CS Career Education for HS Students through Storytelling

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Background - Computer Science (CS) Careers

- Computing job opportunities continue to grow
- Mastery of computational thinking is needed for one to succeed professionally
  - Even true for non-computing focused jobs
- There are gaps between job openings and qualified candidates
  - Current solutions involve bootcamps and micro-courses
- Lack of computing education at K-12 level
  - 20% of countries mandate CS Education

Previous Initiatives - What has been done?

- Computer Science Teachers' Association (CSTA)
  - Developed set of CS standards
  - CS can therefore be integrated into school curriculums
- US States have increased adoption of legislation introducing CS as a requirement in K-12 schools
- There are still barriers
  - Online resources need quality vetting
  - Few resources give suggestions from employed professionals

Computer Science Chats

- CS platform hoping to foster career awareness and readiness
- Recorded video interviews
  - Over 20 so far
  - 6-35 minutes (median 15 minutes)
- Professionals come from
  - Academia (i.e. Harvard University, MIT, Princeton University, SUNY Oswego)
  - Government (i.e. NASA, NSF)
  - Industry (i.e. IBM, Meta, Google)
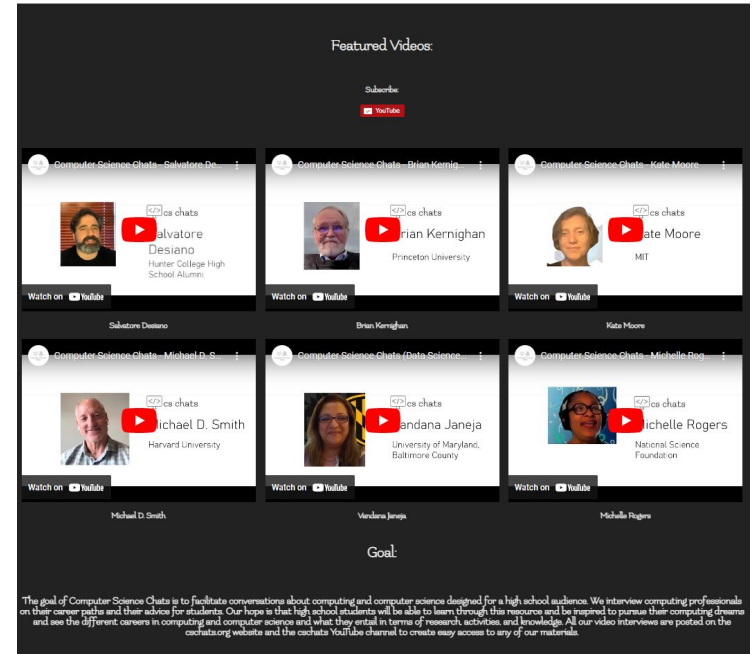
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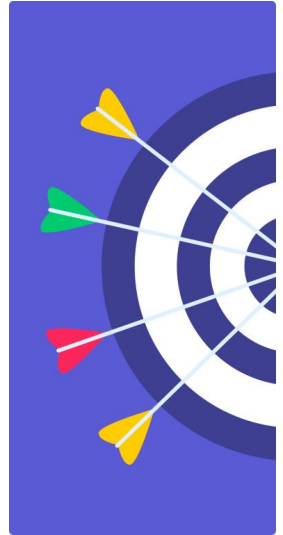

Fig 1. CSChats Homescreen

Computer Science Chats cont.

- Help high school students learn and be inspired
  - Provide role models from diverse backgrounds allows students to see themselves
  - Present examples of various career paths with varying levels of experience means every step of the professional path can be represented
- Reduce inequity
  - Free access to resources ensure that students can access researchers and professors they might not have been able to

Goals

- Present a content analysis of the CS Chats interviews.

- Identify themes related to motivation for pursuing, computing careers, recommendations for pursuing such careers and the future of computing.

Methods

- Subsample of 12 representative interviews were chosen
  - Interviewees are part of a diverse group in terms of demographics, work experience, and specialization
    - 4 identify as women, 3 are from groups historically underrepresented in computing
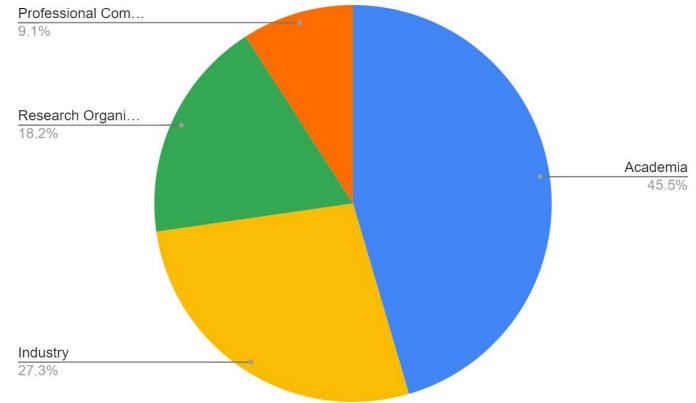   - 7 had a doctoral degree while 5 completed a MS or BS in computing

Fig 2. Breakdown of Professionals' Jobs

Methods Cont.

- Out of an average of 10 questions per interview, three were selected
  - "What inspired you to pursue computer science as a career?",
  - "What advice would you have for high school students who would like to pursue a career in computing?"
  - "Where do you think computing is going in the future and how can students prepare for it?"
- Automatically generated transcripts edited for clarity were used
- A content analysis was conducted with themes identified for each question

Results

1. Motivations for Computer Science as a Career

- Motivations:
    - Novelty of domain
    - Creativity in work
    - Drive to contribute to solving problems
- Exposure to it through courses, networking, and summer programs/internships was a significant factor in desire for computing
- "I think my biggest inspiration was I wanted to do something in a field that was working towards building the future and I wanted to be a part of that",

Results

1. Motivations for Computer Science as a Career cont.

- "they were talking about the complexity of the datasets that they're seeing … and they wanted to make sense of that data … this really inspired me to think about data in different ways and the power of data"
- Some professionals had interest in other fields and discovered computing while others discovered their passion through courses
  - "I had actually had a CS class in high school and thought I enjoyed that I should try this out and just fell in love it was so much fun to get to actually make things and that tapped into that same creative urge that I had so that is that's what got me on the CS track."

Results

2. Advice for High School Students interested in Computer Science Careers

- Advice provided to high school students had several themes
  - Accessibility of field
  - Encouragement to identify opportunities to experience computing
  - Importance of studying mathematics and communication
- Interviewees noted the lack of entrance barriers to the field
  - "there's so much material available that will help you learn there's so many people who are also involved who can lean on or you can build things with"

Results

2. Advice for High School Students interested in Computer Science Careers cont.

- Interviewees also encouraged students to try out CS
  - "be curious to don't be afraid to try"
- They also mentioned the interdisciplinary nature of computing
  - "you know data could range anywhere from movies to game statistics to astrophysics to climate change, any of those, and that's the beauty of it"

Results

3. Future of Computing and How to Prepare for it

- Experts gave a diverse outlook for the field
- Growing reliance of computing in areas of life was mentioned
- "they're essentially everywhere, we can put computers everywhere and we're sticking them in things like thermostats and doorbells and refrigerators",
- Cyber security, privacy, and artificial intelligence were seen as important from the point of view of ethics, explainability, and societal acceptance
  - "The loss of privacy that's a personal thing for lots of people"

Conclusions and Future Work

- Gradually introducing students into CS is very important
  - Low barriers to entry will ensure that students stay engaged
- Keeping computing fun and interesting while keeping in mind ethics is also important
- Students should be aware of the changing nature of computing
  - A strong baseline of core concepts is essential
- Formal and informal opportunities like courses and internships will increase likelihood of pursuing CS as a career
- A further analysis of CSChats will be conducted and more interviews will be recorded to ensure that the platform stays relevant in a rapidly changing CS world.

Thank you!

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