial session included:

- An update on ACM from John White
- A report on CECC, essentially an update on developments since the Washington Summit of June 2009
- A report on the TYCEC Summit of April 2010
- Reports from SIGCAS by Carol Spradling, SIGCHI by Gerrit van der Veer, SIGCSE by Barbara Owens and Alison Young, SIGGRAPH by Barb Helfer, SIGITE by Barry Lunt and SIGPLAN by Dan Grossman
- Additional Reports and Discussions covering NSF / APCS by Cameron Wilson and Owen Astrachan; Tech Packs by Lillian Israel; IFIP by Joe Turner; and CSTA by Michelle Hutton

The second session included illuminating presentations on recent curriculum revisions at Stanford by Mehran Sahami and (remotely) an overview of a recent CRA-e report by Andy van Dam. A panel discussion provided the basis for additional discussion and debate. This session, organized by Dan Garcia involved: David Patterson, former ACM President and UC Berkeley EECS Professor; Tom Murphy, Contra Costa Community College Professor (attended SIGCSE); Josh Paley, high school teacher (regular SIGCSE attendee); Eugene Lemon, high school teacher (recent SIGCSE attendee); and

Michelle Hutton, middle school teacher, CSTA President.

The final session began with a presentation by Peter Denning on his CPATH Field Study Guide project but then evolved towards a discussion about the next computer science volume CS 2012/3. The outcome of this was the need to produce a “Lessons Learned” document outlining lessons from previous curricular efforts, a document containing a set of thoughts from Education Council members to be considered by the future CS 2012/3 committee, a reflective document from the authors of CS 2008. Above all, a key requirement was to identify the leadership for CS 2012/3 and to put in place a CS 2012/3 team as soon as possible.

1.2 The Future of Computing Education Summit

Over the last year there has 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. 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. Ultimately 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. The concept of a Computing Education Coordinating Council (CECC) emerged. In the end a document outlining the concept was produced and that was submitted to NSF for funding, the leadership coming jointly from the Education Board and from the Computer Society. A copy of the submission is included in Annex B.

Acknowledgments

The organization of the original event and subsequent deliberations have been carried out by a planning committee consisting of Mark Guzdial, Heikki Topi, Jane Prey, and previous ACM Education Manager David Schneider (all from the Education Board) and Harriet Taylor and Joe Urban (representing NSF). Lillian Cassel of the Ed Board made available certain funds. A considerable debt of gratitude is due to them all; the issues involved in bringing this unique and very successful event to fruition were all rather complex and their efforts have been considerable.

1.3 Supporting K-12 computing efforts

Reversing declining enrollments in computing disciplines

Within certain institutions there have been some very positive indicators of expanding enrollments. In particular, in the CRA Taulbee Survey of March 2009 the following statements appear:

- *Total enrollment per department by majors and pre-majors in U.S. computer science programs is up 6.2 percent over last year. If only majors are considered, the increase is 8.1 percent. This is the first increase in total enrollment in computer science programs in six years.*
- *The average number of new undergraduate students per department in U.S. computer science programs is up 1.7 percent over last year. If only majors are considered, the increase is 9.5 percent.*
- *Bachelor's degree production in computer science was down 10 percent this year, compared to*

a nearly 20 percent decline last year.

- *Diversity in computer science undergraduate programs remains poor. The fraction of bachelor's degrees awarded to women held steady at 11.8 percent this year. As was the case last year, nearly two-thirds of those receiving bachelor's degrees were White, non-Hispanics.*
- *Total Ph.D. production among the responding departments grew to 1,877 for the period between July 2007 and June 2008. This represents a 5.7 percent increase over last year.*

Of course the Taulbee Survey is based on activity in Ph.D.-granting institutions in the U.S. Declining enrollments remain a worrying feature of large sections of the computing education community. This matter remains of concern, not only to those in education, but to employers and to industrialists. Given the strong link between information technology and innovation, this matter remains vital.

Brochure and associated web site

Members of the Education Board / Council in conjunction with CSTA had produced:

- A brochure that went out to approximately 62,000 high schools and middle schools in the United States. The hope is that broad distribution would encourage students— particularly women and students from disadvantaged communities—to consider studying computing, even if they might otherwise have given little or no thought to that possibility. Around 1,000,000 copies of this have now been produced and distributed; the brochure has also been used (with some element of customization) in Canada and in Scotland and there is now a Spanish version that can be downloaded from the careers web site.
- A web site for further guidance and information. The brochure contains the address of a web site at www.computingcareers.acm.org that includes additional material on educational and career options in the computing field. The web site also links back to the brochure and makes it easy for interested parties to obtain additional copies.

This activity was undertaken with the help, support, approval, and guidance of Chris Stephenson in CSTA and her colleagues. It is important that this close partnership should continue. Indeed it has. Copies of the brochure continue to be distributed both within the U.S. and in other countries (where in many cases permission has been given to customize it to local needs). Recently there have been requests for the brochure to be updated and that is being investigated.

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 and Eric Roberts in conjunction with Chris Stephenson and Michelle Hutton from the Education Council are active in providing advice and guidance to the College Board to look at 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.

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, and again at SIGCSE 2010 in Milwaukee, members of the Education Board put forward a submission for a special panel session that would build on this. Their session on *Rediscovering the Passion, Beauty, Joy and Awe: Making Computing Fun Again* have attracted considerable audiences and they were later deemed to be one of the successes of these conferences. Indeed there have been suggestions that this should become a regular feature of future SIGCSE 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.

1.4 Two-year college activities

Dr. Elizabeth K. Hawthorne provided the following report on the activities of the ACM Two-Year College Education Committee (TYCEC) for the period July 1, 2009 – June 30, 2010:

Membership

- Elizabeth K. Hawthorne, Chair; Senior Professor, Union County College; ehawthorne@acm.org
- Robert D. Campbell, Member; VP of IT Graduate Center CUNY; rcampbell@gc.cuny.edu
- Karl J. Klee, Member; Professor, Alfred State College; kleejk@alfredstate.edu
- Anita Wright, Member; Assistant Professor, Camden County College; amwright@acm.org

Purpose

The Committee charter states: The *Two-Year College Education Committee* 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 TYCEC achieved the following milestones in FYE 2010 (July 1, 2009 – June 30, 2010):

- Conducted the NSF-funded *Strategic Summit on the Computing Education Challenges in Community Colleges*
- Collaboration with colleagues and dissemination of information through participation in a variety of conferences, including ITiCSE 2009, SIGITE 2009, NSF ATE PI Conference 2009, SIGCSE 2010, CISSE 2009
- Active participation in the first ITiCSE Working Group on Information Assurance
- Ongoing communication with CSTA colleagues
- Formal adoption of a new TYCEC Charter by the ACM Education Board
- Ongoing communication with SIGITE colleagues
- Establishment of CS curricular guidelines in CAP-Space, the TYCEC online repository of curricula, assessment and pedagogy resources
- Establishment of social networking component for CAP-Space

- Promotion of internationalization of TYCEC work by participation in the ITiCSE conference and by outreach efforts to South America
- Communication with colleagues via an ongoing column in the *ACM Inroads* publication, *Community College Corner*.
- Participation on the ACM Education Policy Committee
- Presentations to the ACM Education Council and support for the goals and objectives of the ACM Education Council through a variety of synergistic activities

1.5 Updating the computing curricula guidelines

With five volumes of curricular guidelines now published as well as an Overview volume, we had to put in place a process that demonstrated 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.

1.5.1 General strategy

Within the Education Board there was a dialogue on whether the current five-volume strategy employed within CC 2001 remains appropriate. That is an important discussion and would guide much thinking about curricular developments in the coming years.

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.

1.5.2 Computer science

The CS volume in the Computing Curricula 2001 series was originally published back in December 2001. The joint ACM/IEEE-CS Executive Committee initiated a review of the Computer Science volume in the spring of 2006 and subsequently commissioned an interim review of the CS volume in 2007. ACM and the IEEE Computer Society carried out this review jointly. Interim reviews were a new concept, and this is the first such effort. It was always intended to be less resource-intensive than a full review but a key requirement was to keep the curricular guidance up-to-date and in the process address matters of major concern to the community.

The interim review is now complete and has been made available as "CS 2008" online; the publication issue was considered at length by the Education Board and their decision is to reflect the fact that it is interim and therefore not of the same standing as a full review.

During this activity it became clear that a full review of the Computer Science volume was required, one that involved looking at the discipline in a fundamental manner. During the year a number of aspects of this were debated, culminating in a major discussion on the matter in Berkeley. The output from the Berkeley discussion was that the following documents should be produced:

- Insights from Eric Roberts regarding the CS 2001 effort
- A retrospective from CS 2008
- A "lessons learned" document to capture insights from those who have chaired curricular efforts
- Thoughts from the Education Council, seen as input to the deliberations of the new effort

Moreover, as a matter of some urgency, the leadership for the new effort should be put in place as soon as possible. All these documents have now been produced, the leadership has been identified, and the team selection is under way.

1.5.3 Information systems

The existing version of the Information Systems report dates back to 2002. A thorough review and

revision of the Information Systems document of 2002 has been needed for some time, particularly in light of the fact that the 2002 report consists largely of updates to the previous IS report. A comprehensive in-depth review is now complete. The work is a joint effort between ACM and the Association for Information Systems (AIS). By way of background, the AIS is a primarily academic organization the mission of which is to advance knowledge in the use of information technology to improve organizational performance and individual quality of work.

The ACM/AIS Undergraduate Revision Task Force consisted of Heikki Topi and Joe Valacich as co-chairs. More completely, the ACM representatives were Heikki Topi from Bentley University, Jay Nunamaker from the University of Arizona, and Janice Sipior from Villanova University; representing AIS were Joe Valacich, College of Business and Economics at Washington State University, Kate Kaiser from Marquette University, and GJ de Vreede from the University of Nebraska at Omaha.

In August 2007 the first public introduction of the work to the IS community occurred at the Americas Conference on Information Systems AMCIS 2007 at Colorado State University; around this time there was the launch of the associated wiki at blogsandwikis.bentley.edu/iscurriculum to encourage the community to participate in the ongoing review process. In November 2007, a journal article on the project was published in the Communications of the AIS; in December 2007, there was a presentation and status report at the AIS SIG-ED (IAIM) meeting in Montreal. Following these consultation exercises, in February 2008 at a task force meeting in Seattle, there was a major reorientation of the project based on community feedback; in particular there was a strong focus on learning outcomes (which have changed significantly). In addition:

- In June 2008, there was a panel presentation at the European Conference on Information Systems 2008 in Galway, Ireland focusing on global participation issues
- In August 2008 there was a panel presentation at AMCIS 2008 focusing on the revised learning outcomes
- Between September 2008 until early December 2008 there was a number of rounds of solicitation of public feedback on specific curriculum issues and incorporation of the results in the product
- In December 2008 the first draft was presented at the AIS SIG-ED (IAIM) conference
- At the start of 2009 there was an additional period of gathering feedback collection and engaging in rewrites

The final report was released and was formally considered at the Education Council meeting in Vancouver. It was approved and arrangements for publication have been agreed. The report has finally been published.

1.6 Master's degree initiative

There are two aspects to work involving master's degrees, the first initiated from within the Education Board itself and the second stemming from external activity funded by the U.S. Department of Defense.

1.6.1 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.

1.6.2 The GSwERC report

The Graduate Software Engineering Reference Curriculum document (GSwERC) stemmed from a project funded by the U.S. Department of Defense (DoD) to produce graduate-level recommendations for master's programs in the general area of software and systems engineering. It involved various experts in the field (38 in total) and was managed by Art Pyster of Stevens Institute of Technology in New Jersey. Both the IEEE Computer Society and, more recently, the Education Board have members on the Curriculum Author Team, Greg Hislop and Lillian Cassel, respectively.

The DoD had funded the project; they had adopted a very arms-length approach to the development of their report. They wished the work to be made widely available and Art and his colleagues had to make all major decisions about content, publication, and other matters. There had been no "interference" at all, just helpful support.

In terms of the way ahead and Education Board involvement, there were two main issues:

- The possibility of a request for some form of recognition of the work by ACM and by the Computer Society
- The possibility of a request for the Education Board to undertake responsibility for ongoing maintenance of the work, possibly in conjunction with the IEEE Computer Society

This document was considered at the Vancouver meeting of The Education Council and was approved. Since that time there have been ongoing discussions regarding copyright and related publication details. These matters have now been resolved and the document has been published and appears on the ACM website – see <http://www.gswe2009.org/>.

In furtherance of this master's development, the Education Board in conjunction with the Computer Society has clarified its definitions of terms such as "endorsement," etc. which carry implications of different forms of recognition of curricular efforts.

1.7 Computing education publications

JERIC has now been transformed into the *ACM Transactions on Computing Education* (TOCE) and the first issue of the *Transactions* appeared in March 2009. Also it is very encouraging to see the evolution of *ACM Inroads* into an even more important publication for the computing education community;

The editors of both publications are members of the Education Council.

The existence of these is seen as very important for the standing of the computing education community. It is vital that the Education Council continues to offer support as necessary.

1.8 International activity

There have been a number of aspects to the international activities of the Education Board.

1.8.1 European efforts

Members of the Board / Council have been involved in:

- monitoring the activities of Informatics Europe through participation in the organizing

committee and in attendance at the annual European Computer Science Summit

- planning and in leading the Informatics Education Europe conference which was held in Freiburg in Germany on 5th and 6th November 2009
- keeping a close eye on accreditation developments within Europe. There has been an EU funded project called the Euro-Inf project managed by ASIIN 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. Andrew McGettrick has been elected as a member of the EQANIE Board.
- monitoring activity leading to the signing of the Seoul Accord. A number of countries (South Korea, US, UK, Canada, Australia and Japan) were seeking to develop 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.

1.8.2 The Qatar visit

Over recent years the ACM Education Board had been repeatedly challenged to gain a better understanding of the computing education needs of the international community. At the meeting of the Education Council in September 2009 in Vancouver, an international panel provided perspectives from Brazil, India, the Middle East and to a lesser extent China. This gave rise to an invitation for the Education Board to hold one of its meetings at Qatar University in Doha. This would involve the Board in being embedded in a very different community, a different kind of university, a different country and a very different culture.

The outcome of extended deliberations was that members of the Education Board (Mark Guzdial, Dan Garcia, Boots Cassel, Larry Snyder, Heikki Topi and Andrew McGettrick), with vital support from the ACM President Professor Dame Wendy Hall and ACM CEO John White and ACM Council member Mathai Joseph (despite the real threat of volcanic ash clouds) held a meeting in Doha at the start of May 2010. At the outset there was question about whether the needs of India and the Middle East were similar, and could be dealt with in a similar way. An important question was: could we run a summit that would meet the needs of both the Gulf States and India?

Some comments about Qatar are relevant. Qatar itself is a thriving and developing country, one of the Gulf States. The number of people in Qatar is around 1.6 – 1.8 m of whom some 29% are female. Some 50% of the population lives in Doha. The country is very wealthy deriving its wealth from huge gas and oil reserves in the region. The number of native Qatari is around 12.5% of the population. Qatar sees itself developing into a “laboratory for the world” and is at present building Education City, a vast infrastructure of imaginative research buildings and centers. Within Qatar itself, there was presently a lot of “importing of ideas and services” and customizing them to local needs. Of course that was common across many countries.

To a large extent education of males and females are conducted separately, so that there is a female campus and a male campus. Some 70% of computer science students are female. It was observed that males could go abroad to study though that option was less to available to females for cultural reasons.

The format of the visit was that, apart from essentially internal meetings of the Education Board on occasion with staff from the university, there was a one-day workshop, a day punctuated with a

ceremony to set up a student chapter. The workshop included:

- “ACM – Goals, Mission, and Worldwide Agenda” by John White,
- an invited presentation from ACM President Dame Wendy Hall on “The Emerging Science of the Web and Why it’s Important”
- an overview of the work of the Education Board / Education Council
- a panel discussion involving Education Board members on “Computing Education Research: Challenges and Opportunities”
- a panel discussion involving contributions from local colleagues and members of the Education Board on “Computing Careers: The Magic and Beauty of Computing”
- a final panel discussion on “Computing Education in Developing Countries” which included presentations from Mathai Joseph and Mark Stehlik (CMU in Qatar).

The meeting was well attended by faculty members and students from the university. Essentially, all the students were female. They were typically dressed in their black *abaya* and maintained a delightful and respectful but silent interest in the proceedings. They would not enter the room in which we had coffee, for instance. The strong expectation from all faculty members present was that the dignified silence would be maintained throughout the day.

In a truly uplifting final session the students were challenged about their interests in computing, about their ambitions and their hopes for the future. They were presented with the perspective that it was awfully important for them to articulate their views since only then could the education system take account of these and respond. By the end of that session and to the amazement of all, every student had spoken; they had expressed their ambitions to receive greater challenge, for greater attention to be paid to innovate, and for them to be educated so that they could truly help their country. A closing discussion drew attention to the vital role that their ACM Student Chapter could play in helping them to achieve their ambitions.

In a final session on the day that followed the workshop, the Education Board considered what further role it should play, taking into account all the contributions and views it had heard. A clear conclusion from the various meetings was that the needs of India were quite different from those of the Gulf States. In India there is extreme poverty; that is not the story about Qatar.

The possibility of hosting a Computing Education Summit for the Gulf States in Qatar is now being considered. The theme being discussed is along the lines of:

from Computing today to tomorrow’s knowledge economy.

The intention would be to address what is needed for the region in twenty years’ time. That must form the basis of further activity.

1.8.3 Developments related to India

As already noted, the needs of India were seen as quite different from the needs of the Gulf States. Nevertheless there was discussion in Doha involving Mathai Joseph, Member of the ACM Council, about India and some initial ideas were discussed. Since then the Education Board has been asked to consider the possibility of holding a meeting in India similar to the successful meeting in Doha. Of course, it would need to be customized to the needs of India and be sensitive both to the existence of the Computer Society of India and to the existence of ACM India. A benefit would be that members of the Education Board could gain some familiarity with the different patterns of education in that continent and explore ways of working effectively with colleagues in ACM India.

1.9 Promoting new curricular themes and strategies

The continuing anxieties about the state of enrollments and poor retention rates suggest that there continue to be problems with the image and effectiveness of computing education, which seems to have limited appeal to current students and its ongoing popularity. This is true at all levels in the world of 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 we can re-conceptualize computing education in a way that will make it more appealing. Can we create at least one image of computing education that is new and different and does not suffer from the ills of the present situation?

1.10 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 by 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 regular news updates on computing education matters. This has been very positively received. With the departure of David Schneider there has been some interruption to service but this is being addressed.

1.11 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 have developed a Web 2.0 website (in its alpha stage): Technology that Educators of Computing Hail (TECH), hosted at <http://plonetest.acm.org/techtools/>. Dan leads a group of 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 tentatively stored at <http://owaine.dlib.vt.edu/sites/node/579>, but the eventual home for TECH will be: <http://tech.acm.org/>

Ensemble 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 badges, 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. We hope to have the Beta launch of TECH in 2011.

Section Two

Priorities for FYE 2011

2.1 The Future of Computing Education Summit – moving forward

The Summit had been deemed a huge success by all concerned. There were six main outcomes. Attendees agreed that their organizations would be willing to take on roles as either “owners” or “participants,” with one individual being selected to be the convener to make sure that the owners and participants would continue to meet in order to keep the action item going. An owner had a higher level of participation than a participant.

The concept of the Computing Education Coordinating Council emerged. The leadership is to be held jointly between Heikki Topi, Mark Guzdial and Jane Prey from the Education Board and Tom Hilburn from the Computer Society. It was agreed that this body would take responsibility for all the various action items emerging from the Summit. A proposal requesting funding has now been submitted to NSF; this has recently been approved. The five bodies now involved are: ACM, the Computer Society, CSTA, NCWIT and AIS.

Of course the CECC should serve 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 and needed answers include:

- How do we integrate existing initiatives so that they get the best possible visibility?
- Can there be a comprehensive study that integrates what is known about the 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 the message be presented to the political decision makers in a compelling way that demonstrates the critical importance of the issue from the perspective of national competitiveness?
- 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 the Washington Summit meeting should be seen to have beneficial outcomes. Over the next year the Education Board / Council will need to be alert to the development of the CECC.

2.2 Forthcoming Education Council activities

In the coming FY, there is the opportunity for just one meeting 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. That meeting will take place around the start of 2011. The agenda is currently under consideration. The idea of three stages of reviewing developments, brainstorming and then looking at future developments is a pattern that holds much promise.

2.3 Supporting K-12 efforts

Building on the success of the brochure

The production of the brochure and the linked web site has been a high profile activity that seems to have had a beneficial impact. Recent statistics point to the fact that around 40,000 hits per month are

occurring and this peak was reached in August 2009.

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.

Meanwhile, developments of the web site <http://computingcareers.acm.org> have occurred. The oversight for the ongoing development and evolution of the web site had been vested in one of the groups from the Education Council and they are required to keep in mind the specific issues facing K-12 education and the need to work closely with CSTA. The material on the web site has been refined to provide more helpful information; profiles of students from different institutions including pictures and quotes have been included; cross links to other relevant sites (e.g. to include video) have been provided; and, generally efforts have been made to make it more attractive to the younger generation.

Recently there have been suggestions of updating the brochure and the associated web site. Various approaches have been made to ACM seeking updates to the brochure and enhancements to the site. Undertaking such activity has cost implications as well as effort implications. Following the Vancouver meeting brief assessments of the web site had been obtained. At the time of writing there is consultation under way, with the hope that some modest upgrade could be made and this could be done in time for Computer Science Education week that occurs this year from 5th – 11th December 2010.

AP initiatives

Apart from Chris Stephenson being involved, Owen Astrachan, Dan Garcia, Mark Guzdial, Deepak Kumar, Eric Roberts, Chris Stephenson 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 are about to commence and these will lead to refinements of the early ideas.

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 prior to this development, CSTA we had already begun planning for the revision of their ACM Model Curriculum. They had already put together a working committee and are planning a face-to-face meeting to begin our work. CSTA does plan to seek the endorsement of the Education Council once their document is complete and indeed will seek input from members of the Education Council to review the draft and provide preliminary comments.

2.4 Two-year College Education Committee plans

The TYCEC plans to pursue the following activities for FY 2011 (July 1, 2010 – June 30, 2011):

- Production and widespread dissemination of the report of findings from the *Strategic Summit on the Computing Education Challenges in Community Colleges*
- Formal adoption of Committee By-laws
- Identification of replacements for retiring committee members Karl Klee and Bob Campbell.
- Funding for and implementation of the next phase of CAP-Space, an online repository of curricula, assessment and pedagogy resources
- Continuing development of associate-degree computing curricular guidelines
- Engagement in a variety of advocacy efforts on behalf of computing education in the two-year college sector.

- Continuation of our representation on and collaboration with the ACM Education Policy Committee.
- Continuation of support for the ACM Education Council goals and objectives
- Participation in the ITiCSE Working Group on Information Assurance
- 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 2012/13

An important outcome of the CS 2008 interim review was the realization that a more fundamental activity needs to be launched in the near future to produce a new computer science volume. This will then maintain the well-established tradition of undertaking such an activity on a (roughly) 10-yearly time scale. That will be carried out jointly with the IEEE Computer Society and will maintain the ACM / Computer Society leadership role in terms of curriculum guidance.

Key concerns here are the choice of team to undertake this work and setting the context in which that should be done. It would be important that such an endeavor should build on earlier work, notably that of the recent interim review. For in many instances, as the interim review drew to a conclusion there was a recognition that radical change was needed, but the constraints of the interim review process rendered major adjustments undesirable from a range of perspective (resources, practicality, causing undue turbulence in the community, etc.).

Mehran Sahami from Stanford University will undertake the ACM leadership for the CS 2012/13 effort. He has been given the various documents mentioned under 1.5.2 and thought is currently been given to putting in place a complete team and infrastructure in conjunction with the Computer Society.

2.5.2 Software engineering and computer engineering

It is intended that work on interim reviews of both the Software Engineering volume and the Computer Engineering volume should commence in the coming year and be undertaken in conjunction with the Computer Society. Both of these volumes were published originally in 2004 though their development had been completed sometime earlier.

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, e.g. in relation to particular topics within computing.

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 meeting in Qatar has given rise to a proposal for a Gulf Region Summit on computing education. See Annex C. The feasibility of this will have to be considered, both from the perspective of the Education Board and from the perspective of those in the Gulf Region. Assuming that this is deemed desirable and beneficial to all concerned, planning

of this event will need to follow.

- The Education Board will need to respond to the invitation to hold a computing education workshop in India.
- Members of the Education Board / Council continue to be involved in the planning of the Informatics Europe annual summit.
- The intended Informatics Education Europe event, due to take place in Rome this autumn, has had to be cancelled. The financial consequences have been minimal. The reasons for the cancellation have been lack of uptake, caused we believe by some issues in Rome, by the effects of the ash cloud at crucial times, and by concerns arising from the world-wide financial crisis. There have been similar experiences with a number of other conferences. However, there have been expressions of real interest from several quarters and it is intended to review this series of conferences with a view to putting the series on a sounder footing.
- The Euro-Inf project is now complete and steps have been taken by ASIIN within Europe to set up a more permanent accreditation activity based on the results of the Euro-Inf project; this is referred to as EQANIE. Members of the Board / Council are on the Board of EQANIE and involved in a follow-on project called Euro-Inf Spread funded by the European Commission.
- 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.

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 likely to find 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.

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 reversal of recent 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.

We believe that this process will proceed by identifying 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 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
- At a time in which so many people in computing education continue to feel threatened by 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 our support for the community, we will also be in a better position to enlist their aid in solving the many problems we all face.
- 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.

ANNEX A

Roster of the Education Board and Education Council members (FY 2010)

Education Board

Andrew McGettrick, Strathclyde University (Chair)
Mark Guzdial, Georgia Tech (Vice - Chair)

Lillian Cassel, Villanova University
Dan Garcia, University of California at Berkeley
John Impagliazzo, University of Qatar
Maggie Johnson, Google
Jane Prey, Microsoft
Eric Roberts, Stanford University (past chair)
Larry Snyder, University of Washington
Heikki Topi, Bentley University

David Schneider, ACM Staff Liaison (until March 2010)
Yan Timanovsky, ACM Education Manager (since July 2010)
Lillian Israel, ACM Director of Membership

Chris Stephenson, Executive Director, Computer Science Teachers Association
Gordon Davies, Coordinator of ACM European Education Initiative

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
Peter Denning, Naval Postgraduate School
Roscoe Giles, Boston University
Dan Grossman, University of Washington (SIGPLAN)
Beth Hawthorne, Union County College (TYCEC)
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, Seattle
Barry Lunt, Brigham Young University (SIGITE)
Robert McCartney, University of Connecticut (ToCE)
Ken Martin, University of North Florida
Mirella Moro, Universidade Federal de Minas Gerais – UFMG,
Belo Horizonte - MG, Brazil
Barbara Price, Georgia Southern University
Eugene Spafford, Purdue University
Carol Spradling, Northwest Missouri State University
Mark Stehlik, Carnegie Mellon University
Josh Tenenber, University of Washington (ToCE)
Joe Turner, Clemson University (retired)
Gerrit van der Veer, Vrije Universiteit Amsterdam, the Netherlands (SIGCHI)
Patrick Walsh, IBM
Michael Wrinn, Intel
Alison Young, Auckland University of Technology, New Zealand

ANNEX B

Computing Education Coordinating Council (5/20/2010)

The following is a proposal for the formation of a Computing Education Coordinating Council (CECC). It addresses issues of challenges, purpose, strategies, and organization.

Challenges to Computing Education

1. The nature, content, and practices of the various computing professions are not well understood by the public.
2. In many countries, the populations of computing students, educators, and professionals lack diversity.
3. Pre-university computing education has critical weaknesses in funding, teacher preparation, and curriculum requirements.
4. The dynamic nature of computing requires continuing education for practitioners and educators alike. Ongoing research into pedagogy, curriculum, technology, and professional practice is necessary to assure computing education is effective, relevant, and current.

Council Purpose

1. Present a unified, respected view of the nature, content, and achievements of computing education. The Council will provide an ongoing sense of vision, purpose, and leadership in addressing the challenges to computing education. It will have an important role in setting educational priorities.
2. Help secure the resources necessary to meet the challenges facing computing education.
3. Provide a structure for the various computing organizations to communicate about common interests and to act in a united way to address those interests.

Council Strategies

1. The Council will engage in endeavors that support and promote the following:
 - a. Ongoing research and scholarship in computing education to ensure effectiveness, relevance, and currency through developments in pedagogy, curriculum, practice, and technology
 - b. Improvement in pre-university computing education in the areas of teacher preparation and curriculum requirements
 - c. Increased diversity in the populations of computing students, educators, and professionals
 - d. Increased numbers of students pursuing degrees in various fields of computing, including computing education
 - e. Improvement in the public understanding of the nature, content, and practices of various computing professions
 - f. Enhanced understanding about the relationship between computing and other disciplines (e.g., business, the natural sciences, and the social sciences).
2. Where appropriate, the Council shall provide recommendations and input to advocacy groups focused on education policy.
3. Create a communication structure, which allows the Council to speak with a unified voice on those issues of common interest to the organizations who are members of the Council. Disseminate, through presentations and reports, information and opinion that addresses the challenges to computing education.
4. Maintain a list of significant challenges, and monitor and assess progress in addressing the

challenges.

Council Organization

1. The membership of the Council shall be inclusive and wide ranging. It shall be open to all organizations with an interest in computing education: small and large organizations; national and international groups; those focused on pre-university education, undergraduate and graduate education, and professional training; and all fields of computing.
2. The Council will start simple, as a coordinating committee, which would
 - a. Develop and recommend a more comprehensive strategic plan to its member organizations.
 - b. With maturity and acceptance be expanded into a more robust group.

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ANNEX C

ACM Education Board

Towards a Gulf Region Summit on Computing Education

Background

At the start of May 2010, ACM's Education Board, accompanied by the ACM President Wendy Hall and Chief Executive Officer John White, met at Qatar University. They hosted a workshop titled "Research Overtones in Computing Education" together with those having an interest in computing education including colleagues from ictQATAR, CMU (Qatar), and the Qatar National Research Fund. The event was thrilling and enlightening, and it provoked the desire to hold a major event on computing education that would serve the interests of the Gulf region.

Thoughts

It seems that the Gulf States share common challenges and aspirations. It would be entirely feasible to champion an event that was of relevance and importance to all the States in the region (and perhaps further afield). This future event would be of considerable strategic importance for the region and for ACM; we shall tentatively call it a Summit for the Gulf Region, or simply "Summit."

Computing itself is of strategic importance for the region, underpinning its desire to move to a knowledge-based economy and to fulfill Qatar's 2030 Vision. Education, and in particular computing education, has a vital role to play. Part of this is developing ideas in students' inquisitive minds and instilling in them an interest in the computing sciences with an enthusiasm for innovation.

Objectives

The principal aim of the Summit would be to pull together academics as well as industrial and governmental professionals to share perspectives about the way ahead. It would be essential to ensure that computing education is meeting the future needs of the region and its industries, and to consider the identification of the skills and competencies that education should address. Other objectives would include (a) generating a manifest or declaration outlining ways to improve computing education in the region, and (b) proposing ways in which ACM and perhaps other related organizations could assist in the process.

Format and Organization

A proposed format for the Summit would include a variety of discussions and presentations, such as:

- (a) invited talks or keynotes from leading players both from within the Gulf Region and beyond,
- (b) panel discussions that include industrial and governmental professionals to debate ideas with a view to developing policies and identifying such matters as the skills and competencies needed to support future aspirations, and
- (c) paper submissions with a specific focus on the theme of the Summit.

It would be necessary to form a conference organizing committee and a program committee with full participation from the Gulf States.

Venue and Time

For starters, a possible venue for the event would be at a hotel in Qatar. It may be important to have John onsite as a representative of the Education Board. Successor events would move to different Gulf States every other year. A suggested time for this event would be in the fall of 2011 or in 2012.

Sponsors

The principal sponsors of the event would be ACM and its Education Board, Qatar University, and possibly Carnegie Mellon University Qatar. Additional possible sponsors include the Qatar National Research Fund of the Qatar Foundation, ictQATAR, and other funding agencies interested in the success of the event.

Next Steps

- Formulate concrete objectives of the proposed Summit
- Assemble a representative conference / organizing committee
- Assemble a representative program committee
- Decide on the conference venue and time
- Book necessary facilities
- Seek external support immediately if the event will take place in 2011