

Computing Education in Liberal Arts Colleges: A Status Report of the SIGCSE Committee

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Summary

The SIGCSE Committee on Computing Education in Liberal Arts Colleges was approved in late 2015 and began organizing itself at SIGCSE 2016. The Committee has made an initial survey of the liberal arts computer science landscape, and has identified some central issues for more detailed study. This session will present the Committee's initial findings and future plans, and will solicit audience participation in refining the set of central issues and identifying possible resolutions to them.

Background

The phrase “liberal arts” has (at least) two colloquial meanings. One is a set of disciplines, centered on the humanities and fine arts, and thus typically held in contrast to the sciences and engineering. The other is a philosophy of education that emphasizes developing students as thoughtful members of society, including preparing them for productive careers, effective civic engagement, and rich personal lives; this definition is often captured in the phrase “liberal education.” Approaching liberal arts as liberal education implies that any computing discipline, regardless of its name (e.g., “computer science” vs “software engineering”) or the kind of institution hosting it (e.g., small undergraduate college vs research university), can be taught in a liberal arts manner. The Committee therefore took as its working definition of

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“liberal arts college” any institution, including a unit within a larger university, devoted to liberal education.

The Committee conducted a preliminary survey of its members to find out what computing programs in liberal arts environments look like, and to identify what they see as their opportunities and challenges. In many ways this survey painted a fairly stereotypical picture of liberal arts computing, yet at the same time it challenged some of the stereotypes. On the one hand, computing programs in liberal arts colleges typically grant a bachelor of arts degree to a small number of graduates per year (median 10), are staffed by a small number of faculty (median 3), and account for a small fraction (median about 1/3) of the total requirements for graduation from the institution; ABET accreditation is rare. On the other hand, however, there are many departures and outliers from this stereotype: half of the programs in the survey actually offer a BS rather than BA degree, and some departments offer graduate degrees as well as undergraduate ones. There are programs substantially larger by all measures than the medians mentioned above, and ABET accreditation is by no means unheard of. Computing programs in liberal arts institutions take advantage of their environment to encourage interdisciplinary work by students and exposure to “soft” skills (e.g., communication, teamwork, etc.) They face many of the challenges that other computing programs do, such as growing enrollments and difficulty finding quality faculty, but also some that are less common, such as a struggle to educate faculty and administrators elsewhere in the institution about what computer science is and how it fits into a liberal arts education.

Based on the preliminary survey and discussions inside the Committee, the following seem to be central issues for liberal arts computing programs:

- Communicating the nature of the computing sciences to non-technical colleagues
- Interdisciplinarity, combining education in computing and other fields in innovative and useful ways
- Creating computing programs that are available to students who enter those programs late in their careers and/or under-prepared for them
- What, if anything, the general computing education community needs to understand about the liberal arts setting, and how, if at all, computing educators as a whole want to interact with the liberal arts community

- What need, if any, exists for a permanent group dedicated to issues in liberal arts computing
- Whether liberal arts colleges have unique challenges or unique responses with respect to enrollment pressures
- Whether liberal arts colleges have unique challenges or unique responses with respect to faculty recruitment and retention.

The Committee's ultimate goal is to produce a report identifying the most important needs of liberal arts computing programs and proposing mechanisms for meeting those needs. While the above issues are not necessarily the final word on the matter, the Committee believes that they underlie many of the major needs. The Committee's next steps will therefore be to study these issues in more detail, through further discussion, a review of the literature related to computing in liberal arts colleges, and a widely distributed but focused survey. This work will be the main foundation for the Committee's final report.

Session Objectives and Expectations

This session has two primary goals. The first is to inform the SIGCSE community as a whole about the Committee's accomplishments as of the Symposium date, and about the Committee's plans to complete its mission. This will include sharing results from the committee's preliminary survey of liberal arts computing programs. The second is to be a forum for the SIGCSE community to give input to the Committee about the central issues it has identified. Note that many of these issues are relevant beyond liberal arts colleges, and the Committee explicitly desires input from outside the liberal arts community as well as from inside it. The session is thus of general interest to Symposium attendees.

Corresponding to its two goals, this session will have two main outcomes. The SIGCSE community as a whole will learn what the committee has accomplished in its first year of operation and what it plans to do in the future. The Committee will gain valuable feedback from the community on its work to date and input for its remaining efforts.

Outline

The session will consist of a brief verbal report covering the work and plans described in the "Background" section above, with the bulk of the time devoted to guided discussion with the audience of the central remaining issues. By the time of SIGCSE 2017, work on these issues will be in progress, but not complete. Indeed, the Committee expects that the discussion from this session will provide valuable input to that work. To facilitate this result, we will break the audience into small groups, each led by one of the session organizers or Committee conveners. (In addition to the session organizers—Baldwin, Braught, and Holland-Minkley—conveners include Henry Walker, Alyce Brady, and Andrea Lawrence.) Each group will discuss one or more of the central issues, and its leader will briefly summarize its conclusions for the whole group at the end of the session. Specific discussion topics for each issue include examples of how attendees have experienced it and solutions they have found, what data or information could help the Committee better understand the issue, how or if a permanent liberal arts computing organization could help address it, and the extent to

which the issue is an important and distinct one for liberal arts computing programs.

We plan to allocate time during the session as follows:

1. Results to Date (15 minutes, Baldwin & Braught)
2. Small-Group Discussion (45 minutes, Attendees & session / committee leaders)
3. Synopses of Group Conclusions (15 minutes, Session / committee leaders)

Justification for Special Session

This session contains material very relevant to the SIGCSE community, but its structure, namely a short presentation, breakout discussions, and finally reports to the whole group, does not fit well in the format of conventional Symposium sessions. A special session organized specifically for these needs is an ideal alternative. The amount of material to discuss and the structure of those discussions will make good use of the 75 minute session length.