Oregon Pre-engineering & Applied Science
Segment Business Plan
Biennium from July 1, 2009 to June 30, 2011

Segment: In-Class Computer Science

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Date of this version: May 14, 2009

Summary of Plan:

This plan seeks to strengthen existing in-class CS offerings and create net new CS curriculum opportunities for math and science teachers. This in turn will encourage more Oregon students to select CS and related programs in Oregon universities.

Goals

Short-term Goals

- Train 40 teachers during summer 2009, including 32 math or science teachers, on CS4HS[1] curriculum.
- Establish baseline metrics for measuring impact of CS4HS program and resulting curriculum improvements on students selecting CS and related fields (software engineering, computer engineering) in OUS.
- Emplace a system for collecting those metrics.

Medium-Term Goals

- Published integrated curriculum for discrete mathematics and computer science that meets state discrete math standards.
- Test market and deploy discrete math / CS curriculum to 10 high schools in Oregon.
- Train 200 teachers in summer 2010, 250 summer 2011. This is a leading indicator of increasing program support at schools.

Long-Term Goals

- Discrete math / CS curriculum deployed to 30 high schools in Oregon.
- Measurable increase and impact of these programs (based on metrics established in short-term) in number of students selecting CS and related programs in OUS. One option might be to interview in-coming students to CS / Eng programs to determine what impact various HS experiences

[1] Computer Science For High Schools is a summer workshop program developed by Carnegie Mellon University and University of Washington.

Investment Description

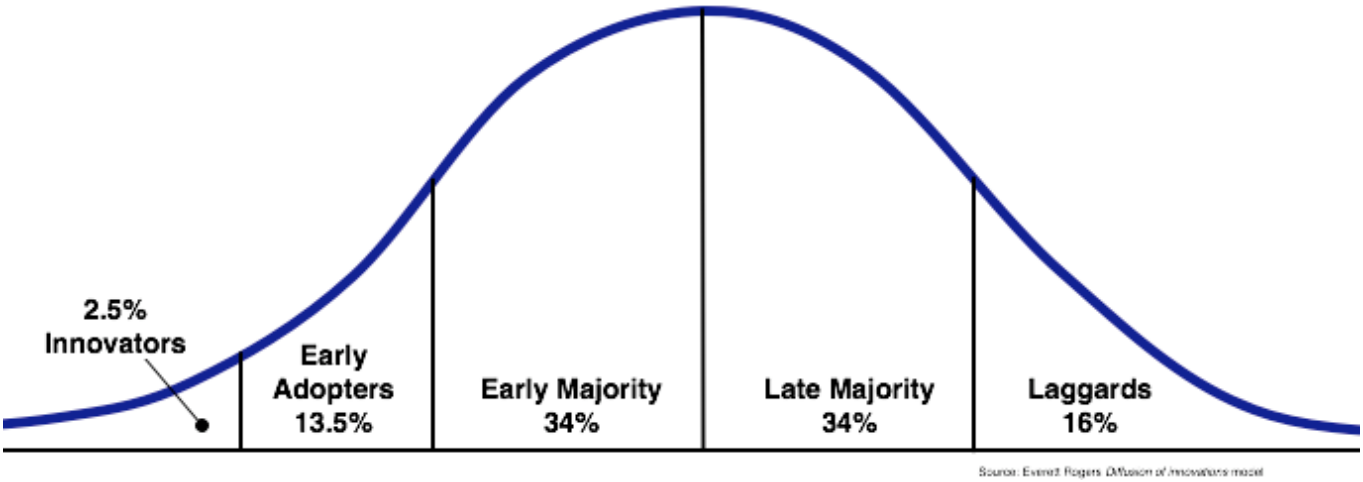
The program will be implemented with in conjunction with existing CS teacher professional development programs of respected quality, reputation, and reach. The expansion includes the following components:

- Introduction of a 2-day CS4HS program to motivate existing CS teachers and introduce CS concepts to existing math and science teachers in Oregon.
- Introduction of CS Unplugged[2] curriculum training and implementation assistance. CS Unplugged is a proven approach to teaching core CS concepts in a fun, human-centered atmosphere.
- Development, training, and deployment of new Discrete Mathematics, aka "Digital Mathematics", curriculum that will provide a solid bridge between state math standards and computer science fundamentals.
- Cost relief and potential incentives to attract motivated teachers to these programs.

Oregon has a proven, long-standing, and trusted program called SuperQuest. This program is a product of the Oregon Computer Science Teachers Association (OCSTA) and the TechStart Education Foundation, the charitable arm of the Software Association of Oregon. These two organizations have a large network of volunteers and lead teachers. It may be possible to offer the new CS4HS program through the existing SuperQuest infrastructure. Similarly, the professional development / teacher training associated with the new Digital Mathematics curriculum may be delivered through the SuperQuest infrastructure.

As part of the outreach and marketing program, this program includes presentations at math and science teacher conferences (OSTA, Oregon Council of Teachers of Mathematics) as a way to recruit CS4HS attendees and pilot program participants.

The Digital Mathematics curriculum development and pilot adoption will be targeted at the innovators and early adopters within the math and computer science educator communities. In the CS educator space, this is the 30% or more that wish to "legitimize" their teaching by including core curriculum requirements in their course offerings. In the math educator space, this is a smaller fraction (likely 5-10%) that are seeking new and fresh material to teach.



[2] See http://csunplugged.org/

Future Plan & Resources

By leveraging private and corporate financial and volunteer support it should be possible to sustain the CS4HS program without additional support from ETIC after 2011.

It is likely, however, that some CS curriculum standardization will emerge from these workshops and collaboration that could lead to further opportunities to deploy new CS programs in high schools throughout the state. Additional resources would be required to support such a deployment to pilot schools and beyond. The investment level here would be comparable to existing efforts underway to deploy Project Lead the Way pre-engineering curriculum.

Schedule

Quarter Ending	Activity	Major Milestones	Responsibility and Dependency (if any)
October 2009	Completion of CS4HS fall in-service training 2009	Achieve growth target, subjective feedback on quality of new CS4HS content	Project Manager
December 2009	Interim reporting including evaluation and assessment of CS4HS 2009	Report submitted Dec 21, 2009	Project Manager
January-June 2010	Pilot Digital Mathematics curriculum deployment	Experience report documented and submitted July 31, 2010	Pilot Teacher
January 2010	Marketing and communication plan for CS4HS 2010		Project Manager
March 2010	Initial Planning for CS4HS 2010	Project Plan delivered Mar 1, 2010	Project Manager
June 2010	Evaluation metrics and planning established for CS4HS 2010	Survey and other measurement instruments identified and documented	Project Manager & any third party evaluators
July 2010	Experience reporting for Digital Mathematics pilot offering	Experience report completed including guidance for further curriculum development for 2010-2011 school year	Pilot teacher(s)
October 2010	Completion of CS4HS 2009	Achieve second year growth target, subjective feedback on quality of new CS4HS content	Project Manager
September 2010	2nd Phase of Digital Mathematics pilot courses begin		
September 2011	Final report including evaluation & assessment	Report Submitted August 15, 2011	Project Manager & any third party evaluators

Budget Narrative

The budget leverages existing industry funds and volunteer infrastructure to enhance and expand existing professional development programs to reach a wider audience across a broader teaching spectrum.

Measuring & Forecasting Results

	Actuals		Projected	
	AY08	***AY09***	***AY10***	***AY11***
Teachers				
Teachers attending CS4HS summer program	49	TBD - 85	200	250
Teacher contact hours				
CS4HS quality of experience survey				
Teacher evaluation of discrete mathematics curriculum				
Students				
Students Participating in Digital Mathematics	0?	0?	15	45
Student contact hours				
Quality of experience survey from discrete mathematics pilot				

Evaluation & Assessment Plan

a) Evaluation resources: While a 3rd party evaluator would be in the best position to assess the impact of these programs, the current plan will limit evaluation to a combination of ETIC industry affairs personnel and the Project Manager.

b) Formative evaluations:

- Post-CS4HS exit surveys of teachers evaluating along these lines:
  - How likely are you to recommend this CS4HS program to your peers?
  - Will the training received at CS4HS allow you to provide new offerings at your school in the coming school year?
  - Mathematics teacher targeted evaluation as we incorporate Digital Math instruction into CS4HS. Questions TBD, but likely along the lines of desire and ability to offer a new Digital Math course in their school.
- Post-pilot Digital Mathematics surveys of students. Should include questions related to desire to further purse computational thinking / CS courses based on the discrete math and programming content in the course.

c) Summative evaluations:

- Metrics evaluation of attendance at CS4HS, tracking growth in math and science teacher participation as well as traditional CS.
- Pre- and post- surveys of Digital Mathematics students to evaluate likelihood of selecting CS and related technical fields for post-HS education.

Proposed Investment and Private Support Forecast ($M)

In-Class Computer Science Plan Budget July 1, 2009 - June 30, 2011	Year Ending June 2010	Year Ending June 2011	Biennium Subtotal
Salary Expenses			
Project Manager - 30% of FTE @ $45k	$13,500	$14,400	$27,900
Stipends for instructors	$5,400	$9,000	$14,400
Stipend for OSTA / math Presentations	$500	$1,000	$1,500
Teacher curriculum development	$5,000	$5,000	$10,000
Subtotal			***$53,800***
Services and Activities			
WOU Facilities (housing & food)	$22,000	$27,500	$49,500
Travel for visiting instructors	$4,000	$4,800	$8,800
Teacher attendance incentives	$4,500	$9,000	$13,500
Subtotal			***$71,800***
Supplies & Equipment			
Direct mail campaign - teachers	$1,500	$2,750	$4,250
Digital Mathematics - various printing	$250	$500	$750
Online tools for evaluation surveys	$250	$250	$500
Miscellaneous	$1,000	$1,500	$2,500
Subtotal			***$8,000***
Grand Total			**$133,600**