What Topic Domains Interest Students in Socially Responsible Computing Coursework?

Ayaan M. Kazerouni
ayaank@calpoly.edu
California Polytechnic State University
San Luis Obispo, California, USA

Zainab Agha
zainabagha@sfsu.edu
San Francisco State University
San Francisco, California, USA

Aleata Hubbard Cheuoua
ahubbar@wested.org
WestEd
San Francisco, California, USA

Melissa Lee
mlee3@wested.org
WestEd
San Francisco, California, USA

Jane Lehr
jlehr@calpoly.edu
California Polytechnic State University
San Luis Obispo, California, USA

Ilmi Yoon
ilmi@sfsu.edu
Northeastern University
San Francisco, California, USA

Zoë Wood
zwood@calpoly.edu
California Polytechnic State University
San Luis Obispo, California, USA

Abstract

Students tend to be interested in and motivated by applications of computing that further the social good (e.g., they would rather develop a game for learning sign language than a chess game). Several studies have positioned humanitarian contexts and socially responsible computing as a "hook" to broaden participation in computing. Within this context, we seek to learn the topic domains that students find most interesting for computing coursework. Our longer-term objective is to design curricular materials that center student voice and choice, with the ultimate goal of broadening and sustaining participation in computing. We gathered data about students' interests from three sources: a survey about student interests administered in CS courses at six post-secondary institutions ($N = 1443$), students' actual topic choices in an open-ended data-centric assignment ($N = 87$), and focus group interviews ($N = 6$). These data are primarily derived from computing majors enrolled in early courses, with some upper division courses represented as well. Evidence from survey responses and actual project choices suggested that students consistently found five domains to be of interest: education, the environment, health, community engagement, and economic development, with little difference in terms of gender identities. Surveys and focus group interviews also suggested that students were interested in coursework focused on artificial intelligence and online security and privacy. Given the broad number of categories we encountered, our results emphasize the importance of letting students choose topic domains themselves whenever possible. When student-chosen topics are not possible, we recommend designing curricular materials in these "top five" domains.

CCS Concepts

• **Social and professional topics → Computing education**.

Keywords

Socially responsible computing, student choice

ACM Reference Format:
Ayaan M. Kazerouni, Zainab Agha, Aleata Hubbard Cheuoua, Melissa Lee, Jane Lehr, Ilmi Yoon, and Zoë Wood. 2018. What Topic Domains Interest Students in Socially Responsible Computing Coursework?. In *Proceedings of Make sure to enter the correct conference title from your rights confirmation email (Conference acronym 'XX).* ACM, New York, NY, USA, 7 pages. https://doi.org/XXXXXXX.XXXXXXX

1 Introduction

There is well-documented evidence for the need and value of integrating ethics and socially responsible computing (SRC) into computing education [6–8, 18, 23, 34]. SRC refers to curricular materials that emphasize both technical and sociotechnical learning outcomes, and its inclusion can be motivating to students [24, 25] and strengthen their sense of belonging in computing [17, 21]. For example, with the addition of SRC curricular materials, students in introductory programming courses have experienced enhanced learning outcomes [18], a strengthened sense of belonging in computing, and increased agency in their learning [13, 17].

Previous work has reported that students find SRC-focused assignments [17] or humanitarian applications of computing [24, 25] broadly appealing. As a result, in addition to supporting students' reflections on their responsibility as future developers [8, 13, 28],

Conference acronym 'XX, Woodstock, NY

ACM ISBN 978-1-4503-XXXX-X/2018/06
https://doi.org/XXXXXXX.XXXXXXX

SRC coursework has also been positioned as a device to broaden participation in computing. At the same time, it is important to attend to contexts that students find personally meaningful and motivating. This can be challenging since students have varied interests that are influenced by their own backgrounds and experiences, and teaching to all of these interests may not be tractable. For example, Postner et al. [25] report that within the general preference for humanitarian contexts, there is some variation in the specific domains that are preferred by students.

So, how do we center a varied set of student interests, while designing socially responsible curricular materials? We used survey responses from 1443 students, open-ended project topic choices from 87 project teams, and focus group interviews with 6 students to answer the research question: *What topic domains interest students in socially responsible computing coursework?*

We found that students were consistently interested in coursework grounded in the **Environment**, **Education**, **Health**, **Economic Development**, and **Community engagement**. Additionally, survey responses and focus groups suggested significant interest in coursework related to **Digital inclusion, safety or privacy**; **Artificial Intelligence**; and **Economic development**. Finally, while a majority of students explored socially important topics when given the option, others focused instead on personally meaningful subjects like video game sales or popular music genres.

2 Background

Undergraduate computing students are by-and-large drawn to socially relevant or "humanitarian" applications of computing [17, 24, 25, 27]. Many have thus positioned humanitarian contexts for computing or "computing for social good" as a fruitful strategy for attracting and retaining students in the computing discipline [10, 13, 15, 17, 18, 21, 32]. Goldweber et al. [15] proposed that "a curricular focus on the societal impact of [Information and Communications Technology] has the potential to attract a larger cohort of students," and Lewis et al. [21] found that students' sense of belonging in computing was stronger when they believed that computing would enable them to achieve communal goals. A multi-institutional study in the USA [17] found that undergraduate computing students tended to report high communal goal orientations and that assignments focused on social responsibility were more likely to engage their interests and give them agency in problem-solving. Students in the same study saw increases in sense of belonging in computing when early CS courses incorporated these kinds of assignments.

Similarly, Postner et al. [24, 25] found that students were more strongly drawn to and motivated by "humanitarian" applications of computing—applications generally aimed toward the benefit of humanity—than non-humanitarian ones. For example, they were more likely to express interest in building an application to secure mental health records than bank account information. While the preference was generally observed for all students, it was observed more strongly for women and non-binary students [25].

While the discussion thus far suggests that SRC coursework tends to be broadly appealing to students, two challenges remain. First, within this general preference, there is some variation in the domains that students find interesting and motivating. For example, in the study by Postner et al. [25], students were more motivated to build applications related to shelter space for the homeless than for tracking dangerous traffic intersections. Instructors have explored humanitarian applications of computing through various domains, e.g., community engagement [32], education [18], and housing [13]. It is likely that these assignments, while socially meaningful, were more motivating to some students than others.

Second, theory and empirical evidence suggest the importance of giving students the ability to make choices about their learning [12, 14, 20, 26, 27, 31]. Attending to students' varied interests and values can positively impact their motivation [11, 14]. George and Thompson [14] connect the importance of student choice in assignments to Self-Determination Theory (SDT) [9] and the Expectancy-Value (EV) model of academic motivation [35]. SDT suggests that autonomy to bring one's own interests and experiences to the learning process can boost motivation [9], and the EV model suggests that students are likely to be motivated when they expect to be successful in tasks that they value [35], for example, tasks containing elements chosen by the students themselves.

In this paper, we take early steps toward addressing these challenges by learning which domains within SRC students find more interesting than others. We used a mixed methods approach to learn about students' interests, considering data from surveys at six institutions, focus group interviews at two institutions, and assignment topic choices made by students at one institution.

3 Methods

This work took place as part of a larger multi-institutional effort to incorporate SRC into early computing courses, involving six primarily-undergraduate public institutions from the California State University system in the USA. We sought to learn from students which domains they would be most interested in exploring in their coursework. To that end, we gathered information from three sources. First, we report results from a survey that was given in a mix of introductory and upper-division CS courses at all six institutions (§3.1). The survey asked students to identify the topic domains that they would most like to see reflected in assignments. Second, two courses at one of the institutions included open-ended assignments in which students could use computing to study topics of their own choosing. We studied the frequency with which students chose various domains (§3.2). Finally, two institutions developed new courses as part of this project, focused on SRC. Students from those courses were interviewed in focus groups (§3.3).

Our Institutional Review Board (IRB) approved our survey and focus group protocol. We analyzed only aggregate statistics for assignment topics, since we did not have informed consent from students to match their assignment submissions with their responses to demographic questions in the survey.

3.1 Surveys

As part of the larger project, students enrolled in computing courses with SRC assignments at all participating institutions completed a 24-item, end-of-course survey examining their reactions to SRC course modules, and impacts on belonging and future course-taking plans. The survey combined items from prior research [1, 16, 22, 29, 30], project-specific questions, and demographic items.

For this study, we analyzed one descriptive item asking, *"Which socially responsible computing topics interest you most?"* Students selected any number of topics from a list of fifteen created through a web search for "social impact issues" and team review (see Table 1 for a listing of topics as they appeared in the survey). As this item was not designed to assess a latent construct, construct validity analyses were not applicable.

Given prior research demonstrating gender differences in topic preferences [25], we also examined this demographic variable in our analyses. The full survey is available upon request to the authors.

The survey was distributed to all enrolled students in December 2024 and May 2025, via instructors who administered it in class. Given this census sampling approach, no sampling procedure or inferential generalization was required. As the survey was treated as an in-class activity, no incentive was provided. Students under 18 years of age or students who opted out of the study were given an alternate assignment. Instructors were asked to encourage participation if response rates fell below 70%. In total, 720 students (Fall 2024) and 723 students (Spring 2025) completed the survey. Most respondents were CS majors ($N_{\text{Fall}} = 615$, $N_{\text{Spring}} = 579$) and identified as men ($N_{\text{Fall}} = 503$, $N_{\text{Spring}} = 458$). Given the broader project's goal of examining differences by university, records where students did not clearly indicate their instructor were deleted. While all students were invited, those who did not participate may differ systematically in their interest, which may limit generalizability. The item on SRC topic interest allowed multiple selections, so item-level missingness was minimal and no imputation was needed.

We learned which topics students found interesting by looking at frequencies with which students selected topics. Additionally, to test for an association between gender identity and topic, we used a series of Chi-squared tests (one per topic) with a Benjamini-Hochberg adjustment [3] to control the false discovery rate from the multiple tests. A post hoc power analysis of the data from both terms showed that with $N = 1443$ and $\alpha = 0.05$, power to detect a large effect (w = 0.5) was 1.0, confirming sufficient statistical power.

3.2 Student-Chosen Assignment Topics

One of the surveyed institutions included two courses with data-centric programming assignments. In the assignments we studied, students were given freedom to choose topics and datasets from the Web and prepare a data-driven report on the topic. The topics students chose to explore in these assignments provide insight into the domains they found interesting. We studied a total of **87 project submissions**. While the assignments we studied included no restrictions on students regarding the topics they chose, both courses included *other* assignments that involved an instructor-prescribed focus on SRC topics like education or food access.

The first course was a data-centric introductory programming course with a data visualization component. The final project in this course was a team project in which students chose datasets from the Web and prepared a data-driven report about their chosen topic, including data analyses and visualizations. The vast majority of datasets were sourced from the CORGIS repository [2] of curated datasets for introductory computing courses. Some teams also worked with data provided by local non-profit organizations. We studied 58 submissions from this course, from four sections offered during the period September 2022–March 2025.

The second course was an upper-division data visualization course offered at the same institution in April–June 2025. One assignment in this course gave students freedom to choose datasets from the Web and prepare interactive visualizations to explain some aspect of their chosen topic. Data was obtained from various sources, like Kaggle,[1] the US government's open data repositories,[2] and the non-profit organization Gapminder.[3] We studied 29 submissions from this course.

To aid comparisons with students' survey responses (§3.1), two authors (who also taught the two studied courses) coded each of the 87 project submissions as belonging to one of the topic categories from the survey. Coding was done qualitatively based on the chosen datasets and content of the assignment submission. For example, two submissions focused on US state government spending categories. One of these submissions covered all the provided data (e.g., education, transportation, parks and recreation), and was coded as **Economic development**; the other submission explored only the spending related to education (i.e., the state's education expenditure and amount spent on financial aid) and was coded as **Education**. Two authors coded all the submissions separately, achieving an inter-rater agreement score (Cohen's κ) of 0.81. The authors then met to resolve the remaining disagreements.

Disagreements typically stemmed from the fact that many submissions could reasonably be considered to belong to multiple categories. For example, two submissions explored scores and attempts on a national standardized entrance exam for tertiary education, and included discussion of the relationship between household income levels and exam attempts and scores. Both coders placed these submissions in the **Education** category, but acknowledge that they could also be placed under the **Social justice** category. Similarly, many submissions explored statewide K–12 CS education enrollments on the basis of race, gender, and income levels—these were coded as **Education** submissions, but could also be considered to be about **Racial equity** or **Gender equity**.

3.3 Focus Groups

We conducted focus groups ($N = 6$) with students from one course each at two of the surveyed institutions to better understand student perceptions about the SRC assignments and topics of interest. The first course was a lower-division introductory course to computer science with first-year students, with SRC assignments on prominent student problems (e.g., on-campus housing allocation). The second course was a data-centric introductory programming course with a data visualization component (i.e., one of the courses studied in §3.2). The focus groups included questions on social and computing aspects of the assignments, interest topics for new SRC assignments and community engagement. For this study, we focused on the interest topics for SRC, based on the questions, *"Does the current SRC assignment relate to things that interest you? Why or why not?"* and *"Do you have ideas for other topics that focus on ethical or societal problems that you would like to work on"*.

[1] https://kaggle.com, accessed July 2025.
[2] https://data.gov, accessed July 2025.
[3] https://gapminder.org, accessed July 2025.

Three focus group sessions were conducted (two remotely via Zoom, and one in-person), each with a unique set of participants (1–3 students per session, for a total of six students). Four students who took the course in Fall 2024 and two students who took the course in Spring 2025. Participants included two men and four women/non-binary students. Participants were recruited by distributing interest forms towards the end of the course, explaining the research objectives. Informed consent was obtained prior to participation. Each focus group lasted for about one hour and was moderated by a researcher who did not teach the course. We conducted thematic qualitative analysis for the focus group transcripts [5]. One author led the initial coding by systematically identifying codes relevant to students' topic interests, and grouping them into broader themes. Other authors iteratively provided feedback on the themes, provided exemplar quotations and discussed interpretation of the findings for consensus, summarized in Section 4.3.

4 Results

4.1 Surveys

Trends in popularity of topics were similar between semesters (see Figure 1[4]). Interest in **Artificial Intelligence** (n = 1057), **Digital inclusion, safety, or privacy** (n = 704), and **Education** (n = 467) was highest overall. Topics with the lowest interest were **Food security** (n = 187) and **Gender equity** (n = 184).

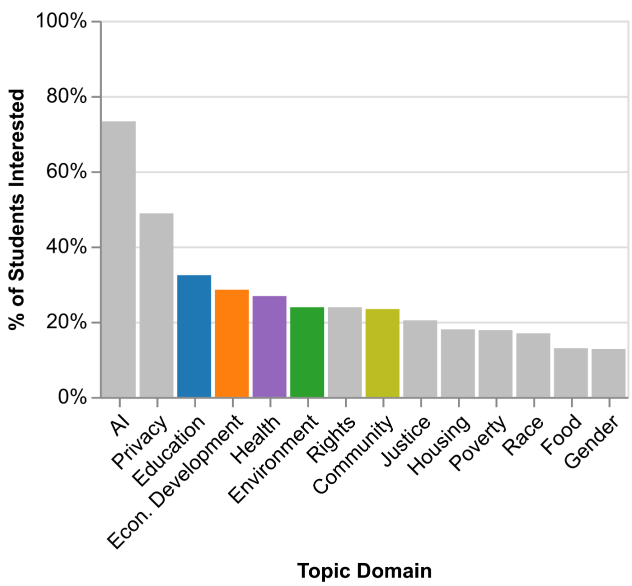

Figure 1: Frequency with which students indicated interest in various topic domains. Percentages add up to more than 100% because students could choose multiple topics of interest. Five domains are colored for easy comparison with their positions in Figure 3.

[4]Some topic names are abbreviated from how they appeared in the survey to control the size of this figure. See Table 1 for a full listing of topics as they appeared in the survey.

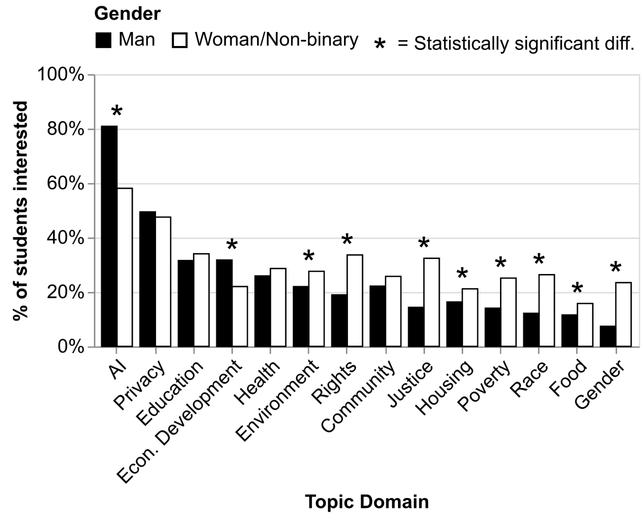

Figure 2: Percentage of men and women/non-binary students who expressed interest in each topic.

Table 1: p-values and Chi-squared statistics for topic interests by gender. p-values reflect Benjamini-Hochberg adjustments for false discovery control. Topics with significant differences are highlighted with a gray background.

Topic	p	χ^2
Artificial intelligence	< 0.0001	83.72
Digital inclusion, safety, or privacy	0.5655	2.08
Education	0.4273	0.80
Economic development	0.0003	14.49
Health	0.3746	1.08
Environment	0.0397	5.31
Human rights	< 0.0001	37.25
Community engagement	0.2035	2.08
Social justice	< 0.0001	63.04
Housing	0.0454	4.75
Poverty	< 0.0001	26.13
Racial equity	< 0.0001	44.90
Food security	0.0454	4.69
Gender equity	< 0.0001	72.94

Several topics showed significant variation between students who identified as men and those who did not (see Figure 2 and Table 1). Students identifying as men were more interested in **AI** and **Economic development**. Students not identifying as men were more interested in the **Environment**, **Human rights**, **Social justice**, **Housing**, **Poverty**, **Racial equity**, **Food security**, and **Gender equity**. There were no observed gender differences in preference for the topics **Digital inclusion, safety or privacy**; **Education**, **Health**, or **Community engagement**.

Regardless of gender identity, the majority of students expressed interest in **AI** as an SRC topic. Also, while our data revealed gender-based differences in SRC topic interest, aligning with the findings of [25], we caution against interpreting these trends as direct reflections of gendered preferences. Instead, we suggest that they are indicative of how the interests of the predominant student profile within our context diverged from the other students.

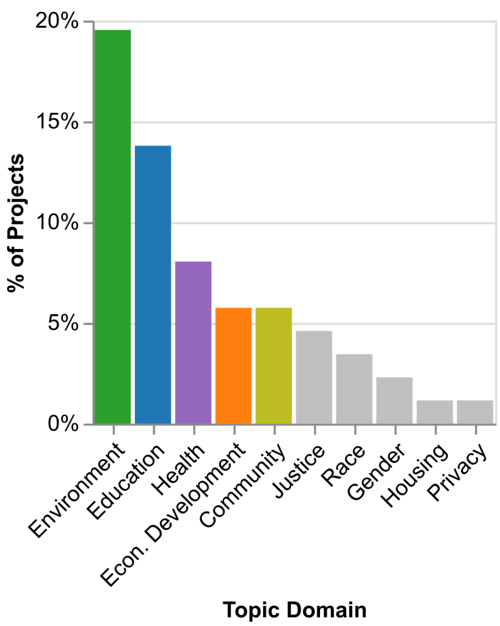

Figure 3: Frequency with which students explored domains. The top five are colored to allow easy comparison with their positions in Figure 1. Not shown: 35% of projects explored topics that were personally interesting to the students, but were not considered SRC topics.

4.2 Student-Chosen Assignment Topics

In the open-ended data-centric assignments, students explored varied topics ranging from fatal police shootings to obesity and diabetes rates to video game sales figures. All 87 projects were qualitatively coded into categories from the survey as described in §3.2. Frequencies with which each category appeared are shown in Figure 3. The bar heights in Figure 3 add up to 65%—we opted against a stacked bar or other part/whole representations to allow visual comparisons with Figure 1. Not shown in Figure 3 is that 35% of projects studied topics that the qualitative coders did not consider to be "socially responsible computing" topics. Examples include video game sales, UFO sighting reports, and Broadway play genres and ticket sales. These are discussed in §5.

The **Environment** and **Education** domains encompassed roughly a third of the projects we encountered. Roughly 20% chose to explore datasets related to the **Environment**. These were often data about global carbon emissions, though some students explored the topic from other lenses, like the environmental impacts of various building materials. 14% of projects explored issues related to **Education**, such as: access to K–12 CS education in California (using data provided by the non-profit CSforCA.org [19]), attempts and scores on a national entrance exam for tertiary education, and per-state educational attainment in the USA over time.

4.3 Focus Groups

In the focus groups, students recommended several topics of interest, with **Community engagement** (n = 4) and **Education** (n = 4) being the most popular interests. Within **Community engagement**, student ideas ranged from supporting their student community, to local and broader community problems. For instance, several students appreciated ideas from the existing SRC assignments (e.g., campus housing) that prioritized fairness, as summarized by a student, *"it was especially relevant because I had university housing last year, and a bunch of my classmates did too, so it was really interesting to choose who can get housing and who doesn't"*. Beyond their immediate student community, students cared about supporting their local community (e.g., transit issues, homelessness) or issues with national impact (e.g., improving voter turnout by determining where voting stations should be placed). A few students wanted to challenge themselves with the difficulty of fairly allocating a budget between these communal issues: *"What if I am the mayor and have a budget, and if I have to decide updating transit but that meant cutting from homeless funds?"*

Within the **Education** domain, students were typically interested in topics such as enrollment, financial aid, advising or gender inequities in computing. For example, one student summarized the relevance of enrollment priority as a relevant problem for many students, *"A system for when students get to choose classes, who gets to enroll first, who gets to enroll last? What's fair?"*. A few students wanted to investigate **Artificial Intelligence**-based solutions for efficiency, such as having an AI advising tool for the needs of transfer students, changing degree pathways, and accelerated graduation, as faculty advisors often have limited time and context. One student explained, *"I'm really interested in developing more of an AI alternative for advising to help students who transfer - like a quicker point of access for you rather than having to sit and wait to speak to an advisor"*. Relatedly, students were interested in **Digital inclusion, safety or privacy** of AI, with concerns regarding AI companionship and emotional reliance on AI. Students also recognized the need for diversity and equity in CS, with interest in topics that increased representation and sense of belonging, both within CS education and in building computing technologies (e.g., breaking stereotypes in characters within video games). Many of these ideas spanned across multiple topic domains, with **Community engagement** and **Education** as the primary topics, and **Economic development**, **Social justice**, **Artificial Intelligence**, and **Digital inclusion, safety, or privacy**, overlapping with these topic interests. While many students considered it important to find applicable topics that were broad enough that all students in the class could relate to them, other focus group data challenged this finding. For example, one student argued that it was important to have a class with content focused on CS education and (in)equity to create "*aha moments*" for peers who were predominantly men because they "*hadn't really noticed*", whereas for this and other non-men students, "[gender inequity] *always comes to my mind... because I am a minority in computer science.*"

5 Discussion

Through surveys, focus groups, and examination of students' choices in open-ended assignments, we learned the topic domains that students found interesting or motivating for socially responsible computing. This section discusses implications of our results, as well as limitations and opportunities for extensions to this work.

Five topics appeared with consistently high student interest in students' survey responses and project topic choices, supplemented by the focus groups: **Environment**, **Education**, **Health**, **Economic Development**, and **Community engagement**. Within these topic domains, focus groups showed students were specifically interested in addressing local community issues and personally relevant educational topics. Additionally, students indicated in survey and focus group responses that they were highly interested in assignments related to **Artificial Intelligence** and **Digital inclusion, safety, or privacy** (§4.1 and §4.3), or the intersection of the two (e.g., digital safety and responsibility with using AI).

This suggests that coursework that is contextualized in these domains is likely to be motivating to a relatively large percentage of students coming from contexts similar to our participants (undergraduate computing students at public institutions in the USA). We note that students in other contexts, e.g., older adults, minorities or students in informal learning environments, may display a different set of interests. An important implication from our findings is that the topic domains should align with specific student interests, while being broadly relatable across the classroom.

Our results come with a few limitations. First, we did not provide definitions for each topic domain listed in our survey (§3.1). It is possible that students interpreted the topics in different ways. For example, when students selected **Artificial Intelligence**, did they wish to learn how to use AI, build AI, or use computing to study the impact on AI on society, akin to how many students used computing to study the impact of carbon emissions? We ought to unpack these further through more targeted surveys or interviews. Our early focus group interviews (§3.3) represent a step in this direction.

External factors may have influenced our students' choices when they were given freedom to choose datasets and topics with which to work (§3.2). It is likely that students' choices of topics were driven by the ease of finding datasets related to their interests. This may explain why **Digital inclusion, safety, or privacy** and **Artificial Intelligence** were highly popular among survey responses, but did not appear in students' project choices. For example, the CORGIS repository includes no datasets on artificial intelligence, and the US open datasets repository only includes data about "potential use cases" for AI. This may change in coming years. For the other popular topics, this limitation is mitigated somewhat, since there appeared to be consistency between students' survey responses and choices made for their assignments. It is also possible that our results were influenced by contemporary developments when this work was carried out. Would AI be as popular among students if our work was carried out three years prior to the rise in generative AI, and will it be as popular among students three years from now?

Finally, our work may be limited by the contexts specific to this project. For example, over the course of three years, a global coding competition aimed at addressing community problems noticed distinct topics of interest for U.S. participants (i.e., social support, peer guidance) and participants from other countries (i.e., safety of individuals and citizens, the environment) [33]. This underscores how sociocultural factors may also shape student interest in SRC topics (e.g., [4]). So, it is likely that our study context of computing courses at public institutions in the California State University system influenced the results presented here. Additionally, course context may have impacted students' topic choices in §3.2: while students were given freedom to choose topics and datasets in the assignments we studied, the majority of *other* coursework in both courses included a bent toward socially responsible computing, i.e., an instructor-prescribed focus on topics like education or food access. Would students' topic choices still be so socially relevant without the surrounding course materials' suggestive power?

We close by acknowledging the importance of incorporating student voice and choice in the design of curricular materials. The fact that a majority of students (65%) chose societally important topics of their own volition may be cautiously interpreted as support for the claim that students are broadly interested in socially responsible or humanitarian applications of computing [15, 17, 24, 25]. 35% of projects explored topics that we did not consider to be of societal importance, such as video game sales, basketball shot choices, and ticket sales for plays on Broadway. However, these topics were still important and likely motivating to those students. As an anecdote, one first-year student who had been engaged only at a basic level throughout the term ended up going well beyond the assignment's minimum requirements when they were free to choose their own topic (in this case, Broadway plays). While only an anecdote, this illustrates the opportunity that would have been lost with a narrow instructor-defined topic. The student would not have been able to connect their budding computing knowledge with something that—it turned out—had been a passion of theirs from childhood.

When an emphasis on student choice is not realistically feasible, as is often the case, we recommend choosing from the domains that we found to be broadly appealing to students. Fulton and Schweitzer [11] suggest that consideration must be given to the learning experience and impact resulting from different student choices (e.g., what if a student chooses a topic of high societal importance, but lower computing complexity?). We recommend aiming for a balance between well-scoped topic domains that are likely to be interesting to students, combined with giving students the freedom to choose from a variety of options.

Acknowledgments

We are grateful to the instructors who incorporated SRC into their courses and distributed our survey. This work was supported by the National Science Foundation (NSF) grant numbers 2216687, 2216513, 2216672, 2216520, 2216694, and 2216575.

References

[1] Christine Alvarado, Gustavo Umbelino, and Mia Minnes. 2018. The persistent effect of pre-college computing experience on college CS course grades. In *Proceedings of the 49th ACM Technical Symposium on Computer Science Education*. 876–881.

[2] Austin Cory Bart, Ryan Whitcomb, Dennis Kafura, Clifford A. Shaffer, and Eli Tilevich. 2017. Computing with CORGIS: Diverse, Real-world Datasets for Introductory Computing. In *Proceedings of the 2017 ACM SIGCSE Technical Symposium on Computer Science Education (SIGCSE '17)*. ACM, 57–62. doi:10.1145/3017680.3017708

[3] Yoav Benjamini and Yosef Hochberg. 1995. Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing. *Journal of the Royal Statistical Society Series B: Statistical Methodology* 57, 1 (Jan. 1995), 289–300. doi:10.1111/j.2517-6161.1995.tb02031.x

[4] David A Bergin. 2016. Social influences on interest. *Educational Psychologist* 51, 1 (2016), 7–22.

[5] Virginia Braun and Victoria Clarke. 2012. Thematic analysis. American Psychological Association. (2012).

[6] Noelle Brown, Koriann South, Suresh Venkatasubramanian, and Eliane S. Wiese. 2023. Designing Ethically-Integrated Assignments: It's Harder Than it Looks. In *Proceedings of the 2023 ACM Conference on International Computing Education Research - Volume 1* (Chicago, IL, USA) *(ICER '23)*. Association for Computing Machinery, New York, NY, USA, 177–190. doi:10.1145/3568813.3600126

[7] Francisco Castro, Sahitya Raipura, Heather Conboy, Peter Haas, Leon Osterweil, and Ivon Arroyo. 2023. Piloting an Interactive Ethics and Responsible Computing Learning Environment in Undergraduate CS Courses. In *Proceedings of the 54th ACM Technical Symposium on Computer Science Education V. 1*. 659–665.

[8] Lena Cohen, Heila Precel, Harold Triedman, and Kathi Fisler. 2021. A new model for weaving responsible computing into courses across the CS curriculum. In *Proceedings of the 52nd ACM Technical Symposium on Computer Science Education*.

[9] Edward L. Deci and Richard M. Ryan. 1985. *Intrinsic Motivation and Self-Determination in Human Behavior*. Springer US. doi:10.1007/978-1-4899-2271-7

[10] Amanda B. Diekman, Elizabeth R. Brown, Amanda M. Johnston, and Emily K. Clark. 2010. Seeking Congruity Between Goals and Roles: A New Look at Why Women Opt Out of Science, Technology, Engineering, and Mathematics Careers. *Psychological Science* 21, 8 (July 2010), 1051–1057. doi:10.1177/0956797610377342

[11] Steven Fulton and Dino Schweitzer. 2011. Impact of Giving Students a Choice of Homework Assignments in an Introductory Computer Science Class. *International Journal for the Scholarship of Teaching and Learning* 5, 1 (2011), n1.

[12] Rita Garcia and Bradley Alexander. 2022. Using Assignment Design as an Instrument to Collect Student Voice. In *Proceedings of the 53rd ACM Technical Symposium on Computer Science Education - Volume 1* (Providence, RI, USA) *(SIGCSE 2022)*. Association for Computing Machinery, New York, NY, USA, 223–229. doi:10.1145/3478431.3499271

[13] Aakash Gautam, Anagha Kulkarni, Sarah Hug, Jane Lehr, and Ilmi Yoon. 2024. Socially Responsible Computing in an Introductory Course. In *Proceedings of the 55th ACM Technical Symposium on Computer Science Education V. 1 (SIGCSE 2024)*. ACM, 373–379. doi:10.1145/3626252.3630926

[14] Myra J George and Jennifer E Thompson. 2024. Giving Choice in Assignments. In *Creating Culturally Affirming and Meaningful Assignments*. Routledge, 87–100.

[15] Mikey Goldweber, Renzo Davoli, Joyce Currie Little, Charles Riedesel, Henry Walker, Gerry Cross, and Brian R. Von Konsky. 2011. Enhancing the social issues components in our computing curriculum: computing for the social good. *ACM Inroads* 2, 1 (Feb. 2011), 64–82. doi:10.1145/1929887.1929907

[16] Heather L Henderson, Brittany Bloodhart, Amanda S Adams, Rebecca T Barnes, Melissa Burt, Sandra Clinton, Elaine Godfrey, Ilana Pollack, Emily V Fischer, and Paul R Hernandez. 2022. Seeking congruity for communal and agentic goals: A longitudinal examination of US college women's persistence in STEM. *Social Psychology of Education* 25, 2 (2022), 649–674.

[17] Ayaan M. Kazerouni, Melissa Lee, Aleata Hubbard Cheuoua, Aakash Gautam, Sahar Hooshmand, Paul Salvador Inventado, Eun-Young Kang, Jane Lehr, Yu Sun, Kevin A. Wortman, Ilmi Yoon, and Zoë Wood. 2025. The Benefits of Socially Responsible Computing in Early Computing Courses: A Multi-Institutional Study at Primarily Undergraduate Hispanic-Serving Institutions. *ACM Transactions on Computing Education* 25, 2 (May 2025), 1–24. doi:10.1145/3727988

[18] Ayaan M. Kazerouni, Jane Lehr, and Zoë Wood. 2024. Community Action Computing: A Data-centric CS0 Course. In *Proceedings of the 55th ACM Technical Symposium on Computer Science Education V. 1 (SIGCSE 2024)*. ACM, 646–652. doi:10.1145/3626252.3630807

[19] Sonia Koshi, Laura Hinton, Lisa Cruz, Allison Scott, and Julie Flapan. 2021. The California Computer Science Access Report. (2021). https://csforca.org/wp-content/uploads/2021/09/KC21007_CS-for-CA_9-28-21-1.pdf

[20] Lucas Layman, Laurie Williams, and Kelli Slaten. 2007. Note to self: make assignments meaningful. *SIGCSE Bull.* 39, 1 (March 2007), 459–463. doi:10.1145/1227504.1227466

[21] Colleen Lewis, Paul Bruno, Jonathan Raygoza, and Julia Wang. 2019. Alignment of Goals and Perceptions of Computing Predicts Students' Sense of Belonging in Computing. In *Proceedings of the 2019 ACM Conference on International Computing Education Research (ICER '19)*. ACM, 11–19. doi:10.1145/3291279.3339426

[22] Sukanya Kannan Moudgalya, Chris Mayfield, Aman Yadav, Helen H Hu, and Clif Kussmaul. 2021. Measuring students' sense of belonging in introductory CS courses. In *Proceedings of the 52nd ACM Technical Symposium on Computer Science Education*. 445–451.

[23] Evan Peck. 2017. The Ethical Engine: Integrating Ethical Design into Intro Computer Science. *blog, Bucknell HCI* 5 (2017).

[24] Lori Postner, Heidi J. C. Ellis, Gregory W. Hislop, and Wesley Shumar. 2024. The Potential of Humanitarian Applications to Increase Interest and Motivation of Underrepresented Student Groups. In *Proceedings of the 55th ACM Technical Symposium on Computer Science Education V. 2 (SIGCSE 2024)*. ACM, 1780–1781. doi:10.1145/3626253.3635513

[25] Lori Postner, Gregory W Hislop, and Heidi J.C. Ellis. 2023. Humanitarian Applications Increase Interest and Motivation of Women in Computing. In *Proceedings of the 54th ACM Technical Symposium on Computer Science Education V. 1 (SIGCSE 2023)*. ACM, 416–422. doi:10.1145/3545945.3569832

[26] Atanas Radenski. 2009. Freedom of choice as motivational factor for active learning. *SIGCSE Bull.* 41, 3 (July 2009), 21–25. doi:10.1145/1595496.1562891

[27] Jean J. Ryoo, Jane Margolis, Cynthia Estrada, Tiera Chante Tanksley, Dawn Guest-Johnson, and Sophia Mendoza. 2019. Student Voices: Equity, Identity, and Agency in CS Classrooms. In *2019 Research on Equity and Sustained Participation in Engineering, Computing, and Technology (RESPECT)*. 1–2. doi:10.1109/RESPECT46404.2019.8985947

[28] Jean J Ryoo, Alicia Morris, and Jane Margolis. 2021. "What happens to the Raspado man in a cash-free society?": Teaching and learning socially responsible computing. *ACM Transactions on Computing Education (TOCE)* 21, 4 (2021), 1–28.

[29] Adrian Salguero, William G Griswold, Christine Alvarado, and Leo Porter. 2021. Understanding sources of student struggle in early computer science courses. In *Proceedings of the 17th ACM Conference on International Computing Education Research*. 319–333.

[30] Eman Sherif, Jayne Everson, F Megumi Kivuva, Mara Kirdani-Ryan, and Amy J Ko. 2024. Exploring the Impact of Assessment Policies on Marginalized Students' Experiences in Post-Secondary Programming Courses. In *Proceedings of the 2024 ACM Conference on International Computing Education Research-Volume 1*. 233–245.

[31] Jeffrey A. Stone and Elinor M. Madigan. 2008. The impact of providing project choices in CS1. *SIGCSE Bull.* 40, 2 (June 2008), 65–68. doi:10.1145/1383602.1383637

[32] Yu Sun, Qichao Dong, and Fang Tang. 2025. Integrating Socially Responsible Computing through Direct Community Engagement in CS2 to Promote Latinx Student Retention. In *Proceedings of the 56th ACM Technical Symposium on Computer Science Education V. 1 (SIGCSE TS 2025)*. ACM, 1078–1084. doi:10.1145/3641554.3701895

[33] Technovation. 2015. *Three-Year App Analysis: Technovation Is*. Technical Report. Technovation. https://www.technovation.org/wp-content/uploads/2019/07/TechnovationAnalysys-2015-1.pdf Accessed: 2025-07-23.

[34] Sepehr Vakil. 2018. Ethics, identity, and political vision: Toward a justice-centered approach to equity in computer science education. *Harvard educational review* 88, 1 (2018), 26–52.

[35] Allan Wigfield and Jacquelynne S Eccles. 2000. Expectancy–value theory of achievement motivation. *Contemporary educational psychology* 25, 1 (2000), 68–81.