

ACM Education Board Annual Report Fiscal Year FY 2003

10/1/03

Membership of the Board 2002-2003

Chair	Peter Denning
Vice-Chair	Russ Shackelford
	Robert Aiken
	Lillian (Boots) Cassel
	Gordon Davies
	Marvin Israel
	Bruce Klein
	Rich LeBlanc
	Andrew McGettrick
	Eric Roberts
	Larry Snyder
Headquarters Liaison.....	Fred Aronson

Standing Committees:

Accreditation	John Impagliazzo
College Education.....	Russell Shackelford
Pre-College Education.....	Robert Cartwright
Professional Development.....	Gordon Davies
Self Assessment.....	[vacant]
Two-Year College Curriculum.....	Robert Campbell

Task Forces:

Computer Information Systems	John Gorgone
	Gordon B. Davis
K-12 Task Force	Chris Stephenson

Representatives:

Computer Science Accreditation Board (CSAB) Directors	Robert Cannon
	Della Bonnette
	Kenneth Martin
	Neal Coulter

Institute for Certification of
Computer Professionals (ICCP)
Directors

Joyce Currie Little
Jan B. Wilson

Scope

The ACM has been called on to respond in new ways to the education needs of the Information Technology Profession (ITP). People with diverse educational needs now look to ACM for US and international leadership in K-12 (pre-college) education, professional education, certification of basic IT skills, certification of professional skills, and self-assessment. The main points of the Board's Education Strategy are summarized in Table 1. Although this strategy is strongly influenced by experience in the USA, the Board is well aware that the concerns and issues raised transcend national boundaries. The Board works with international groups in these areas.

For many years, ACM's education involvement was primarily focused on universities, which were the fastest growing education sector and in the greatest need of curriculum guidelines. In the past decade, other sectors have taken off, including K12, Two-Year Colleges, accreditation, and Professional Development. The strategic plan is broad and comprehensive, covering ACM involvement in all these sectors.

Budgeting and Staff Support

The Board worked with the Executive Committee to develop an annual budget that enables action on the strategic plan.

TABLE 1: Summary of Education Strategic Plan

Grand Challenge	Strategic Directions Supported in 2003
<p>A How to interest qualified, talented students to go into the IT field or extend their interest in other fields to include IT.</p>	<ul style="list-style-type: none"> • Advanced Placement: AP Test and Curriculum for Computing • HS computing curricula for those not in AP programs (Allen Tucker committee). • Work closely with other groups to develop guidelines and networking for K-12 teachers (proposal to establish society for K-12 CS teachers).
<p>B How can higher education satisfy the needs of industry and government for IT innovation, IT professionals, and high-level computing capabilities in other fields.</p>	<ul style="list-style-type: none"> • Curriculum recommendations for colleges and universities(CC2001: overview volume, software engineering, computer engineering, information systems, two-year colleges). • Explore new directions for curriculum including great principles foundation, teaching how to generate value, and teaching programming. • Work with CSAB on improved financial model after merger into ABET; and on CSAB taking charge of the guidelines for the IT degree programs. • Help establish SIG on IT Education (SIGITE). • Reference model for structure and content of IT profession.
<p>C How can IT and other professionals maintain a current level of knowledge of IT and maintain certification where appropriate.</p>	<ul style="list-style-type: none"> • Establish and maintain an online Professional Development Centre to offer on-line courses to members. • Resurrect some form of Self-Assessment linked to the PD Centre. • Certifications for the public. Establish guidelines for review or endorsement of non-ACM certification programs (work with ICCP).
<p>D How can IT professionals present IT as an attractive field for a career choice and establish public appreciation of the importance</p>	<ul style="list-style-type: none"> • Maintain a Career Development Centre. • Establish a planning group for a Personal Legacy Center consisting of personal professional archives that can be used by historians of computing. • Assist IFIP in developing standard descriptions of IT skill sets.

and benefits of IT.

- Advise Executive Committee on role of a possible professional qualifications committee.
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Projects

Following are summaries of the projects active in 2000; their headlines appear in the table above. They are cross-indexed to the main tracks in which they appear (A, B, C, and D).

A-1. Advanced Placement (Cartwright)

The ETS project to establish an object-oriented AP curriculum and test, with Java as the vehicle, continued to move forward. ACM has not been asked to contribute much this year because the project is on track. A big concern is helping the teachers learn the new curriculum. We are cooperating with the K-12 task force to help these teachers.

A-2. HS non-AP CS Curricula (Stephenson, Tucker)

The K-12 Task Force Curriculum Committee, under the leadership of Allen Tucker in consultation with many educators, developed a new model curriculum for high school computer science education. Tucker obtained teacher feedback at several major conferences and meetings of state-level computer science educators. The committee will distribute a prepublication draft before the end of 2003. It is preparing an article for *Learning and Leading with Technology*, and is planning future conference presentations for SIGCSE and the 2004 CS&IT Computer Science Symposium.

A-3. K-12 Task Force (Stephenson)

The K-12 Education Task Force has focused on three projects. (1) the planning and provision of the 2003 Computer Science and Information technology Symposium which was held in conjunction with NECC; (2) the development of the High School Computer Science Curriculum, including several presentations in support of the curriculum; and (3) the initiation of the JETT project for AP workshops in partnership with the College Board, which provided a series of pilot Java workshops for teachers.

A-4. Society for HS CS Teachers (Stephenson)

The K-12 Task Force is working toward the foundation of a national association for computer science teachers. This organization will be a semi-

autonomous body hosted by ACM. A founding meeting is planned for October 17-18; it will include two or three dozen high school teachers, university faculty, and state legislators. It will discuss the mission, focus, form, operating procedures, and member benefits for this organization. We expect many of the attendees to join the association's steering committee.

B-1. Curriculum Recommendations

ACM has long been a leader in developing, disseminating, implementing and evaluating model curricula.

Computing Curriculum 2001 (Roberts) The Computer Science volume of the CC2001 project was published in December 2001. Although it is difficult to assess the impact of the report with any precision, anecdotal reports suggest that it has significant influence on curriculum development throughout the world. At the July 2002 IFIP Working Group 2.3 Conference in Brazil, delegates reported that the CC2001 report had become the standard reference measure for computing curricula in several countries and that it had served as a valuable resource for locally developed curricula in others. The report has been widely cited, and the entire Body of Knowledge appeared as an appendix to a Department of Commerce report entitled "Education and Training for the Information Technology Workforce" in June 2003.

During the last fiscal year, two additional reports from the CC2001 series have been published: the report from the Two-Year College committee (August 2002) and the report from the Information Systems committee (November 2002). The remaining volumes, one on Computer Engineering, another on Software Engineering, and an overview volume linking the efforts together, remain under development but are making steady progress.

College Committee (Shackelford). With respect to curriculum, we prepared a draft Overview Volume that identifies intersections among the discipline-specific volumes; we planned a larger project, for which we have obtained NSF support, that will map the superset of computing-related topics, examine ways to more economically keep the several discipline-specific volumes up-to-date, and aid in defining new computing-related disciplines. With respect to the emergence of IT degree programs, we have supported the creation of SIGITE, worked with SIGITE people on the development of an IT-2004 curriculum volume, invited IT people to join in the CC Overview volume project, and worked with ABET on the accreditation of IT degree programs under CAC. With respect to CSAB, we have responded to threats to the financial viability of CSAB by participating in a committee charged with defining the core issues and identifying what is needed to guarantee CSAB's financial health. Finally, with respect to our relations with the IEEE-Computer Society, we have had frequent meetings with the IEEE-CS VP of

Educational Activities and defined concrete steps to improve relations between the two organizations.

Software Engineering (LeBlanc): Our Software Engineering curriculum work is being done in conjunction with the IEEE Computer Society and several other international profession societies under the Computing Curricula - Software Engineering (CCSE) Project. Substantial progress has been made this year, starting from the results of an workshop co-sponsored by NSF, ACM and IEEE-CS in June, 2002. During the year, two drafts of a Software Engineering Education Knowledge (SEEK) specification were published for review and work was initiated on creating descriptions of recommended curriculum structures. All of this activity culminated in July 2003 with the publication for review of the first draft of the CCSE volume. During the year, the leadership of the CCSE project made presentations about the ongoing work at a variety of conferences in order to invite broad participation in our work by software engineering and computer science educators.

Computer Engineering (McGettrick): Following a relatively slow start, progress on the Computer Engineering volume picked up over the summer 2003. The team met in Atlanta in June and again in mid-September, with members of the Ed Board exerting strong influences on the direction. By November 2003, in time for the FIE conference, the team plans to make needed adjustments to the body of knowledge and to finalize the various chapters of the main report. Because of the amount of work involved, this schedule may slip. Following FIE, the group plans to a) deal with FIE feedback, and b) to add course advice (already under development). We expect to submit a completed volume for approval during 2004. A paper spun off from the volume will be published in the IEEE Transactions on Education in November 2003.

Information Systems (Gorgone):

- a. IS 2002: Teaming with the Association for Information Systems (AIS) and Association of Information Technology Professionals (AITP), the CIS Task Force completed the IS 2002 report (model curriculum and guidelines for undergraduates) for inclusion in the CC 2001 report. The report has been approved by ACM, AIS and AITP, and it is endorsed by eight information technology societies and including IEEE-CS and the Society for Information Management which includes CIO's & senior IT executives. IS 2002 report has been published by ACM and AIS and is available on their web site.
- b. MSIS 2000: (Graduate information systems curriculum model): The MSIS 2000 report was submitted for inclusion in the CC2001 project.

- c. MSIS 2005: (Graduate IS curriculum model): At the AMCIS 2002 August meeting, AIS agreed to join ACM to form a joint task force to update MSIS 2000. The target date for completing the report is 2005.

ACM has successfully teamed with AIS, IEEE-CS, CSAB, and industry representatives to develop a set of criteria for accrediting undergraduate Information Systems programs. The Criteria have been approved ABET, IS program evaluators trained, and two IS accreditation cycles completed successfully. At the August AMCIS 2003 meeting, 57 individuals, representing master degree programs in IS, voted in favor of proposing graduate degree criteria for accreditation of MSIS programs.

Two-Year Colleges (Campbell): The TYC committee is closing out two projects: a Computer Science curriculum final report, which has been printed and distributed and will be a component of the CC2001 volumes; and a project to develop and disseminate cybersecurity guidelines (funded by AACC). The TYC committee has been supporting other curriculum activities: a final draft of guidelines for Information Systems curricula was distributed to reviewers (Sep 2003) in anticipation of a final report in Spring 2004; and a software engineering report draft was sent out for review in Summer 2003, in anticipation of its being included in the Software Engineering college volume task force report. The TYC committee has submitted a proposal to NSF to develop a full cybersecurity curriculum. The TYC committee has agreed to work with the IEEECS TYC committee on a joint report about computer engineering.

B-2. New Directions in Curriculum (Denning, Roberts)

Great Principles of Computing (Denning). We have completed a paper proposing the structure of the computing field in terms of its great principles of computing mechanics and design, and its central professional practices. At its December meeting, the Ed Board plans to discuss this framework and its implications on the organization and content of curricula.

Programming Paradigms. In recent years, the languages, paradigms, and tools used to teach computer science have become increasingly complex. This added complexity puts pressure on designers of introductory courses, who must cover more material in an already overcrowded syllabus. The problem of complexity is exacerbated by the fact that languages and tools change quickly, which leads to instability in the manner in which computer science is taught. The situation has reached a point where it is difficult for computer science education to keep up.

To address this need, the Education Board plans to convene a new task force in the current fiscal year to define a simple, stable subset of Java and a set of supporting libraries that can meet the needs of our computer science

education. The rationale behind this project is expressed in the following five-point argument: (1) The education community needs a simplified, stable set of libraries with which to teach introductory computer science. (2) That community is disinclined to accept any set of teaching libraries unless it is recognized as “standard.” (3) Sun Microsystems, which is the current guardian of the Java standard, is unlikely to develop a simplified pedagogical library for a variety of economic reasons. (4) The education community must therefore find some other agency to develop and support such libraries. (5) The ACM, through the Education Board and SIGCSE, is in the best position to develop an independent standard that the community will accept.

Although the details have yet to be finalized, we hope to convene a task force that can operate on an aggressive time schedule looking towards completion in the summer of 2005. General milestone dates include appointment of the task force in the fall of 2003, a general presentation at SIGCSE 2004 to discuss the project and solicit contributions of library material for review, a series of working meetings over the next nine months culminating in the development of a complete proposal for presentation at SIGCSE 2005, and a final release that summer in time for computer science educators to use in the fall.

B-3. CSAB (Cassel)

ACM connects with accreditation of computing programs through its membership in CSAB, which represents ACM, IEEE-CS, and AIS (Association for Information Systems) in ABET. CSAB develops criteria for accrediting programs in computer science and information systems. Accreditation criteria for programs in information technology are under development. CSAB also recruits and trains individuals to serve as program evaluators on accreditation visits.

This year has seen the beginnings of a dramatic change in computing accreditation. The ABET Computing Accreditation Commission has developed General Criteria for Computing Programs. The ABET Board of Directors will vote on the general criteria at their meeting November 1. The ABET Board Executive Committee accepted the proposed general criteria with a unanimous vote on September 21. The general criteria apply to programs that do not match the existing program specific criteria (currently only computer science and information systems). The general criteria allow innovative programs to apply for accreditation if they can show that they have appropriate program objectives and are achieving related outcomes. An immediate consequence of the new criteria will be the possibility for accreditation of information technology programs. More importantly, as new programs address emerging needs in the computing and information disciplines, accreditation will be possible before full program specific criteria

can be developed. The plan calls for pilot visits to a few information technology programs in Fall 2004 under the general criteria.

These changes will impact CSAB directly. CSAB will revise the program criteria for computer science and information systems to reflect the existence of the CAC general criteria. The program criteria may add requirements to the general criteria, but may not reduce expectations or contradict the general criteria. The emerging criteria for information technology will also be written in a format consistent with the general criteria. Current expectations are that the program criteria for information technology will be completed during 2004 and will begin the ABET approval process. If that is successful, initial visits under the IT criteria will start in Fall 2005 and full implementation of the IT criteria should be in place by Fall 2006.

Financial issues continue to concern CSAB. Under ABET procedures, the sponsoring society pays fees related to the number of programs accredited. The addition of information technology and other computing programs could constitute a significant financial burden to CSAB, whose only support is from its three member societies. There is concern about this model within the ABET community from other societies as well.

B-4. SIG on IT Education (Cassel)

The former Society for Information Technology Education has entered the ACM family as the new SIGITE. Primary activities within the organization are development of curriculum recommendations for bachelor level programs in information technology and accreditation criteria for such programs. An alternate ACM representative to CSAB is Barbara Price, a founding member of SIGITE. This appointment established an early connection between the IT education community and CSAB. The draft accreditation criteria were presented to the CRA IT Deans meeting and will receive further exposure at the ABET annual meeting late in October.

B-5. Reference Model on IT Field (Denning)

The board is interested to put together a concept paper proposing a reference model for the IT profession. This would be a response to a challenge from IFIP (which met on this topic in October 2002). No further action has been taken in this year.

C-2. Professional Development (Davies, Aronson)

Professional Development Centre. ACM launched a new PD program in September 2002. The program includes nearly 200 web-based courses on Java, Web Development, Object-Oriented Programming, Project

Management, Telecommunications, e-Business, and Networking & Security, which are provided at no charge to ACM professional and student members. Student member access to the full course list was added in March 2003. In addition, over 500 other courses (web-based, CD ROM, classroom-style instructor-led) are made available to ACM members at a discount. The courses are from leading providers of Professional Development, including Sun Educational Services (SES), Digital Think (DT), Telecommunications Research Associates (TRA).

Member response is overwhelmingly positive. New members say it's a reason to join ACM, and existing members say it's a reason to renew. The PD Centre has proved to be a very valuable new benefit for members. In addition, 90% of members submitting evaluation forms for courses they've completed say that they would recommend the courses they've taken for the PD program.

Negotiations are now progressing with other course providers to allow a wider variety of courses to be made available to ACM members at a discount, including those in the management area.

Professional Development Committee. The Professional Development Committee, which was dormant for several years, has now been reactivated to provide oversight and planning for the PD Centre. The revised charter outlines the Professional Development Committee's responsibilities in this new context. The Professional Development Committee will seek to serve the continuing professional development needs of the membership.

Self Assessment. Attempts have been made to revive the Self-Assessment programs that were so popular in the 1980s. The intention is to create new web based Self-Assessment, but so far the PD Committee has been unsuccessful in finding volunteers to take on the task. In all likelihood, some payment to authors will be required if Self-Assessment is to emerge again.

C-3. Certification Study (Little)

A Task Force on Certification was formed to find ways to provide assistance to the public and to ACM regarding certification. The project will bring together information about certification programs and the potential impact they have on educational systems and the information technology workforce. The Task Force met near Washington DC May 16-18, 2003. Members are: Joyce Currie Little (Chair), Bob Cannon, Bob Campbell, Gordon Davies, Terry Linkletter, and John Hughes..

D-1. Legacy Centre (Denning, M Israel)

The Legacy Centre (LC) will be a new branch of the ACM portal and will contain archives that display materials from personal professional lives and corporate histories in a way that can be used by historians, and by others. It can be a significant new member benefit. The Board endorsed, and the EC approved, creating a planning committee to draw up a plan for the center and guidelines for contributors, with Denning and Israel and co-chairs. Representatives from Charles Babbage Foundation (CBF) and Computer History Museum (CHM) are on the board. There are significant opportunities to obtain foundation funding for the corporate archives (with CBF) and Library of Congress.

D-2. IT Skills (Davies)

The Education Board had a significant role in the organization of a Joint Working Conference on "Meeting Global IT Skills Needs - the Role of Professionalism". Thirty five experts on IT Skills and Professionalism from 14 countries met at Gorse Hill, Woking, UK on 25-27 October 2002. Four members of the Education Board (Denning, Davies, LeBlanc, Roberts) were among them. The conference was sponsored by IFIP, OECD, WITSA, supported by BCS, CEPIS, CompTIA, Intellect, Birkbeck University of London & SEARCC, and in cooperation with ACM, CIPS and IEEE-CS. A comprehensive background paper provided briefing for participants before the event, showing the main occupational frameworks that were emerging internationally. Papers by an international panel of speakers focused on three key aspects of IT skills needs - demand, supply and constraints. Participants exchanged views and experiences in extended Work Group sessions. At the closing session, participants distilled the key messages that had emerged from the presentations and work group sessions, and agreed to continue their work by sharing best practice relating to skills. They agreed to a long list of actions. ACM agreed to help with the formulation of a reference model for the IT field. The Education Board has an unstarted task to draft a white paper about a reference model.

D-3. Professional Practices and Qualifications (Impagliazzo)

The ad hoc committee on Professional Practices and Qualifications (PPQ) presented a draft proposal for chartering a possible PPQ committee of the Education Board. The proposal incorporated comments received from the (skeptical) ACM Executive Committee in 2002 June on an earlier draft. The principal purpose of the proposed committee would be to promote computing ethics, professionalism, and ethical conduct in computing education. Another purpose was to support of the fourth component of the

Education Strategic Plan of the Education Board as it would complement the pre-college, college, and professional development components. Among the possible projects sought by the proposed PPQ committee were self assessment, certification, and value dynamics. After due discussion, the Education Board was not convinced that an identifiable need existed for a new committee. The Board members felt that the projects proposed by the PPQ proposal could be achieved either by ad hoc committees of the Board or by existing committees of the Board. The Board agreed to not propose a PPQ committee, but left open the possibility for its future consideration. The Board asked the Executive Committee to fold the concern for professionalism into the rechartered Members Activities Board.

Major Actions

July 2002:

TYC Cybersecurity Workshop conducted in Washington DC (Campbell)
Evaluations from the 2002 CS & IT Symposium completed. (Stephenson)

August 2002:

Article concerning the 2002 CS & IT Symposium completed. (Stephenson)
IS 2002 final draft presented at AIS Conference (Gorgone)
IS accreditation guidelines discussed at AIS Conference (Gorgone)
CCSE posts first draft of SEEK for external review (LeBlanc)

September 2002:

TYC Cybersecurity Workshop paper finalized (Campbell)
K-12 Task Force Fall priority-setting meeting (Stephenson)

October 2002:

IFIP Global IT Skills workshop (Denning et al)
Symposium 2003 Planning meeting. (Stephenson)
With CSAB directors discussed AIS membership, training IS program evaluators, IT accreditation (Gorgone)

November 2002:

CC2001 Information Systems report approved (Gorgone)
TYC CS Report finalized and endorsed by ACM Ed Board (Campbell)
TYC CS Report endorsed by IEEE-CS, who will publish (Campbell)
Proposal for JETT Project developed (Stephenson)
IS accreditation and update presented at FIE Conference (Gorgone).
CCSE in curriculum panel at FIE conference in Boston (LeBlanc)
CCSE presents status at SIGSOFT FSE (LeBlanc)

December 2002:

TYC Cybersecurity Workshop Report published (Campbell)
Meeting with JETT pilot sites (Stephenson)
IS 2002 report presented at joint session ICIE/ICIS conferences (Gorgone)
IS 2002 report presented for approval by AIS. (Gorgone)
IS accreditation status at ICIR Conf Information & Research (Gorgone)
CCSE Pedagogy Groups begin work (LeBlanc)

January 2003:

TYC Cybersecurity Workshop conference presentation (Campbell)
Planning the 2003 CS & IT Symposium completed (Stephenson)

IS 2002 report published in ACM DL and AIS Communications.
CCSE posts SEEK 2.0 and responses to SEEK 1.0 (LeBlanc)

February 2003:

TYC Cybersecurity Workshop conference presentation (Campbell)
Presentation of Computer Engineering volume plans, SIGCSE (McGettrick)
K-12 Task Force hospitality suite for teachers at SIGCSE (Stephenson)
SIGCSE presentation: ACM High School CS Curriculum. (Stephenson)
Microsoft grant for 2003 CS & IT Symposium (Stephenson)
Discuss attaching the Symposium to SIGCSE in Norfolk (Stephenson)
CSAB Board telecon on IS accreditation progress (Gorgone).

March 2003:

TYC IS Workshop (Campbell)
ACM EC directs K-12 TF to explore formation of association for Computer Science Educators (Stephenson)
CCSE leaders present recommendations at CSEET, Madrid (LeBlanc)
CCSE leaders present to EWG, Madrid (LeBlanc)
SIGITE approved (Klein)

April 2003:

TYC Cybersecurity proposal submitted to NSF (Campbell)
TYC Cybersecurity Workshop conference presentation (Campbell)
Planning meeting for ramp-up of JETT project (Stephenson)
CSAB directors discuss IS pilot programs, IT, and future plans. (Gorgone)

May 2003:

K-12 Task Force Spring priority-setting meeting (Stephenson)
Final planning meeting for 2003 CS & IT Symposium (Stephenson)
Planning meeting for web repository project (Stephenson)
CCSE 1.0 discussed at Summit on Software Engineering Education at ICSE, Portland (LeBlanc)
Certification task force meets (Little)

June 2003:

2003 CS & IT Symposium held in Seattle (Stephenson)
ACM HS CS Curriculum presented at the NECC (Stephenson)
IS Dept Chairs invited to AMCIS 2003 MSIS meeting (Gorgone)
Personal Legacy Centre proposal endorsed by Board (Denning, Israel)
CCSE panel in SIGCSE conference ITiCSE, Thessaloniki, Greece (LeBlanc)
CCSE volume draft posted for public review (LeBlanc)

July 2003:

TYC CS Report published (Campbell)
Project manager hired for 2004 CS & IT Symposium (Stephenson)
ACM/ College Board projects presented to AP Convention (Stephenson)
Final review ACM HS CS Curriculum (Stephenson)
Met with ABET CAC Executive Committee re: progress of the IT criteria,
updates to the IS criteria to reflect IS 2002, and effects of general
computing criteria on IS criteria (Gorgone)
Draft of "Great Principles of Computing" submitted to CACM for
publication in IT profession column, November 2003 (Denning)
EC approves proposal to plan Personal Legacy Centre with Denning and M
Israel as co-chairs (Denning)

August 2003:

TYC IS draft Report distributed for comment (Campbell)
Steering committee meeting for JETT project. (Stephenson)
Article completed, 2003 CS & IT Symposium (Stephenson)
MSIS 2000 report discussed at the AMCIS 2003 (Gorgone)
At AMCIS 2003 57 MSIS reps favored proposing graduate accreditation
criteria for MSIS programs (Gorgone)
CCSE 1.0 and other curriculum projects presented to the annual Congress of
the Brazilian Computing Society in Campinas, Brazil (LeBlanc)