SIGCSE Committee on Computing Education in Liberal Arts Colleges

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Background

Computing programs at liberal arts colleges differ in a number of ways from programs at other institutions. This SIGCSE committee focuses on faculty perspectives and needs within a liberal arts context.

Toward an Understanding of the Term, "Liberal Arts College"

Liberal arts colleges include post-secondary institutions that emphasize education for the breadth of graduates' career, civic, and personal lives, in contrast to institutions that focus on more narrow preparation (e.g., for a specific profession).

This definition describes a spectrum of higher education institutions, not a dichotomy. Nonetheless, the definition does highlight certain kinds of institution and views of education:

- Liberal arts colleges focus on undergraduate education, as graduate education invariably concentrates on a single area.
- Although many liberal arts colleges are the undergraduate colleges of major universities (e.g., in the Ivy League or at flagship campuses of many state systems), independent liberal arts colleges are generally small, enrolling at most a few thousand students.
- Society in general, and some members of the liberal arts community itself, consider programs in the humanities, arts, and sciences to be central to (and in some views defining of) the liberal arts. While liberal arts colleges may offer such "professional" programs as engineering, nursing, business, etc., those subjects are traditionally not seen as part of the liberal arts canon.
- Graduation requirements at liberal arts colleges typically involve small majors relative to the number of general education and elective courses. Liberal arts colleges may

explicitly constrain the size of majors or impose requirements on content or skills to be covered.

Characteristics of Computing Programs at Liberal Arts Colleges

These characteristics of liberal arts colleges have a significant impact on computing programs. The committee's initial report of 2019 identified or confirmed several distinct characteristics of liberal arts computing programs, briefly summarized here:

- Program requirements account for about one-third (38%) of students' total graduation requirements at liberal arts colleges, versus half or more at top-ranked CS programs at national universities, according to our 2016 survey of committee members (based on the median). Liberal arts colleges commonly want students to devote significant time to activities outside their majors.
- Roughly half of surveyed liberal arts computing programs lead to a Bachelor of Arts (BA) degree, and half to a Bachelor of Science (BS) degree. Few such programs are ABET accredited.
- Graduates of liberal arts computing programs are often valued for their "soft skills" such as communication and teamwork. Liberal arts computing curricula develop these skills in diverse ways, for example, through study abroad, participation in writing-across-the-curriculum programs, and courses that directly address social consequences of computing.
- Liberal arts computing programs typically educate students with a broad range of academic and career interests, not just computing majors. This poses challenges for both curriculum and advising.
- Liberal arts computing programs sometimes struggle to educate non-computing faculty and administrators about what computing is, what it needs, and how it fits into a liberal education. Particular issues include the evaluation of disciplinary and interdisciplinary scholarship, faculty salaries, needs for research and teaching laboratories, and position within the institution (e.g., whether computing should be considered a science or a professional program).
- Liberal arts computing programs are often small programs in small colleges. The committee's 2016 survey found that participating programs graduated a median 10 students a year, while the number of faculty advising computing majors ranged from 1 to 14 with a median of 3.
- Even with an emphasis on the fundamentals, liberal arts computing faculty are challenged to adapt to technology and language changes, and to keep courses current in areas outside of faculty expertise.
- Liberal arts computing programs face the same enrollment challenges as at universities, but often with less flexibility, fewer resources (e.g., no graduate students), and fewer opportunities for hiring.

- Finally, while liberal arts colleges provide unique opportunities for collegiality within and across departments, they are often geographically and thus professionally isolating.

Groups of Liberal Arts Faculty

Since computing programs at liberal arts colleges often are small, and since schools may be spread geographically, several small-scale organizations have developed for faculty at these schools. In each case, an important objective has been to promote discussion, consider alternatives for curricula and pedagogy, identify common problems, and share/brainstorm possible approaches. In order to encourage substantive investigation and conversation, these groups have been reasonably small or regionally focused.

- The distinctive situation of computing programs in liberal arts colleges led to the formation of a Liberal Arts Computer Science Consortium (LACS) in 1984. This group has been continuously active since its founding, and consists of a modest number (15-20) of computer science faculty from leading liberal arts colleges who meet periodically to discuss problems facing their programs, share solutions, and synthesize approaches to curricula and pedagogy.
- Within Iowa, Iowa Undergraduate Computer Science Consortium has met since 1994 "to promote communication among CS faculty and facilitate discussion of common problems and issues." Meeting annually with about 25 attending, many attendees come from liberal arts colleges within the state (driving time under 3-4 hours). Some faculty from state universities also attend to discuss undergraduate curricula and to further connections between state and private institutions.
- The Consortium for Computing Sciences in Colleges was formed in 1985, originally focused just on small colleges before broadening its perspective to curricular and educational issues in computing at any institution in 2002. The Consortium “is concerned with the advancement of major programs in both Computer Science and Computer Information Systems, and with the use of computers in the Liberal Arts and Sciences.” The Consortium is made up of 10 regional organizations, each of which sponsors an annual conference, and many liberal arts colleges participate in these regional conferences.

A "Voice" for Liberal Arts Faculty

In recent years, national bodies, such as the ACM/IEEE-CS CS2013 Curricular Task Force, have sought representation from liberal arts college faculty. Due to its published curricular recommendations, LACS members often have been tapped for these roles. In this context, both LACS and other faculty have identified the need for a more broadly-based "voice" for the liberal arts in computing education.

However, although LACS has been very successful (e.g., producing respected curriculum models for liberal arts computer science and being an early advocate for laboratory computer science courses), much of its strength comes from its small size and informal organization, characteristics that do not scale well. Similarly, the Iowa Undergraduate Computer Science Consortium has been successful (e.g., facilitating the networking of faculty, collaborating on a grant), due its relatively small size and personal contacts.

Altogether, the creation of this SIGCSE Committee addresses the concerns of LACS members and others for the development of a national "voice" for computing education within liberal arts colleges. The SIGCSE framework provides a natural setting for exploring possibilities on a national/international scale, as established by the SIGCSE Board.

SIGCSE Committee Charge and Goals

In its initial work, starting in 2016, the Committee established that computing programs in liberal arts colleges face two major needs. First, the liberal arts computing community needs an open organization to provide a voice in larger discussions of computing education. Second, faculty in liberal arts computing programs need a network for sharing ideas with similarly situated colleagues. The Committee identified these needs through two surveys, discussions at SIGCSE Technical Symposia and through the committee mailing list, and review of the computing education literature. As summarized in its 2019 report, this work established that these two needs are widespread and that meeting them requires a permanent organization dedicated to supporting and representing liberal arts computing educators.

This SIGCSE committee will continue its work by proposing a structure for and establishing such a permanent liberal arts computing organization. The committee will also continue to facilitate communication and collaboration within the liberal arts computing community in the interest of supporting its identified needs.

Desired Outcomes

The committee will begin acting in the role of a permanent organization to support and speak for liberal arts computing educators.The committee will explore structures for formalizing its nature as a permanent organization. Ideally, existing structures within the SIGCSE Bylaws, such as committees or working groups, can be adapted to this purpose. The committee will propose a specific structure and carry out any work required to establish itself as a permanent group. If appropriate, the committee will propose adjustments to the SIGCSE Bylaws to more generally permit the conversion of committees engaging in long-term initiatives into permanent or "standing committee" status.

While working to formalize itself as a permanent organization, the committee will continue its work in support of liberal arts computing education by prioritizing and exploring the effectiveness of a number of the recommendations contained in the 2019 Committee report. An outline of the intended actions is included below in the Timeline. Input from the broader liberal arts computing community will continue to be solicited and incorporated in the committee's' ongoing efforts.

Timeline

The committee's work from 2016-2019 focused on understanding the various perspectives and needs of the liberal arts computing education community; this work is summarized in its Spring 2019 report, available in the June 2019 issue of ACM Inroads (https://dl.acm.org/citation.cfm?id=3314027). As the committee continues its work, its activities will shift to establishing itself as a permanent organization and sponsoring activities directly in support of the liberal arts computing education community. It proposes the following plan for proceeding with its updated charge and goals:

Summer 2019: Develop and propose a workshop or pre-symposium event for SIGCSE 2020 focused on identified needs; Research organizational structures within SIGCSE Bylaws to identify paths toward establishing a permanent organization
Fall 2019: Prepare a summary of possible organization structures and make recommendations
SIGCSE 2020: Initial meeting of committee as an on-going organization; Workshop or Pre-symposium event for liberal arts computing educators
Spring/Summer 2020: Act on feedback and recommendations from initial meeting; Communicate with the SIGCSE Board about next steps; Plan and propose SIGCSE 2021 activities

Throughout this timeline, electronic communication through the committee listserv will be used to gather community input and include those who cannot attend the planned meetings or workshop/pre-symposium events.

Call for Participation and Supporting Listserv

The vision of this committee includes discussions among numerous liberal-arts faculty. The committee has worked with ACM and SIGCSE to establish a committee listserv. All ACM-established listservs may be found at listserv.acm.org. To join the discussion for this committee, SIGCSE members should log into their ACM account (available to SIGCSE members) at the ACM Listserv page and click the subscribe link for SIGCSE-LIBARTS-COMM.

Information about major committee activities are also shared through the SIGCSE-MEMBERS mailing list.