Creative Computing Challenge

Computing Learning in New Hampshire Schools

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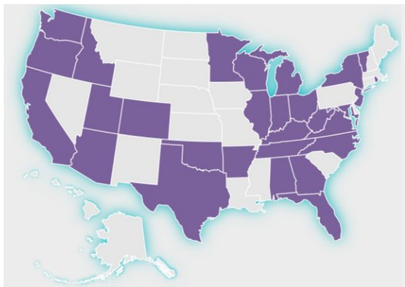
NH High School Computing Education

- Less than 1.25% of high school students took AP CS in 2015 (144/59,976)
- Only 12% of the AP CS exam takers were females
- There was only one Hispanic/Latino and no Black/African American AP CS exam taker
- Only 19 high schools offered AP CS last year
  - 6 of the schools offered AP CS through third parties
- 1,594 open computing jobs (x 2.2 state average demand rate), but only 314 CS college graduates (2015)

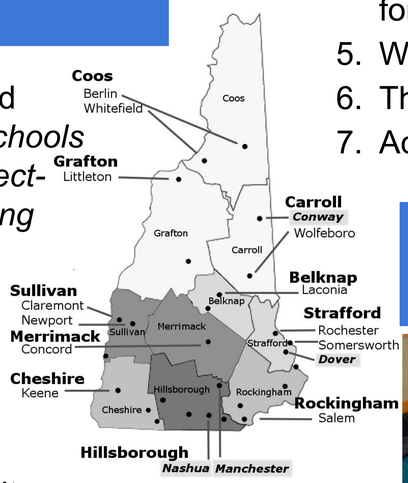


CS ***does not count*** towards high school graduation math or science requirements in

- 29 states plus DC
- including NH

Objectives

*Prepare **22+ teachers** in **16+** Career and Technical Education centers and high schools to teach **400+ students** a rigorous, project-based, and personally relevant computing curriculum*



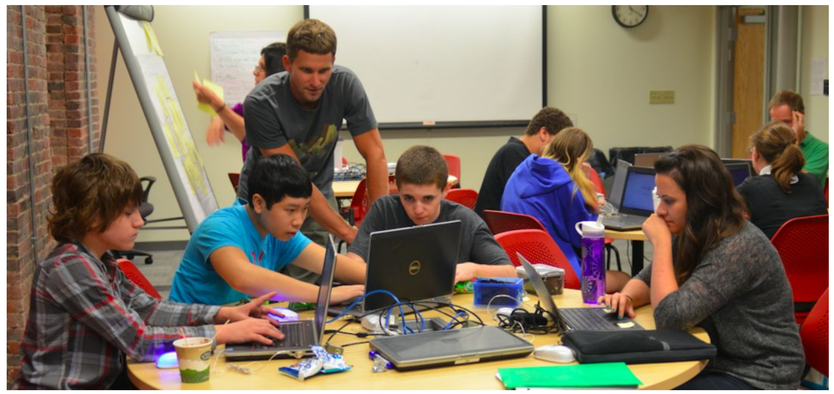
- Multi-layered, iterative approach to
  - Teacher professional development
  - Curriculum development
- Statewide collaborative project in NH
  - UNH computing and education faculty
  - UNH Cooperative Extension field specialists & volunteers
  - UNH Leitzel Center for Mathematics, Science, and Engineering Education
  - NH DOE Career and Technical Education
  - Professionals from NH high-tech sector
- Engage students in learning computational thinking
- Increase participation of students from underrepresented groups in computing

2014 Summer Student Learning Impact

- 14 high school students
  - 62% male, 85% white
  - Entering 9th grade: 69% age 14, 25% age 15
- Intro to CS with App Inventor and learning about natural ecosystems
- Four project teams
  - Report invasive species
  - Document cases of shoreline erosion
  - Wanr about clogged storm water drains
  - Measure stream dynamics

Right now, how confident are you in your ability to …

1. Design new software
2. Use new software
3. Solve computing problems
4. Prototype an app to turn data into smart decision-making for an environmental problem
5. Write code to program computing devices or services
6. Think of new computing inventions
7. Actually create new computing inventions



Student attitude survey: 34 items, 5 key constructs

Composite	Time	Min	Max	Mean	Std. Deviation	Effect Size
Computing Interest	Pre	21	96	58.68	22.71	--
	Post	38	96	64.93	15.94	
Computing Confidence	Pre	5	62	32.74	18.89	**0.93***
	Post	24	100	57.54	20.45	
Intent to Persist	Pre	10	100	62.30	24.24	--
	Post	43	95	68.32	17.75	
Social Support	Pre	0	83	63.89	22.41	--
	Post	56	100	71.30	12.94	
Computing Outcome Expectations	Pre	44	94	70.83	15.01	--
	Post	50	94	75.00	14.51	

2015 Teacher Professional Learning Summer Institute

Design Principles

Learner motivation

- Authentic problems and issues of personal and social relevance to learners

Deeper learning

- Engaging learners to be
  - ***creators*** of technological innovations
  - instead of ***users*** of computer applications

Inquiry-based & culturally responsive pedagogies

- Supporting learners with diverse backgrounds, life experiences, and abilities

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