

**2018-19 Annual Report on
COMM ST 149: Computing Everywhere
Computational Literacy Initiative**

Course Coordinator

Jeremy Birnholtz

Graduate Student Peer Mentor and Coordinator

Jeremy Foote

Instructors

Rawan Alharbi, Scott Cambo, Maxwell Crouse, Mike DeVito, Jeremy Foote, Diego Gómez-Zarà,
Jamie Gorson, Nick Hagar, Christina Harrington, Mmachi Obiorah, Irina Rabkina, Daniel Trielli,

Thanks for Administrative Assistance to

Madeleine Agaton, Theresa Bratanch, Rebekah Sigman, Joy Stoyanova, Brad Zakarin

Thanks for Financial Support to

School of Communication, Alumnae of Northwestern, Sanders Curriculum Fund

Introduction

The goal of Computing Everywhere (CE) is to make computational literacy more broadly accessible, particularly to a non-technical audience. Building on our initial offering of one section in 2016, 4 in 2017 and 2018, in 2019 we again offered 4 sections (2 sections per quarter in winter and spring 2019) of a zero-credit (graded S/U) course consisting of a series of 5 weekly 2-hour workshops about key components of computational literacy. Building on last year's action plan, we also added one one-day workshop (and attempted to offer a second one, which drew very limited interest) this year in spring. Overall enrollment decreased in CE programming from last year, with 31 students completing either the winter (13) or spring (11) workshop series, or one-day workshop (7). This compares with 40 students in 2018-19, reflecting a continuing downward trend.

Twelve graduate students (including one postdoc) in the School of Communication and related programs proposed workshop topics and served as paid instructors and peer mentors, with faculty coordination and mentoring by Jeremy Birnholtz. Support was provided by the School of Communication, a curriculum development grant from the Alumnae of Northwestern, and an endowed gift supporting education in digital media.

Winter topics included: 1) basics of mobile app building, 2) scripts and automation, 3) artificial intelligence fact and fiction, 4) data and computational journalism and 5) recommender algorithms.

Spring topics included: 1) basic Python coding in Earsketch, 2) TCP/IP basics and network structure, 3) cognition and computation, 4) social network analysis, and 5) algorithms and accountability.

The topic for the one-day workshop was building rapid prototypes.

Feedback was solicited from students each week via an anonymous questionnaire. Overall response from students was enthusiastic. This document provides a summary of our experience and lessons learned.

How It Worked

As in the past, our goal was to create a lightweight, low-pressure, hands-on and low-risk environment in which students could experiment with technology and develop computational literacy. Again the course carried zero credits and was a self-contained (i.e., without homework or reading assignments) series of five weekly 2-hour workshops. This allowed us to present the course to the students as a low-risk, relatively low-effort endeavor (see feedback below) that would be completed in the first half of the quarter, before exam and project deadlines kicked in. To make things more convenient and less formal for students, this year all sessions were held in residential Engagement Center classrooms located in campus residence halls.

We offered two 20-student sections of the course in Winter and Spring quarters of 2019, with a separate slate of workshops for each quarter that were repeated for the two sections. That is, there were 5 winter workshops that were each offered twice and 5 spring workshops that were each offered twice. To avoid conflicts with other courses and based on past student feedback, both sections were in the evening: 7 - 9 pm on Tuesday and Wednesday. Unlike prior years the one-day workshop was also offered in the evening, with pizza provided for a short dinner break.

Doctoral students and postdocs in Technology and Social Behavior, Media, Technology and Society, and related areas (e.g., HCI-focused students in Learning Sciences, Computer Science and Cognitive Science) were invited in the fall to submit proposals (individually or in pairs) in fall quarter 2018 to develop a single two-hour workshop (or a 4-hour workshop) and teach it twice. Compensation of \$700 per instructor was provided (with the per-instructor amount the same whether there were 1 or 2 instructors).

A total of 12 proposals (including the one-time workshops) were submitted and received, all of which were evaluated by the course coordinator in terms of appropriateness, instructor experience and to achieve a suitable range of topics in each quarter. Ten proposals were ultimately selected for the workshop series, along with the two one-time workshop proposals. All applicants received detailed feedback on their proposals, and selected instructors were

assigned to peer-mentoring pairs to provide feedback on each other's proposals and emerging lesson plans.

Once workshop proposals had been accepted, a schedule of workshops was proposed (and modified as necessary), and instructors were asked to begin work on lesson plans and meet with the course coordinator. For Winter Quarter workshops, mentoring meetings occurred in late fall. For Spring Quarter workshops, mentoring meetings occurred in late winter.

Each workshop consisted of a combination of hands-on exercises, experimentation with coding and/or design, and group discussion led by the instructors. Instructors were encouraged, through the proposal instructions, peer mentoring and 1-2 mentorship meetings, to keep their workshop tailored to the School of Communication student audience. That is, concepts were expressed in terms familiar to Communication students and, where appropriate, using familiar examples and metaphors. Hands-on experimentation with technologies and code wherever possible were strongly encouraged.

All instructors received detailed instruction feedback from the course coordinator and/or peer mentor (or occasionally from a trained observer affiliated with the Searle Center for Advancing Learning and Teaching), who attended one instance of each workshop. Students completed a brief evaluation questionnaire following each workshop.

To manage the logistics of the course, workshop instructors were assigned basic administrative roles such as collecting student feedback, handling enrollment/registration questions, preparing the syllabus and course launch, etc.

Student Experience and Learning

In general student experience with the workshops was very positive. As Figure 1 shows, students generally felt they learned a lot and that the quality of instruction was good, and indicated that they wanted to learn more about the topics presented and felt all workshops should be offered again in the future. Qualitative comments indicated that students enjoyed the hands-on exercises, experimenting with different software tools and learning how computing systems work. In general, they were particularly enthusiastic about hands-on activities and challenges to solve problems on their own.

For example, one student in the spring TCP/IP network architecture session said, "I really liked the hands on demonstration because I felt like it gave me a really fundamental understanding of how it works. I also like how previous concepts that were taught early on kept reoccurring throughout." A student in the spring social network analysis section said, "I really liked the hands on activities using social media in the beginning and also counting the nodes and edges on the sheet that we were given and thinking about the implications of it all. I also really liked that there

were a lot of different ways to understand the topic: using our own social medias, presentation, using paper structure, and the application at the end.”

A student in the Winter automation session said, “”1. Nick really took the effort to show us the code behind how automation would work, which I really appreciated, 2. I also found the articles and link to real world problems really fascinating and relevant. Not something I expected and introduced me to a new, ethical dimension to comsci. Really enjoyed it!”

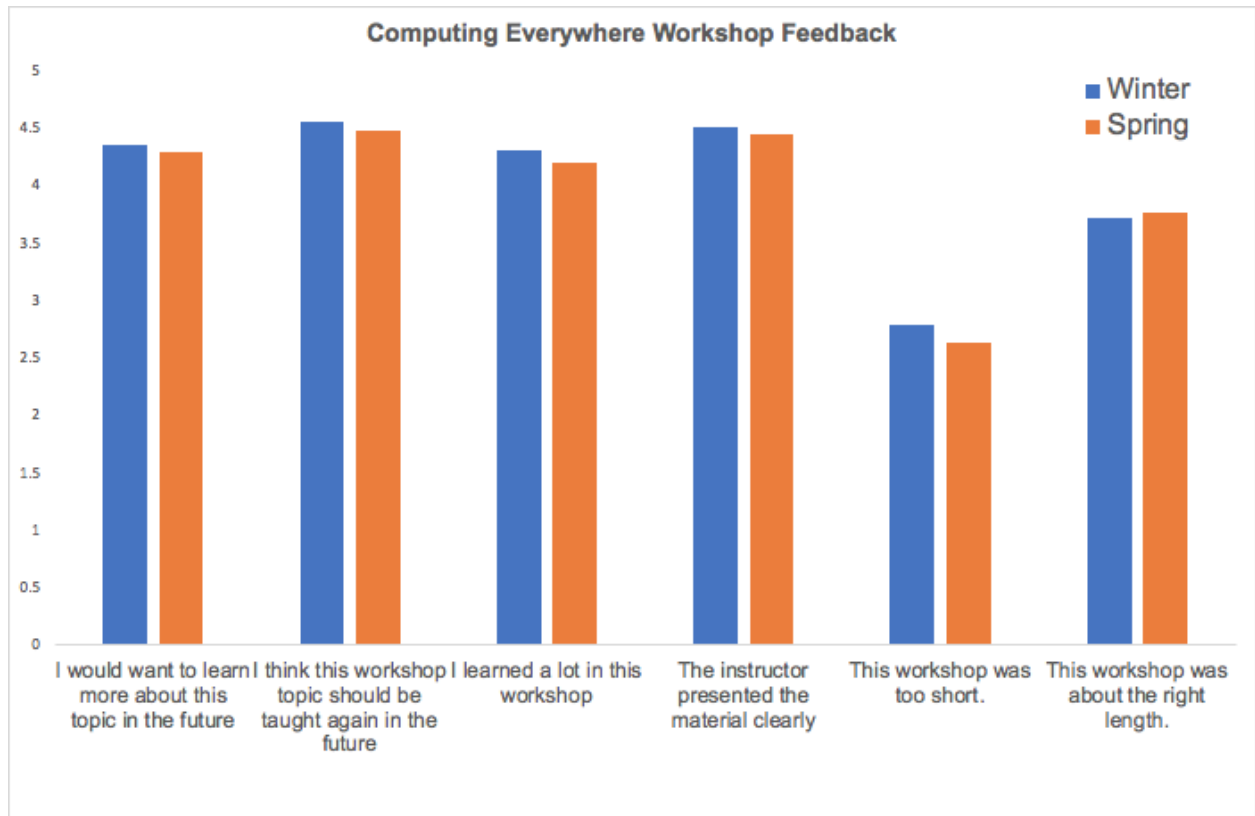


Figure 1: Averaged student feedback for all workshops, by quarter. (1 = Strongly Disagree, 5 = Strongly Agree)

In general, students also appreciated the quality of instruction, noting in particular the patience, helpfulness and good nature of the instructors for the sessions. As in the past, Some students also indicated a desire for more depth in covering certain topics. As in the past, one way to read these comments is to suggest that the students appetites were whetted, and they were ready for more. This also points to opportunities for deeper or longer workshops, as in the past.

Instructor Experience

Workshop instructors were asked to complete a brief questionnaire at the completion of each quarter, though instructors who taught during both quarters were not required to complete it twice. The questionnaire was completed by 6 (of 12) instructors. Feedback was generally positive, with some constructive suggestions for improving the experience.

Overall, 5 instructors said that their experience was “excellent” (3) or “very good” (1), with 1 indicating a “good” experience and 0 reporting a fair or poor experience. Moreover, all of the instructors expressed at least some interest in teaching Computing Everywhere workshops in the future, except in cases where they will graduate.

In qualitative comments, instructors appreciated the enthusiasm of the students, mentoring and feedback provided by the course coordinator throughout the course, and the experience of watching students learn. One instructor said, “I really appreciated Jeremy’s feedback. I learned a lot from them. Students were friendly and proactive. I loved the experience in general.” Another said “I really enjoyed the teaching itself, and the chance to get detailed feedback ahead of time from multiple people who had read through my syllabus was really valuable. I was able to completely overhaul one of my planned activities into something the students got a lot out of because of my conversation with Jeremy ahead of the workshop, which was great.” One instructor also appreciated the meeting prior to the start of winter, suggesting that this be a quarterly occurrence.

Instructors also raised several constructive issues to work on in future offerings, which are addressed in detail below. In general, the main points of constructive criticism were centered around coordination among instructors (which is a repeated point from last year, though it has gotten better), erratic enrollment numbers across sections, and better communication of both student goals to instructors and workshop objectives/depth to students. In authoring this report, the coordinator is once again adding attrition and enrollment numbers themselves to this list of issues to address.

Another point that arose in the 2018-19 experience is the need for a more structured application form and process, which will be implemented.

Lessons Learned and Goals for 2019-20

While the overall trajectory of Computing Everywhere was positive this year in terms of quality of instruction, expanding the offerings and maintaining momentum for the program, there are several challenges that remain. This section is a summary of those issues, some possible solutions and some preliminary proposals for addressing them, with some repeated text from prior reports where appropriate.

Student Enrollment

In the last two reports, student enrollment and attrition have been significant issues, arguably due to the lightweight, zero-credit structure of the course. While it's possible that this could be due to negative student experiences, this seems unlikely given the positive student feedback (albeit with some sample bias, as only students who enroll complete the feedback). This year we were more proactive in promoting the course, but this appeared to lead both to higher enrollment and higher rates of attrition. It is not clear what the solution to this problem is, but it is frustrating.

Proposed 2019-20 action: Again, I propose that we keep an eye on enrollment numbers and continue to be aggressive in getting the word out about the course in 2019-20. A suggestion from last year that we did not implement but might consider would be to hire an undergraduate to assist with course outreach and publicity, as well as getting an informal sense of student interests.

As in the past, another possibility to consider would be to make CE a more structured part of the curriculum, with, for example, a computing literacy requirement for the major and/or modules, with CE being one of a menu of options for completing that requirement. This will be revisited as a part of upcoming discussions of the Comm Studies undergraduate curriculum.

Instructor Coordination

Last year, several instructors felt that the decentralized approach to the course was perhaps too decentralized in that there was often little awareness among the instructors of who else was teaching and what they were covering. It was suggested last year that we have an instructors meeting, and this was implemented this year with a single lunch meeting for all instructors late in fall quarter.

At this meeting instructors could meet each other, sync on course launch logistics and administrative jobs, and briefly summarize their workshops and identify potential synergies. This appears to have been a largely effective solution to the problem, though there may be value in having two meetings as was mentioned above.

Last year some concerns were also raised around the assignment of administrative tasks to the students, which were sometimes inconsistent across quarters and also sometimes resulted in disparate workloads or poor coordination. This was streamlined somewhat in 2019, particularly with help from Jeremy Foote, the peer mentor/coordinator. These extra coordination steps will be continued in 2019-20.

An additional possible action that would provide substantially more structure would be to offer a relatively lightweight graduate course that all CE instructors would be required to take once. The course would carry full graduate credit and cover the basics of teaching and lesson plan development, where each student's final project would be a planned and rehearsed CE workshop that they could subsequently be paid to offer if they wished. An open question here is

whether this would be required of all instructors (Jeremy's initial inclination: probably) and whether existing instructors would be 'grandfathered' in (also, probably).

We are currently seeking feedback on this from instructors and discussing with directors of the MTS and TSB graduate programs.

Depth of Instruction and Mentoring

As in 2017-18, student and instructor feedback suggests a desire for more depth on particular topics, both via "deeper-dive" workshops and perhaps additional online instructional materials.

In 2017-18 we adopted the in-depth workshop format and continued it, with limited success this past year. This resulted in one workshop being offered that was generally successful and well-received by the students. A second workshop was attempted but drew insufficient interest, and a third had some tentative effort invested in it but was not pursued further.

Proposed action for 2019-20: In developing these workshops, it may be helpful in considering student appetite for particular topics and also to solicit instructors who have offered. We will work with the undergraduate program administrator and digital media strategist to come up with plans for workshops and topics that are likely to draw student interest.