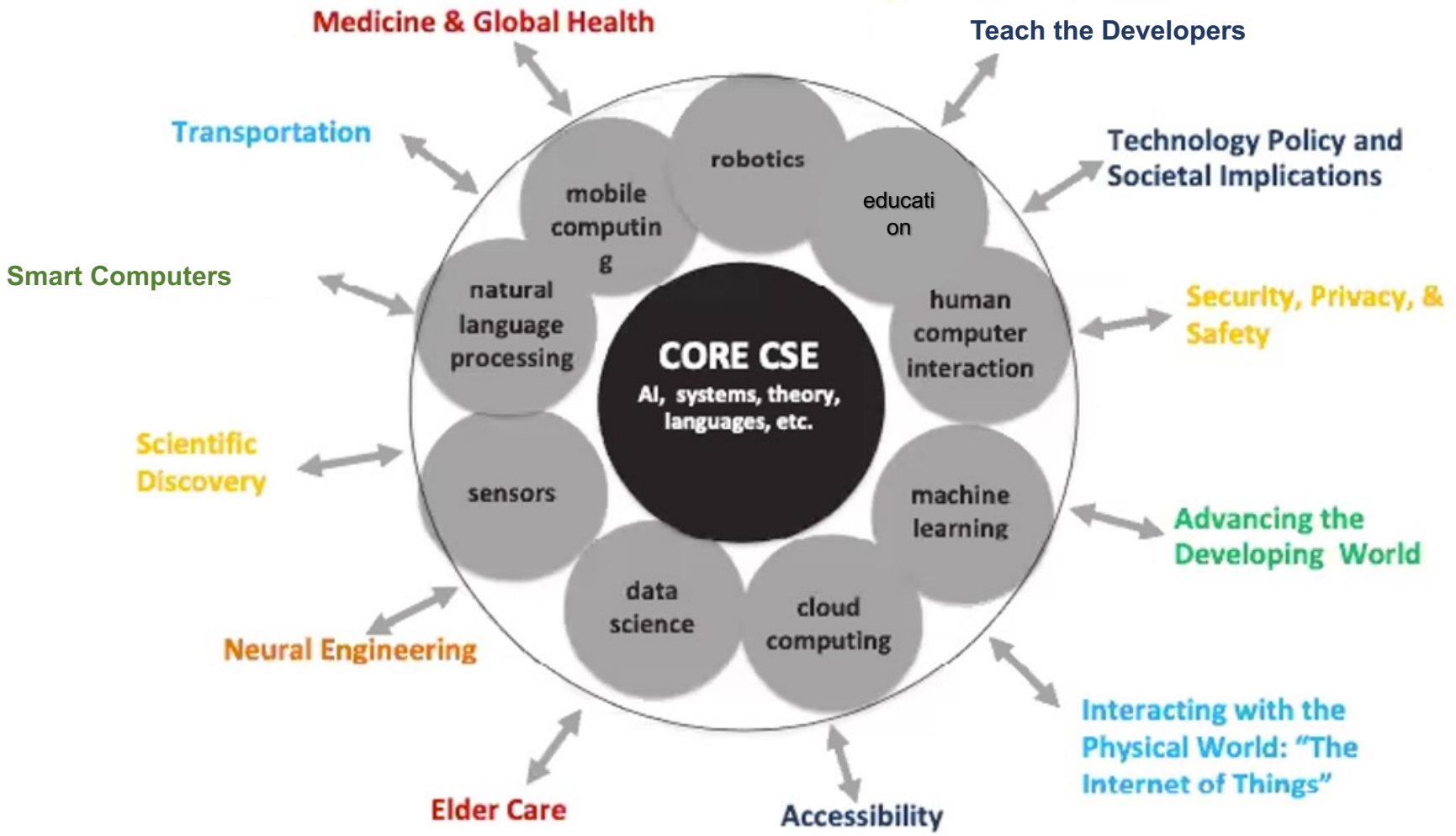
How Informal Computer Science Learning Programming are Reaching Their Students

What I'll be discussing

- How is this research connected to computer science research?
- Motivations for this research
- What prior research in this area has shown?
- How are informal CS learning programming reaching their students?
  - Who I interviewed
  - How was the data analyzed
  - What are the results

A 21st century view of Computer Science: A field unique in its societal impact



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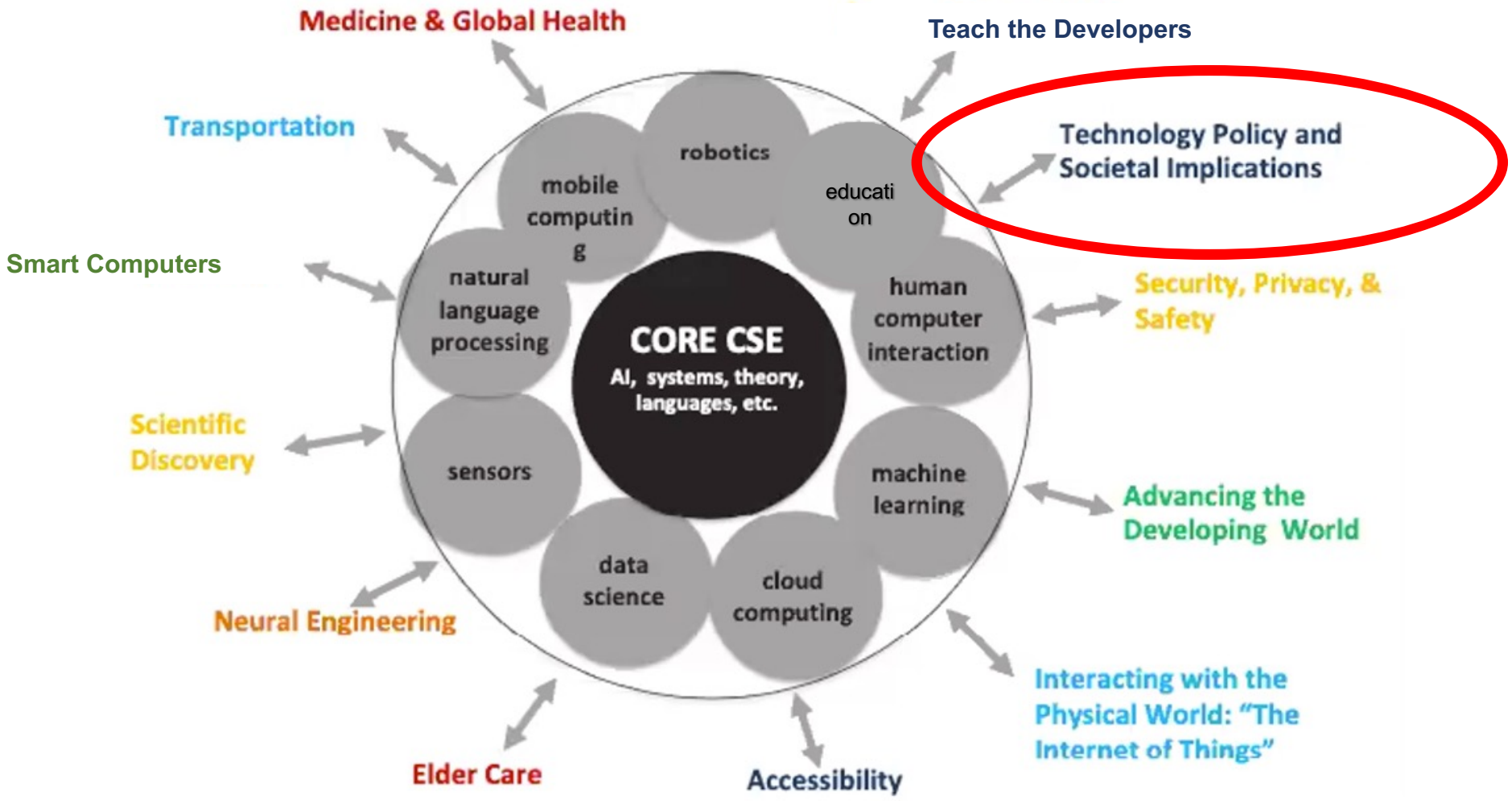

The Call to Broaden Participation in Computing

- 81% identified as male
- 48% White
- 24% percent are Asian
- 12% are international students

- Who sponsors research for Broaden Participation in Computing?
  - NSF
  - ACM
  - Google
  - Microsoft

Prior Research on Informal CS Learning Programs

- Informal Learning Programs focus on [Decker et al]:
  - 49% focus on increasing gender diversity
  - 31% focus on increasing “Ethnic” diversity

- Who shows up to the Informal Learning Programs [McGill et al]:
  - 79.7% white students
  - Almost all boys

The Hole in Prior Research

- How, where, and who do these informal learning programs recruit?
- RQ1: What recruiting practices are informal CS learning programs using?
- RQ2: What is the cultural competency of the practices?

Elements of Cultural Competence

- **Valuing diversity:** programs understand, appreciate, and respect its worth
- **Cultural self-assessment:** programs accurately and exhaustively assessing their current beliefs against current practices
- **Dynamics of differences: w**hen a program with one culture interacts with a population or group from another, both may misjudge the other's actions based on learned expectations
- **Institutionalization of Cultural Knowledge:** When programs implement ways to learn about cultures other than its own.
- **Adaptation to Diversity**: programs adapt their policies and practices in order to meet the needs of people from different backgrounds.

Cultural Competence Continuum

- **Cultural Destructiveness:** program's practices, attitudes, and policies "... are destructive to cultures and consequently to individuals within the culture"
- **Cultural Incapacity:** program's do not purposefully seek destruction, but instead lack the ability to help those that are culturally different or who are marginalized.
- **Cultural Blindness:** program's hold beliefs that their practices and polices are unbiased towards race, gender, sexual orientation, religion, and level of income.
- **Cultural Pre-Competence:** Program's realize that their polices, practices, and beliefs disproportionately negatively effect minority groups and try to improve them
- **Cultural competence:** Meets all the elements of cultural competence

Our Participants

- 14 participants who hosted informal CS learning programs in the Puget Sound

- All participants were involved in an informal learning program and knew how they recruited their students

The Semi Structured Interview Questions

- I asked questions about:
  - Their recruiting practices
  - Who they are trying to recruit
  - Challenges they face in broadening diversity

Our Findings

- Identified 22 different practices that informal CS programs used

- Cultural competence implementations of practices ranging from Cultural Incapacity to Cultural Pre-Competence
  - Criteria 1: for a practice to be culturally competent it must meet one of the elements of cultural competence

Mailing lists as a recruiting practice

- All 14 programs used mailing lists

- P1: "... we have a, like a list of about a thousand emails that we've collected over the years, uh, parents or people who signed up on online. And so we just kind of blasted out flyers and tried to run promotional things ... so the list is comprised of, um, the bulk of it is comprised of people or families who have interacted with us in some way, whether their child took a class at some point ..."

Mailing lists as a recruiting practice

- P11: " ... there's a mailing list the only thing is that email campaigns are not effective. Again, people, if people get so many emails every day right it's it's a noise. Some people just don't even read emails. So, the if you get if you get open rate of like 10% 15% 10% you're lucky ...”
- Both P1 and P11 used mailing lists in a way that did not meet criterion one and demonstrated cultural incapacity because this practice does not have the capacity to increase participation from girls and students from different SES and races.

Mailing lists as a recruiting practice

- P13: "that <target population> has changed our recruiting from more of sort of waiting for people to email us or sign up for our list … Instead, we are now going okay what schools are the students we're looking to recruit...”

- P13’s implementation of email lists demonstrated culture pre-competence. Their implementation satisfied criterion one and met the cultural-self assessment and valuing diversity elements.

Mailing lists as a recruiting practice

- P5 reported that they had built up a list of over 600 deaf community programs
- P14 primarily used their mailing list to contact teachers that they had talked to in the past
- P5 and P14 demonstrated a maintenance and development of a network of schoolteachers meeting the institutionalization of cultural knowledge element

Summary

- Where this research is in relation to the rest of computer science
- The motivation for this research
- Prior research and the gaps in it
- Who the participants were
- One of the 22 ways informal CS learning programming reaching their students

References

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