

CS for Waterville



Kim Quinn Hutchinson & Charles Fadel

Why we are here

“Maine high schools should offer computer science courses...

Jobs in almost all fields will require proficiency by the time today's youths enter the workforce.”

Portland Press Herald

“Computer Science is a liberal art: it’s something that everybody should be exposed to and everyone should have a mastery of to some extent.”

Steve Jobs

Computing occupations are the #1 source of all new wages in the U.S. and make up over half of all projected new jobs in STEM fields, making Computer Science one of the most in-demand college degrees.

Code.org

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The Facts*

- **Maine currently has 939 open computing jobs**
 - 2.3x the average demand rate in Maine.
- **Average salary** for a computing occupation in ME is **\$79,127**
 - vs average salary in the state \$45,300.
- The existing open jobs represent a \$74.3M opportunity in terms of annual salaries.
- **Maine had only 119 computer science graduates in 2017; only 16% were female.**
- 73% of principals surveyed think CS is just as or more important than STEM.
- Computer science drives job growth & innovation throughout our economy and society.
- **Computing occupations are the number one source of all new wages in the U.S.**
- Computer Science one of the most in-demand college degrees.
- Computing is used all around us and in virtually every field.
- **Computing is foundational knowledge that all students need.**
 - But computer science is marginalized throughout education.
- Fewer than half of U.S. schools offer any computer science courses
 - only 8% of STEM graduates study it.

We need to improve access for all students, including groups who have traditionally been underrepresented.

Closing the Gap in Maine

“Maine needs to:

- Create a state plan for K-12 computer science.
- Make rigorous computer science standards publicly available across K-12.
- Dedicate funding for rigorous computer science professional development and course support.
- Offer clear certification pathways for computer science teachers.
- Offer computer science to established programs at institutions of higher education to preservice teachers.
- Dedicate computer science positions in state or local education agencies.
- Offer computer science in all secondary schools
- Count computer science for a core graduation requirement.
- Count computer science as a core admission requirement at institutions of higher education. “



1	2	3
State Plan	Standards	Funding
No	No	No
4	5	6
Certification	Preservice Teacher Prep	State Supervisor
No	No	No
7	8	9
Require HS to Offer	Core Grad Credit	Higher Ed Admission
No	No	No

Overall Strategy

Mentors & Coaches to build Student:

- Identity
- Agency
- Purpose

CS/EE (+Math remediation incl. Data Science)

Internships & Apprenticeships

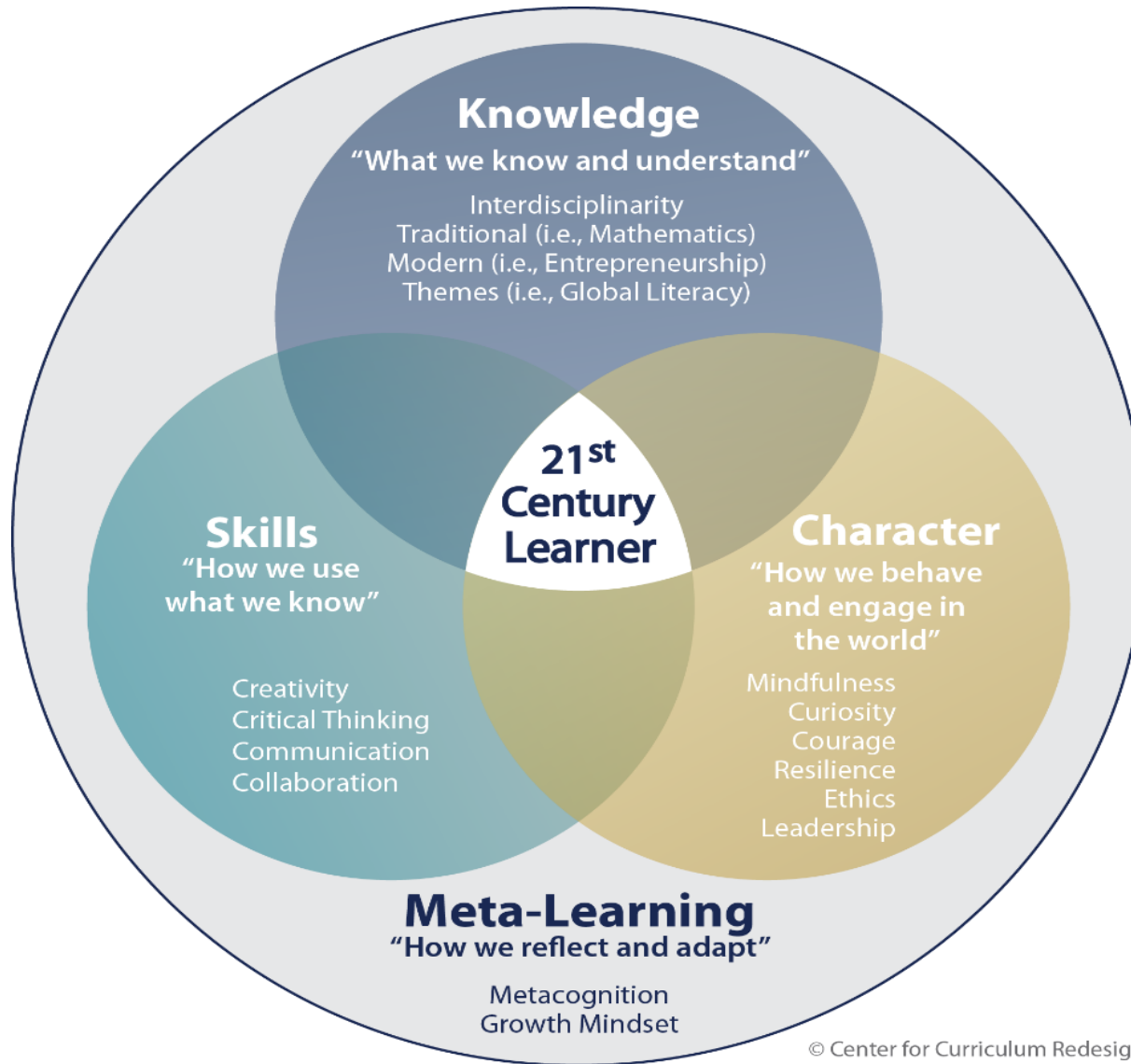
Local & Global Employers

Skills, Character, Meta-Learning

Entrepreneurship

Feedback + Predictive analytics of needs

21st Century Skills



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CyberPanthers Pilot Project Goals

Teach Computer Science + Competencies + Entrepreneurship *and*

- Build student identity, agency and purpose
- Develop social/emotional skills
- Break the negative feedback loop by providing access to resources, family support, high expectations and team spirit

CyberPanthers Pilot Project Scope

- **Students:** High school students in the greater Waterville area
- **Time & Place:** Three-year pilot beginning August 2018 through July 2021
- **Curriculum:** Code.org + CCR filling the gaps
- **Possible job market segments for Maine**
 - Cybersecurity/Blockchain
 - Gaming/AR/VR
 - App Dev
 - Artificial Intelligence (AI)

Year 1:

- Design and build custom curriculum elements
- Train coaches/mentors/leaders
- Develop authorized intern programs for year 3
- Enhance community partnerships

Years 2-3 Scope

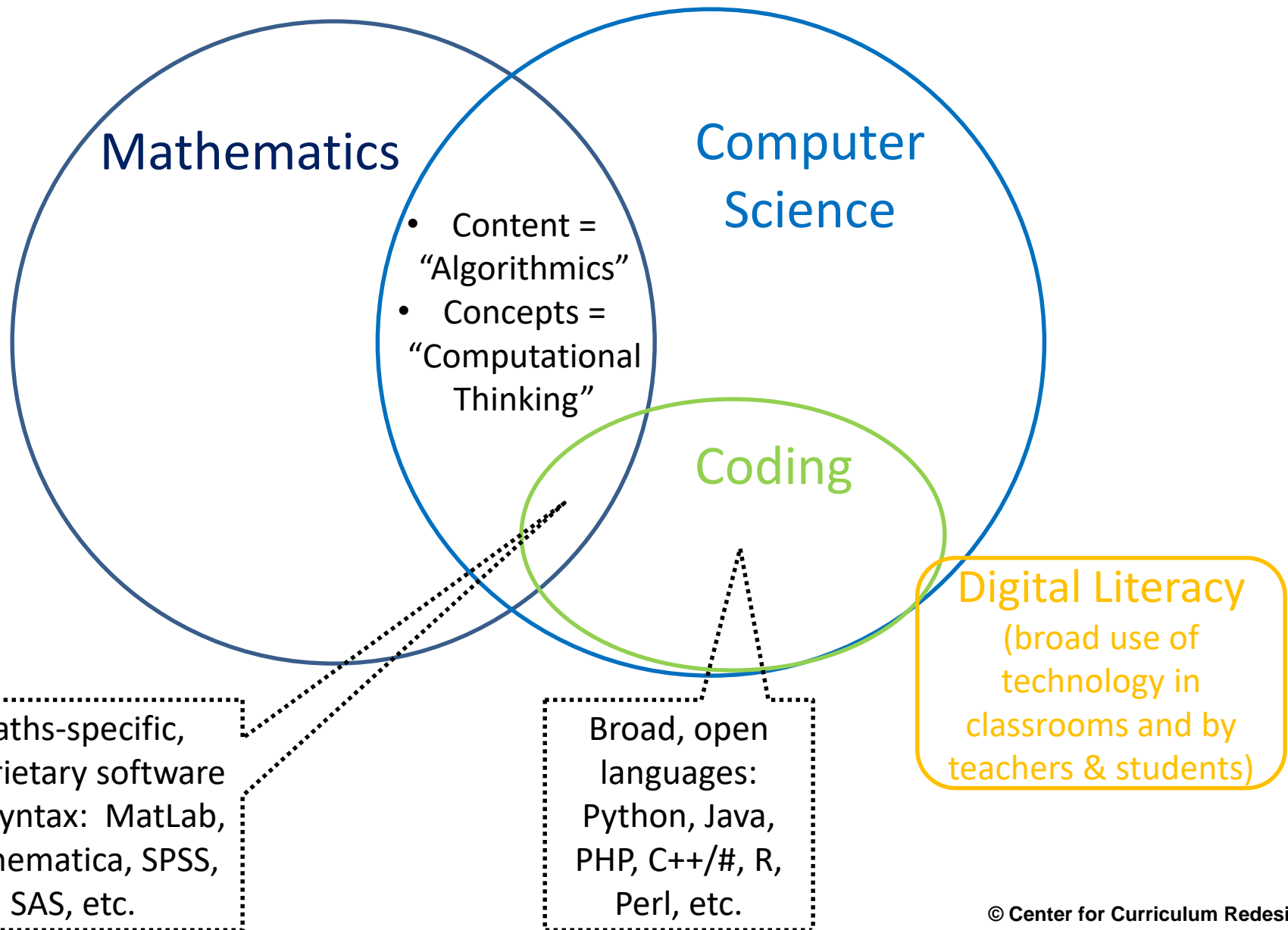
Year 2:

- Deliver CS curriculum as an elective course meeting Career Prep requirement
- Develop extended CS curriculum pathways.
- We anticipate a minimum of 20-40 students in the first phase.

Year 3:

- Deliver extended CS pathways
- Possible future development of Biotech
- We anticipate a minimum of 50-70 enrollees.

Computer Science is a LOT more than Coding



CCR approach to Partnerships

- Minimize prototype and scaling costs, and time-to-market
- Build all elements of success (social/emotional support)

WTVL HS:



Jobs for Maine's Graduates:



Thomas College:



CGI:



AYC:



Partner status



Waterville Senior High School

- WTVL Curriculum Committee voted *unanimously* to recommend the pilot to the WTVL school board.
- WTVL School Board vote *unanimously* to support the CyberPanthers CS pilot on October 15, 2018.
- Working closely with Superintendent Haley, Principal Laramée through student registration for fall offering

Partner status

JMG is very excited to partner with our CS pilot.



JMG is making many of their resources available to the pilot including:.

- Student/parent commitment Forms
- Employer Engagement Handbook (experience with internships & job shadowing)
- Labor economist JMG contracts and shares with another Alfond Foundation Project
- Change Management experience on the JMG executive team
- Teachers with social worker background.

Partner status



Thomas College is very excited to partner with our CS pilot.

- Several Thomas College resources such as sample CS syllabi
- Opportunity for free college credit could be available to the pilot. Dual credit, college credit now, & week intensive.
- Thomas Cup competition
- We have shared our job descriptions for both the adjunct professor and student mentors as they will likely come from Thomas College, Colby College or KVCC.

Partner status



CGI is very excited to partner with our CS pilot.

Several CGI resources are available to the pilot including:

- STEM camp activities to be used at information sessions.
- Access to the latest trends in the CS field
- Guest Speakers
- Visit to CGI facility

Partner status



Boys & Girls Club & YMCS of Greater Waterville @ Alfond Center is very excited to partner with our CS pilot.

- AYC can host information sessions for students and parents.
- CS students would provide mentorship in year 2 to the younger students at AYC afterschool program

Development Sequence

Sept. 2018-2019	Sept. 2019-2020	Sept. 2020-2021
<ul style="list-style-type: none">• Design CS curriculum and implementation Model	<ul style="list-style-type: none">• Deploy & measure CS Pilot Gr. 9-10• Design CS pathways	<ul style="list-style-type: none">• Continue & measure CS pilot (Gr. 9-10)• Deploy & measure CS pathway Gr. 10-11

Staffing for *Pilot*


Full-time:

- Executive Director
- Curriculum designers
- Platform developer + tools

Part-time:

- CS instructor(s)
- CS college mentor(s)
- 1/4 Social worker
- 1/4 Labor economist
- 1/4 Anthropologist
- 1/4 Change Management consultant

Proposed Monthly scorecard

Criteria	Sub-criteria and date due	Rating
Project Staffing		
Partner recruitment		
Curriculum development		
Teacher recruitment		
Student enrollment		
Parent engagement		

Enroll in Waterville High School's
NEW Computer Science Elective!
AND fulfill your Career Prep requirement!

APP DEVELOPMENT

Create the next hot App



VIRTUAL / AUGMENTED REALITY

Design immersive experiences



GAMING

Everyone can play the game you develop



ARTIFICIAL INTELLIGENCE

Teach machines to learn



DIGITAL HUMANITIES

Design and create digitally



CYBER SECURITY / BLOCKCHAIN

Prevent hacking of your profiles and email



Be part of this exciting new course, with opportunities for Internships,
Mentorship, and tons of hands-on learning

Sign Up Now for Fall 2019 – Limited Space!
Learn More at WatervilleCyberPanthers.com

Course Modules

Exploring Virtual Reality and Augmented Reality

- Experience VR --explore VR apps (VR headsets TBD)
- Experience AR-- ex) explore BBC Civilisations AR
- Create a basic AR experience

Introduction to Programming

- Creative Computing with Scratch 3.0
- Exploring Block Coding
- Animating Objects
- Programming Interactive Stories
- Career Connection

Course Modules

Designing Basic Games

- Understanding basic game mechanics
- Good game design, Plotting Scenes and Shapes
- Starter games in Scratch 3.0
- Variables and keeping score
- Conditionals, Booleans and User Input
- Final Game Dev and Project Pitch
- Career Connection

Computers Change Everything

- How the internet works
- How computers work
- Filetypes: e.g., txt, sound, video, img

Course Modules

Introduction to Artificial Intelligence and Machine Learning

- Introduction to Artificial Intelligence and Machine Learning
- Be CreAltive- exploring AI Experiments and more
- Programming an AI-ready robot, Cozmo

Understanding Data, Privacy and Cybersecurity Basics

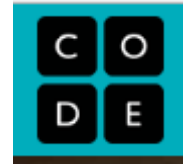
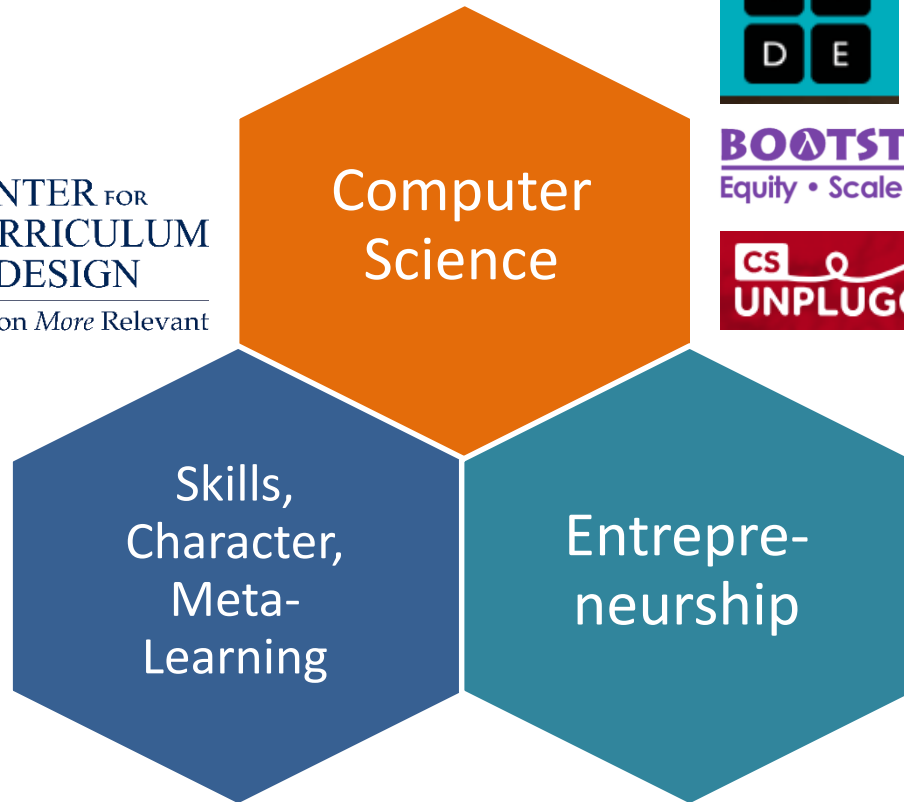
- Personal Privacy and making sense of data
- Cyber Security and Protecting Yourself
- Understand Google's My Activity page and what it collects
- Understand how to report cyber crime
- Explore NSA Day of Cyber
- Career Connection

Course Modules

Introduction to App Development

- Mobile app idea brainstorm
- Idea Generation and Paper Prototyping
- User Interface
- Programming Communication and Vocabulary
- Build App, Showcase
- Career Connection

Content Partners



BUILD
Greater Boston



- CS: quilt and improve, based on existing curriculum
- EE: post-pilot
- Entrepreneurship: spawn real companies!

Employability Partners

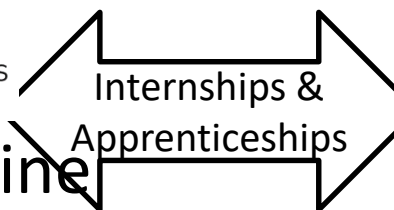
Research: Silvernail



Apprenticeships:



Industry Partners: Educate Maine



Internships & Apprenticeships



Feedback + Predictive analytics of needs

For more information

Executive Director

Kim Quinn Hutchinson

kquinnhutchinson@gmail.com

404-694-0267 (mobile)

Let's shape education for the
future we want!



CENTER FOR
CURRICULUM
REDESIGN

Charles@curriculumredesign.org

www.curriculumredesign.org

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