OVERCOMING BARRIERS TO INCLUDING ETHICS AND SOCIAL RESPONSIBILITY IN COMPUTING COURSES

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ABSTRACT

In this paper we describe qualitative work that identified barriers to incorporating ethics and social responsibility in computing curricula in public teaching universities in the US. Three themes emerged: competent creation, expertise, and deference to authority. There is evidence that faculty see the incorporation of ethics and social issues into the curriculum in a systematic manner as important, yet they consistently point to the need for efficiencies, concerns regarding their own expertise, and prioritization of need.

KEYWORDS: computing ethics, teaching computing ethics, integrating computing ethics, social responsibility in computing-

1. THE ISSUE

A recent focus of concern in ethical and social responsibility in the digital environment is the way in which privacy has been breached and human behavior has been monitored, recorded, and sold. Increased surveillance and the ability to engage in information data mining without consent has been the topic of multiple studies (e.g., Altaweel, 2015; Libbert, 2015; Mengwei Xu et al., 2017; Zuboff, 2019). These developments have contributed to an awareness among many of the need to better educate computing students regarding ethics and social responsibility. In the United States faculty at some research institutions and private liberal arts colleges have started to explore what it means to increase understanding and awareness, however there is little evidence that these activities have been replicated at public colleges and universities where faculty have high teaching loads (Burton et al. 2018; Groz et al. 2019; Saltz, et al. 2019; Shaer & Peck, 2018). Until recently there has been limited focus on cross-disciplinary approaches and incorporating philosophical interpretations of ethical frameworks into computing (Burton et al., 2017). Yet, while some have used philosophical understandings of ethics in computing, there has been less effort directed at incorporating social science approaches that move beyond an emphasis on the individual and utilitarian interpretations toward the intersubjective and articulations of “the good.”

Recently Wolf (2016) argued for the need for enhanced interdisciplinary attention to ethical matters and social responsibility in computing. This attention is well-warranted in the current political, social, and economic landscape where humanity is working and living, and in the academy where we seek to educate for character, career, and future leadership. The ACM Code of Ethics and Professional Conduct (2018) raises deeper awareness of what it means to be a

computing professional. It suggests the computing profession and the computing professional must be astute, insightful participants in the social fabric who demonstrate a public understanding of the broader social environment. Increasingly, individuals find themselves in an environment where they are at a crossroads regarding what it means to be responsible professionals and socially engaged actors who have the capacity to ask challenging questions of their social worlds, the broader environment, and themselves.

Our project builds on these contemporary issues and challenges by exploring perceptions of computer science department chairs and faculty at target institutions surrounding notions of "ethical and socially responsible computing" and "collaboration." To lay the groundwork, we highlight the social issues and point to calls for enhanced ethical and social understanding by scholars from multiple disciplines. Next, we survey the literature related to incorporating ethical and social responsibility into the computer science curriculum. Then we outline the methods we used to gather information from current computer science faculty. Finally, we share the results from our study, documenting the perceptions of computer science department chairs and faculty at target institutions regarding notions of "ethical and socially responsible computing" and the overall design of a process whereby curriculum modules on these topics are created for delivery in typical computer science courses.

2. ETHICS & SOCIAL RESPONSIBILITY AND CS INSTRUCTION

Over the last fifteen years we have seen an unprecedented expansion in enhanced information extraction and analysis techniques to create big data and significant advances in artificial intelligence. Gary T. Marx (1998) in an early analysis of this expansion encouraged careful consideration of how to inform and how to protect those who will be indirectly and directly impacted. Yet as news organizations and multiple scholars have noted, since 2004 Google, and subsequently Facebook, have found ways to track, extract, and sell the human experience of millions (Zuboff, 2019). Bauman & Lyon (2013:135-136) specifically note that, "… the road to submission to an offer leads through the elimination of choice … The willing, nay enthusiastic cooperation of the manipulated is the paramount resource deployed by the synopticons of consumer markets." We are living in an era where differentiation, categorization, and manipulation of traits is framed as a moral good, yet the collection that is sold is not a human with moral obligations and agency (Bauman & Lyon, 2013; Bauman, 2013). Publications on surveillance often focus on governmental investigations and background patterns of surveillance, yet the current flow of information is from multiple locations and establishes privileges and detriments for peoples (Ullrich, 2018; Young, 2017). Societal values are used and disarmed through the establishment of filters that leverage control (Helles & Flyverbom, 2019). Responses to multiple breeches of trust have frequently been after-the-fact correctives, leading to significant questions about how consumers, industry experts, and educators should respond and engage in proactive attempts to incorporate an ethical focus.

Ethics discussions within computer science have taken multiple forms over the years, and the merits of a focus on professional competence is frequently positioned as counter to responsibility to society and the benefit of humanity. Configured as competent creation, Stieb (2008:226) expounds on the "unnecessary and unfortunate 'add on'" of benefit to humanity in professional discussions and professional codes. He articulates the rights of professionals to focus on individual needs, with a narrow emphasis on ensuring product quality and the immediate safety of the user. The central issue of ethics and responsibility is perceived as either

too expansive to consider, too complicated to master, or put down to the fact that it is impossible to articulate the "good." It appears that Stieb (2008, 2009, 2011) is arguing for a form of negative freedom that does not directly acknowledge the social arena within which the acts of engineering and computing are occurring, thus missing, in particular, the cultural and structural realities of neoliberalism and its consequences (Pendenza & Lamattina, 2019). While other approaches that expand the discourse encourage self-awareness through a virtue ethics lens or encourage a way of looking at the world that enhances the sense of self-identity and personal responsibility, they still emphasize the individual first through a social identity connection that does not directly interpret or structure an understanding of the "public good." Miller (2008) in a debate with the ideas of competent creation encourages computing and engineering professionals to not abandon the concept of the "public good," yet there is not a direct expansion of what this might entail. Gotterbarn (1995, 2001), has, however, consistently encouraged a recognition of the impact of computing on humanity. As he does so, he points to the responsibilities that computing professionals need to consider as they do their work, the social environment within which they are acting, and the implications of what it is they are doing. This is certainly distinct from competent creation, yet, the social remains ill-defined and questions about how to define the public good, what it means to engage in social responsibility, and how particular goals and outcomes should be established are left open.

Certainly, these conversations occur among professionals as they relate to the products they create, as well as among educators. As Stahl et al. (2016) note, professionals in computing have been exposed through their education to the ethical standards of associated professional bodies (e.g., ACM, BCS). Yet, understanding how to define and prioritize ethical needs and the relevant issues that are at stake has not been part of that education. This leaves professionals in the field—including practitioners and educators--to establish, for themselves and their students, what ethical and social considerations might mean for those new to the profession. Certainly, the complex process of "becoming" includes a premise under neoliberalism that it is through your labor that you will develop a self-awareness. In essence it is labor itself that will stand as the social (Farrugia, 2019:1098-99). To not accomplish is to potentially lose your sense of being. For current computing professionals, including computer science faculty, who are functioning within a social-economic-political environment where efficiency is primary, and for whom instruction has typically been narrow and specialized, reaching beyond the confines of existing understandings of the individual and competence requires additional resources for self and profession. It is not clear that there has been sufficient education on the differences and overlap among various ethical frameworks and interpretations of social responsibility to inform future instruction.

There have, however, been attempts to create an ethics education framework. Over the years a variety of approaches have incorporated ethics and social responsibility into the computer science curriculum. There are two primary methods. The first involves a standalone course in computing ethics and social responsibility. The second incorporates ethics and social responsibility modules into most courses in the computer science curriculum.

There are numerous textbooks that are designed to support the standalone approach. For example, Brinkman and Sanders (2013), Tavani (2015), and Quinn (2017). Others such a Burton, Goldsmith, and Mattei (2018) describe a course that uses science fiction to drive the pedagogy of a computing ethics course. Like many who teach computing ethics they are interested in seeing students understand computing as something more than competent creation of computing artifacts: "Teachers and leaders in the field have a responsibility to drive the

discussion about the effects of their own work and the work of their students" (2018:57). Urman and Blumenthal (2018) focus on engaging students in a different way. Their computing ethics course is one that promotes the common good. Moore (2020) takes a different approach and calls for the incorporation of politics into computing ethics education. Moore does acknowledge a practical challenge of this approach: "instructors in computer science departments might not be interested, available, or capable of teaching such classes" (2020:421). Henderson (2019) describes a course focused on Data Ethics and Privacy that is a "fifth-level module" that is available for master's students as well as undergraduates who are in their final year.

There is widespread concern that the standalone computing ethics course model presents several structural challenges. When the course is not taught by a computer science faculty member, it sends a message to students that it is somehow less important than their "real" computer science courses. This negative message is exacerbated when the course does not have a "CompSci" prefix. Even when the course has that prefix and is taught by a computer science faculty member, the fact that it is a senior-level course sends the message that the consideration of ethical and social impacts of computing is something that is done late in the "computing process" and after the "difficult technical work" is nearing completion. To address these concerns, many are exploring ways to incorporate ethics modules in a variety of computer science courses. Grosz et al. (2019) describe a project in which computing ethics modules are developed for delivery in a variety of computer science courses at Harvard. Saltz et al. (2019) describe how they integrate ethics into a variety of machine-learning courses. Skirpan et al. (2018) developed modules where students are expected to incorporate the social and ethical lessons into the projects they do in a variety of computer science courses.

There are many potential variations of the two extremes suggested above, including hybrid models that include both approaches. Regardless of model, there is the bootstrapping problem Moore (2020) acknowledged when it comes to incorporating politics into computer science. It takes special expertise to teach computing ethics, use science fiction as a pedagogy, develop students' understanding of the common good, and importantly, to consider the "ethical and social aspects" of a project from conception to completion. All computer science faculty, but especially those at teaching-focused undergraduate institutions, need preparation that enables them to effectively develop within their students these essential professional abilities. It may not be easy. Henderson notes that he took a year's leave to further his "understanding of law as a mechanism for regulating and enabling ethical behaviour" (2019). Further, many computer science faculty may feel ill-equipped to evaluate the sorts of work that tends to come along with the teaching and learning of ethics and social responsibility.

The incorporation of ethics, and if it occurs, social responsibility, is not consistent across levels of delivery within the computer science curriculum at the undergraduate level. Consequently, students often find themselves exploring the ethical questions from a utilitarian perspective, from an individualistic understanding of consequences for individuals who make up the collective, or for themselves as professionals.

3. METHODOLOGY

In order to develop a deeper understanding of how ethics and social responsibility are understood and when they are used by computer science faculty, we developed a multi-tiered approach that is based in critical methodology and is designed to both interpret and engage. First, we identified state, public universities that had computer science, humanities, and social

science programs/departments. Each identified department had between 3 and 65 faculty. Second, we designed interview and survey instruments to collect data from the selected departments (Babbie, 2016). We received Institutional Review Board approval for all documents and research processes.

Our research/intervention process occurred in three phases. In phase one we designed and carried out a qualitative interview study with department chairs of the identified computer science, humanities, and social science departments. We sent emails to the selected department chairs announcing our project and requesting their participation in an interview. Interested participants signed and returned an informed consent document prior to the interview. Individual interviews occurred via an audio-only Zoom meeting, and we sent a debriefing document after the interview. We designed the questions to identify existing understandings of academics and academic practices related to the infusion of ethics and social responsibility into the computer science curriculum, and computing concerns into humanities and social science curriculum. We also asked about faculty collaboration and how those collaborations are supported by colleagues, the department, and by the university. In addition, we sought information on whether and how work in their department is aligned with strategic or master academic planning at their institution. We used four questions, with additional probes, during both the computer science and the humanities and social science interviews.

In phase two of the project we distributed a short survey instrument to all faculty in departments where we had engaged in interviews with department chairs. Fifteen survey questions distributed to computer science faculty explored the extent to which ethics and social responsibility were perceived as important to instruction, research, and service, the types of pedagogical approaches used, which courses incorporated ethics, what assessments were used to understand skill development, the level of confidence faculty had in their knowledge of social and ethical issues, and their pattern of collaboration. We also asked some basic demographic questions regarding years of experience and rank. We created and distributed seventeen survey questions to humanities and social science faculty. Similar questions regarding pedagogical approaches, assessment, collaboration and demographics were asked of them We also included questions to identify the extent to which they address digital communication, information technology, or social media in their research and instruction, and their comfort level associated with this delivery. Finally, for phase three, we identified, via online data collection and through direct contacts, faculty interested in participating in workshops on ethics and social responsibility.

For purposes of this paper we analyzed results from the interviews with computer science department chairs and the survey results from the computer science faculty in the associated departments. Our findings are based on an analysis of the five interviews conducted with CS department chairs and the survey responses received from CS faculty. As of this writing, of the 150 surveys distributed, 16 have been completed. Our emphasis is therefore on a qualitative interpretation. Berg (2009) argues that it is through qualitative processes that we can better understand the interpretive processes of humans, their levels of awareness, and their thought patterns. Our first step was to engage in open and focused coding of the five transcripts of the interviews (Berg 2009, Katz 1983). Competent creation, expertise, and deference to authority emerged from a review of the codes we identified. We also identified several important elements related to pedagogical approaches and interest. Descriptive information from the surveys conducted with faculty in the associated departments supports various aspects of these

themes, and those results will be used to point to the significance of the details shared by department chairs.

4. THE FINDINGS

The interest in and challenge of identifying and incorporating ethics and social responsibility in the curriculum, instruction, and research of our selected computer science faculty was apparent in a variety of ways. While there is professed interest, there are frequent questions about placement of ethics. There are also descriptions without a direct understanding of whether the placement of ethics is effective or, at points, necessary. Each of these aspects will be explored under the themes outlined below.

4.1. Competent Creation

Department chairs addressed ethics in a variety of ways during the interviews, but the various points at which they invoked aspects of competent creation in their responses are most notable. Creation of a reliable product and the efficient means of instructing are clear priorities. Ensuring that students are independent, successful, and meet the outcomes associated with particular courses and the overall program of study are central concerns, and this focus is evident in the way in which they describe faculty responsibilities, resource acquisition, resource use, and development (e.g., grants).

Descriptions of instruction typically brought to the forefront their understanding of the necessity of efficient instruction patterns, and how meeting particular outcomes, often set by industry, were essential. As one chair indicates, [we]

> "give our students a lot of really relevant up to date experience on how this material is being used right this minute in industry." M3B

> "[T]he curriculum really focuses on the tech, the skillsets of actually doing the programming, setting up servers, configuring servers, just to get the job done and get the product delivered." M3C

Additionally, expectations that the program of study will support economic direction and student needs is clear from the following quote:

> "We place really well our students to local companies in [our state] so that's one way for us to contribute to the economics of the states." M1R

Even as they touted the ability of faculty, they focused on the practical over and against the ethical and social issues that might be addressed in the classroom. For example,

> "our faculty are very good at covering the necessary theoretical aspects, but they've also got a lot of practical experience" M3A

> "this course needs to prepare students for the next course and the instructors in the next course are complaining that students are showing up and they're not prepared and

> so there's a lot of pressure to use the limited time available to make sure students know how to program and get them ready for the next class" M3I

A discussion of ethics under this framework highlights applied understandings and does not ask questions about the social implications of computing. As the chairperson stated, in courses:

> "you talk about everything from security ethics to programming ethics to intellectual property ethics to the ethics of application." M2B

An emphasis on ensuring appropriate end-products was highlighted, with a focus on dealing with understanding the rules surrounding research development and intellectual property:

> "we do have to get a little into technology transfer and intellectual property, because in some cases we are… and increasingly so, we are developing products for clients." M2H

The pressures of instruction, research, and product development often lead faculty toward a prioritization of time and delivery that follows patterns of neoliberal concern with product use and safety and efficiency of development for clients. Even when there is an emphasis on ethics, it is more directly related to the rules of use and how the transfer of a product is handled. When emphasis goes beyond this level, instruction of the ethical and social responsibility issues is placed differently within the curriculum or is outsourced to another department for support. Competent creation is then revisited through the voicing of interest in a curriculum that meets industry needs, through an emphasis on efficient use of resources, or through a deep concern about faculty competence to deliver on ethical and social concerns. It is this emphasis on expertise that carries with it multiple challenges related to overcoming competent creation.

4.2. Expertise

Responses from participants regarding how ethics and social responsibility is delivered brings up faculty concerns related to instructing in areas that are outside of their direct training. While a few faculty have more comprehensive training, many do not. As one department chair noted,

> "having some background in philosophical ethics is a real help. And not all of the faculty have a strong background in philosophy." M2E

Faculty also recognized that aligning expertise with lower division courses where interest in ethics is significant is important:

> "But really in that liberal arts course, in that one non-major course, putting our best, most experienced faculty in ethics is the way we like to go." M2G

In order to ensure successful learning, there have been some efforts to encourage faculty without expertise in ethics to engage in professional development, and certainly as it impacts instruction and collaboration, it is perceived as important for faculty. For example:

> "Others have picked up the course with say a summer to prepare it and have done some directed readings that are led by the experienced faculty." M2F

Yet, department chairs acknowledge that it is challenging to deliver on ethics and social issues associated with computing, when most of the faculty lack that expertise. As the following quotes point out, the emphasis on specialization in training for a faculty position in computer science, along with understandings of the boundaries of the discipline, preclude the possibility of particular types of discussions and instruction.

> "You're not going to bump into a lot of people who would be qualified to teach both a course in computer science and say, a course in psychology." M3T

> "We, meaning those faculty teaching those courses, did not feel prepared and competent to be teaching ethics, carrying the weight of the ethics teaching responsibility." M4D

> "it's more the expertise or background preparation than it is the time per se. … They're hired to be a machine learning or a database or whatever expert." M4H

> "we're looking at about six of our forty faculty, and then the faculty that now teach the one course, which is in essence the ethics course or the professionalism and practice, that's two of us." M4G

On a faculty of forty only two focus on ethics delivery at any level. Faculty have adapted to a particular understanding of delivery and emphasize its functionality. However, as they leave ethics delivery to a small number of individuals in their department, or as they emphasize delivery of ethics at the lower division or within an application, they marginalize it and present ethics and social issues to students as either specific concerns (i.e., applications), end point concerns (i.e., when you find particular cases within a setting), or areas that are outside their purview. This implies that it is also outside the students' purview. If they "run into" an issue it will be considered, but from what angle and with what tools? Modeling expertise as it is currently structured, implies that while ethics and social responsibility are important, they are not central to the life of the discipline. In essence, functionality means "does it work?"

In large measure, the expertise interpretation present in these discussions also carries a sense of deference to authority, a deference to the training previously received as well as a deference to other forms of authority that exist within and adjacent to instruction. Looking at those patterns of deference provides additional insight into how computer science faculty understand expectations.

4.3. Deference to Authority

Public universities exist within the authority structure of the state and adhere to laws and policies that are externally driven and internally interpreted. Rules and regulations apply to multiple aspects of instruction and course delivery, and review of practice occurs by the state, regional accrediting bodies, and accreditors specific to the programs (Bowen & Tobin 2015). *A priori* to any state or local structure and rules, disciplines themselves internally seek validation from their trajectory of knowledge creation and application. It is a form of authority that exists

within the language, method, and substance of the discipline, as well as in and through those deemed "worthy" to speak with and for the discipline itself (Bowen & Tobin, 2015; Hallett, 2007; Kaufman-Osborn, 2017; Keith, 1994). Identifying levels of authority, and who can speak for what under what circumstances can be a topic of debate. There is a form of deference present in the understanding of who has expertise related to which knowledge that serves both in support of and a barrier to knowledge creation and delivery. Yet, for the department chairs that were interviewed other forms of deference to authority were often predominant. Sometimes interestingly so:

> "We've got a lot of accreditors breathing down our neck" M3H.

Another noted,

> "because we're ABET, we tend to follow a traditional, create the objectives, create where we're going to measure that and what ranges we're going to look for in determining whether it's effective." M4F

Deferring to program accreditors both provides support for the delivery of the program and for the attainment of resources that programs perceive they need. Importantly accreditors also establish a mechanism for where and whether discussions of ethics and social responsibility are incorporated into the program of study. For many, program accreditation is a sign of success. Without it, resource discussions and understanding of program goals and outcomes may become more difficult.

Interest in program accreditation needs can also be identified in discussions about when and how a faculty person may decide to change what they deliver. Certainly, faculty are responsible for structuring their courses and syllabi, however, they are also responsible for delivering on departmentally understood curricular outcomes that support accreditation. When asked about whether faculty might insert more discussions of ethics and social responsibility into their courses, a department chair responded:

> "faculty would be willing to work in elements so long as they're comfortable that the existing core curriculum items that they're responsible for and they're going to get dinged for if they don't cover, if there's room to squeeze it in. If they've got the authorization from the department that this is the deployment level responsibility" M3J
>
> "If that's a department level decision, then I think they would follow it. That would give them the cover that they would need, and they wouldn't be nervous that they were going to get dinged for stealing time from something else that they thought was more important." M3M

In these quotes we see both concern about what a faculty person will be downgraded for not delivering and a sense that a faculty person needs "cover" in order to feel comfortable adjusting instruction. This suggests that the department has a set understanding and that "deployment" of the curriculum is not in the total purview of the faculty person. Departmental authority to frame, set, and implement appears to be officially set, and deference to that set understanding of the substance of a course is essential to faculty success.

Interpretations of authority are also evident related to university structure, procedures, and processes. When asked about the feasibility of more cross-disciplinary instruction and research, a chair responded:

> "there is a gigantic administrative barrier in the form of the faculty union." M3S

The implication is that there are significant challenges depending on faculty/administrative structure related to setting up team instruction.

The chairperson, identifying the limits to their own administrative authority in scheduling team-teaching, stated:

> "if I were to take say, an instructor with a PhD in psychology and appoint them to be the instructor of record for a senior level course in the computer science department. I'm not sure I could do that." M3U

Even with accreditation and internal departmental control over curriculum, faculty, in this case department chairs, do not feel that they have the authority to make significant delivery adjustments that cross disciplinary boundaries or reach into the community at large. The same department chair noted:

> "but there's a lot of red tape. I know they ran into a bunch of red tape problems because you have to be careful that you're not setting things up where students appear to be competing with outside industry." M3Q

The caution related to process and procedure and the impact it has on making significant change to curriculum or delivery is also evident when chairs were asked about department involvement in institutional strategic planning or master academic planning. One participant indicated:

> [The] "University just finished the strategic plan and then [the] college actually had a committee that they developed a stage and then the departments are kind of asked to revise or revisit their strategic plan. … So it's a top down process that's, so we are meeting the university missions and the goals as we develop our own and strategic plan." M5P

The hierarchical nature of public universities is exemplified in this quote, and in the comments regarding course content, faculty delivery of that content, and accreditation. Perceptions related to change includes references to faculty being "nervous" about "stealing" from something considered more important, and a need for "cover" to allow for any significant incorporation of ideas that are outside of curriculum delivery toward product development. The implication is that the trajectory of the department, its curriculum, and its students are set, and that adjustments that do not follow the line of sequenced development are suspect. Perhaps the real struggle is with balancing understandings of the hierarchical university, the accrediting bodies, and the discipline itself. What is most significant here? Where is the time to process? Faculty find themselves challenged by a need to balance various aspects of course delivery, research, and service.

5. SHIFTING THE FOCUS—WORKSHOPS FOR CRITICAL CONSCIOUSNESS

A review of the department chair interviews and responses to the faculty survey underscores the relevance of the identified themes. Responses to the survey demonstrate an understanding of the necessity of instruction in responsible computing and the current placement of ethics and social responsibility in the curriculum. Of the sixteen faculty who responded to the question, "As a faculty person in higher education, to what extent do you see responsible computing (i.e., ethics and social responsibility in the design and implementation of information technology and social media) as important to your instruction?," twelve indicated that it was important and four that it was somewhat important. When these response patterns are compared to responses to the survey question, "Considering the standard CS courses identified below, to what extent do you address ethics or ethical and/or social issues in each course?," we note some discrepancies. Response options for this question were: to a great extent, to some extent, not at all, or does not apply. Of the twelve participants who responded to this question, nine indicated "does not apply" for Artificial Intelligence courses and Database courses. Eight chose "does not apply" to Computer Graphics Courses and seven chose "does not apply" to Web Programming. On the other hand, other courses were identified as including responsible computing at a high or fairly high level. The courses that were identified as addressing ethics and social issues the most were Computer Science 0, Networking, and Thesis.

These responses are consistent with department chair comments regarding responsible computing placement in the curriculum and raise questions about how additional instruction in responsible computing could be infused into the curriculum. Perhaps, given how faculty currently handle the curriculum, the feasibility of incorporating responsible computing is not viable due to elements of time, expertise, and expectations surrounding curriculum sequencing. Or perhaps delivery of topics such as AI and databases is done mechanistically and portends conversation about the inclusion of substance and consequences of ethics in instruction. Nevertheless, these data and the interviews with department chairs confirm the presence and absence of particular types of substantive conversation regarding responsible computing at public state universities and highlights where professional development may be possible.

To assist faculty who are interested in infusing ethics more systematically across the curriculum, we have designed a workshop that will help faculty reach across disciplines. Each workshop involves computer science and humanities or social science faculty who come together for five to six hours. Rather than having the workshop designed around a case analysis or a direct lecture framework, we engage faculty in a staged process to address interests, capacities, and modalities. The pair and share process encourages the development of empathy regarding individual interpretation of responsible computing, ethics, and social elements. The model also demonstrates how engaged dialogue can build toward deeper reflection and can act as the groundwork for pedagogical practice. We model designing a teaching module using a dialogical process that demonstrates stages of development. At the end of this step, participants have an awareness of not only what a module may contain, but how alternative viewpoints are used to approach a standard computer science topic. Using elements from critical curriculum studies and interpretations of virtue ethics, we encourage both personal and professional self-awareness and development through this workshop (Au 2018, Stovall, 2011).

6. CONCLUSION

The responses to the interviews and the supplemental data from the survey demonstrates how particular interpretations of expertise and delivery are embedded within academic cultural and structural dynamics. The themes of competent creation, expertise, and deference to authority capture the essence of the strengths and challenges faculty face in meeting the expectations of departments, universities, and industry. While many of these faculty see the incorporation of ethics and social issues into the curriculum in a systematic manner as important, and perhaps even wish for more, they consistently point to the need for efficiencies, concerns regarding their own expertise, and prioritization of need. Since our social, professional, and digital environments are now deeply entwined, it is time to help faculty enhance their capacity to embed ethics and critical awareness into the culture of their teaching and research.

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