Putting the Pro in Professional Learning
Empowering Educators to Design for Equity

Joanna Goode

University of Oregon, goodej@uoregon.edu

This keynote lecture will present research on the influential role of teachers in designing, facilitating, and advocating for equitable learning experiences in computing classrooms. The talk will consider how teachers gain knowledge, skills, and a sense of agency to address inequities in computing learning experiences. Specifically, the discussion will illustrate three distinct ways that teacher leaders can serve as powerful agents of change: as effective facilitators for other teachers' learning experiences about inclusive computing, as curriculum co-designers of justice-oriented computing curriculum, and as advocates for equitable school policies

CCS CONCEPTS • Social and professional topics → K-12 education

Additional Keywords and Phrases: Teacher leadership, Teacher agency, Social justice education, Exploring Computer Science

1 INTRODUCTION

Despite a variety of large-scale, national efforts to promote computer science education, there continues to be great disparities in which students have opportunities to experience meaningful and engaging experiences in computer science classrooms. These disparities are related to systemic challenges faced by historically underserved communities, including limited access to computer science courses, teacher preparation, and instructional materials [1]. These inequities are furthered by biased belief systems of educators and others who serve as gatekeepers for students even when school opportunities might be available. In the United States, students who are not White and male are less likely to have access and participate in computer science classes. When minoritized students do spend time in computing classrooms, often their learning experiences are not aligned with their expressed identities and interests.

However, teacher leadership and agency can play a pivotal role in advancing computer science education and promoting equity and inclusion. Teacher leadership refers to the ability of educators to take on influential roles beyond their traditional classroom responsibilities, guiding initiatives to improve teaching and learning practices. In the context of computer science education, teacher leaders can serve as champions for promoting the adoption of computing curriculum into school curriculum not only at their school, but in their professional networks and in their regional communities. By assuming leadership roles, computer science teachers can collaborate with colleagues, administrators, researchers, policymakers, and other community members to shape the direction of computer science programs, including professional development, curriculum, resources, and educational policies and practices.

Teacher agency, on the other hand, pertains to the empowerment that educators have to make decisions about their teaching practices, the curriculum, and other spheres of influence in their educational work. In the realm of their classrooms, teacher agency allows educators to adapt and tailor their instructional approaches

to suit the needs and interests of their students, integrate issues of justice into the curriculum, as well as to respond effectively to emerging computing topics and current events. Further, teacher agency can also address issues that extend outside of computer science classrooms, such as contributing to the development of curriculum, supporting the professional learning needs of other computing teachers, and speaking as professional experts in government and school policy discussions related to computing education. Ultimately, teacher leadership and agency are vital for computing education as they foster a community of educators who are confident, innovative, and responsive, especially for addressing issues of equity, inclusion, and justice across the ecosystem of computing education.

Supporting the development of teacher leadership and teacher agency in the education involves an examination of the actions of individual educators within particular social contexts marked by a set of resources that are culturally, socially, and historically developed [2]. Thus, teacher agency is mediated by the interaction between an individual teacher and the structures impacting their capability to exercise power, particularly in reform contexts that bring new normative professional tools and expectations. Further, an ecological theory of teacher agency suggests that while teachers as actors possess capacities to achieve reform, their ability to fully achieve agency relies on the interaction between these capacities and the ecological contingencies of the environment [3]. An ecological theory study of teacher-enacted curriculum reform found that teacher agency is largely about "repertoires for maneuver" - the possibilities for different forms of action available for teachers in their temporal, material, and social context [4]. In addition, the beliefs, values, and attributes that individual teachers mobilize in specific settings are important characteristics of teacher agency. This talk considers how offering teacher professional learning programs that support teachers in developing and enacting their own repertoires for maneuver, particularly within their spheres of influence, can strengthen the entire enterprise of computer science education.

This talk considers three different ways that teachers are engaging in agential work based on teachers' particular preparation, knowledge, and lived experiences. Who better to inform computing education than experienced computing teachers? After all, these teachers hold deep knowledge, multiple skills, and experiences, including:

- Professional knowledge of Students
- Professional knowledge of Pedagogy
- Professional knowledge of Computer Science
- Professional knowledge of Schools

Teachers' professional knowledge in these areas uniquely situates these teachers to bring knowledge and perspectives to professional communities that not only demonstrates the importance of teacher leadership, but also how teacher agency contributes to a more equitable computer science education.

2 FOSTERING TEACHER LEADERSHIP AND AGENCY

To illustrate how teacher leadership can be agential, this talk considers three professional development programs that uniquely support teacher leadership and directly influence the course of computer science education. All three programs involve teachers who are part of the Exploring Computer Science (ECS) course. The ECS course was developed in 2008 to provide the first widely available introductory computer science course [5]. The course includes an instructional curriculum guide that includes daily lesson plans and a structured inquiry pedagogical approach. A central part of the course design involves teachers' attending an intensive one-week professional development workshop to build their knowledge of the curriculum. As teachers begin teaching the course in their schools, they attend quarterly Saturday workshops, followed by a second summer of professional development workshops. Foundational aspects of the professional preparation for ECS include rehearsal-based teaching of inquiry-based pedagogy and discussions about race and racism. An estimated 4,000 teachers have participated in the ECS professional development program in

preparation for teaching the course. Unlike most high school computer science classes, the ECS course has attracted a more representative numbers of girls, and students of color, that is comparative to the school population.

2.1 Professional Development Facilitators

Teacher facilitators play a crucial role in the success and effectiveness of teacher professional development. The ECS teacher facilitators are a group of over 40 facilitators who co-lead ECS professional development workshops across the nation. While some of these primarily lead workshop in their own home region, other facilitators travel across the country to support the development of new ECS programs or offer a national "all-comers" learning opportunity. The ECS facilitators all experience a preparation pathway before becoming a facilitator, including the completion of the two-year ECS PD, observing PD sessions, apprenticing during PD sessions, and finally, co-leading a session with a more experienced facilitator. This long-term preparation allows facilitators to learn how to ask questions that support inquiry, facilitate conversations around race and equity, and navigate challenging scenarios or conversations. Further, each year a group of ECS facilitators come together to continue to learn together, particularly around issues of infusing more culturally relevant and responsive strategies into the pedagogy highlighted in PD sessions. These skilled educators, with expertise not only in teaching computer science but also in teaching the ECS class, possess a deep understanding of the challenges and opportunities teachers face in their classrooms. By serving as facilitators, they create a supportive and collegial learning environment where fellow teachers can engage in meaningful discussions, share experiences, deepen understandings of secondary computer science content, and learn effective instructional practices that are responsive to the cultures and interests of students. Because they can speak to their own classroom teaching experiences, ECS facilitators foster a sense of trust and openness, encouraging their teacher colleagues to reflect on their teaching practices and explore new equity-focused strategies. As teacher colleagues, teacher facilitators are relatable and approachable, making it easier for other educators to connect and learn from one another. Their presence enriches professional development, contributing to a continuous growth culture within the teaching community and ultimately benefiting students by improving the quality of instruction in the classroom.

2.2 Curriculum Co-Design Teachers

Another realm of knowledge that teachers are uniquely situated to be involved with is the development of instructional materials. Yet, it is typical for curriculum to be written and provided to practicing teachers without the authentic involvement of multiple teachers representing different social, cultural, and contexts. One generative approach that has shown promise for leveraging the deep knowledge of teachers is co-designing instructional curriculum. A recent national co-design effort involves 12 ECS teachers in learning, planning, and (re)writing the ECS instructional lessons for updates of computing topics and a renewed commitment to incorporating universal design and social justice-focused lessons throughout the lessons. This effort involves two phases: 1) a shared learning process focuses on justice-oriented themes related to computer science; and 2) a unit and lesson template development process and lesson writing, revising, and rewriting. The phase I work involved monthly meetings with teachers focused on a social justice theme. Before each meeting, teachers would read, review, or watch a set of readings or visuals related to the social justice topic and computing. During the meeting time, teachers would make connections with these thematic topics, computing education, and the ECS written materials in general. The phase II work of co-design involves co-design teachers collectively revisiting unit and lesson structures, sequencing, and integration of key themes, topics, and issues of justice throughout the instructional materials. Ultimately, these teachers bring a wisdom of practice from their own teaching of ECS materials, knowledge of pedagogy, and a shared experience and commitment to infusing justice-oriented topics into an upcoming refreshed edition of ECS. These classroom

teachers' visioning of how to adapt curricular materials, and commitment to a two-year endeavor for the project, supports teacher leadership and agential attitudes of teachers involved in this robust process.

2.3 Social Justice Teacher Leaders

A third program to support teacher leadership and agency is focused on involving teachers in computer science educational efforts that extend outside of the classroom. As computer science education continues to grow across secondary schools, there has been an acceleration of local, regional, and state efforts and initiatives that are aimed at building and broadening participation in K-12 CS. In the United States, most computer science educational policies, including learning standards and teacher preparation supports, are influence by state legislation and state and school district education policies. Yet, these planning efforts rarely involve the expertise of computer science teachers with classroom teaching experience. Teachers' familiarity and expertise in teaching and learning computing are embedded within their understanding of the ecosystem of daily school practices and policies, knowledge that is essential when developing educational pathways and policies in computer science education. To help support teachers' involvement in the ecosystem of computing education that extends outside of the classroom, the "Social Justice Teacher Leaders" program has support small cohorts of ECS teachers in identifying their vision and areas of influence for improving computer science education. The Social Justice Teacher leaders meet for two days during the summer, examining state and local policies, practices, and the interests and assets they bring to enterprise of computer science education. Participating teachers then meet regularly during the school year as they consider planning and acting on agential projects that influence and improve equitable computer science education. Systemically, these teacher leaders work to create sustainable changes through the amplification of teacher voice in state policy efforts, broad attention to recruitment efforts, and consideration of how data can play a role in measuring and supporting these systemic efforts.

3 CONCLUSION

In conclusion, the disparities in computer science education persist due to systemic challenges faced by historically underserved communities and biased belief systems that influence students' opportunities to learn. However, the transformation of computer science education and the promotion of equity and inclusion can be achieved through teacher leadership and agency. Teacher leaders can champion the adoption of computing curriculum, collaborate with various stakeholders, and shape the direction of computer science programs. Teacher agency empowers educators to adapt their instructional approaches, integrate issues of justice, and address challenges both within and beyond computer science classrooms. Developing teacher leadership and agency involves providing professional learning programs that allow teachers to develop their own repertoires for maneuver within their spheres of influence. By nurturing teacher leadership and agency, the entire ecosystem of computing education can be strengthened.

REFERENCES

[1] Jane Margolis, Rachel Estrella, Joanna Goode, Jennifer Holme, & Kimberly Nao. 2017. Stuck in the shallow end: Education, race, and computing. MIT Press.

[2] Sue Lasky. 2005. A sociocultural approach to understanding teacher identity, agency and professional vulnerability in a context of

secondary school reform. Teaching and Teacher Education, 21, 8. 899-916.

[3] Gert Biesta and Michael Teddler. 2007. Agency and learning in the lifecourse: Towards an ecological perspective. Studies in the education of adults 39, 2. 132-149.

[4] Mark Priestley, Richard Edwards, Andrea Priestley, and Kate Miller. 2012. Teacher agency in curriculum making: Agents of change and spaces for maneuver. Curriculum Inquiry. 42, 2. 191-214.

[5] Joanna Goode, Gail Chapman, and Jane Margolis. 2012. Beyond curriculum: The exploring computer science program. ACM Inroads. 3, 2. 47-53.