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Proposing Organization	TechStart Education Foundation
Proposal Title:	TechStart, Oregon Computer Science Teachers Association, and Chemeketa Community College Proposal
Proposal Date:	September 29, 2009 – Revised 10/13/09
Project Abstract: <i>(Provide a short description of project using no more than the space provided here.)</i>	<p>This plan seeks to strengthen existing in-class computer science (CS) offerings and create net new CS curriculum opportunities for math and science teachers that incorporate and satisfy the new state discrete mathematics standards. This in turn will encourage more Oregon students to select CS and related programs in Oregon universities.</p> <p>The plan is to leverage and magnify existing infrastructure and programs provided by the three collaborating organizations, as well as leverage industry funds raised by TechStart and the Software Association of Oregon.</p>
Amount Requested:	\$140,000

Project Contact:	Natasha MacDonald
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Assumptions

Our ability to innovate and stay competitive relies on the technical knowledge and the soft skills, such as teamwork and creativity, inherent in technology education. Unfortunately, today's students have grown up as consumers of technology; they have lost the desire to explore and ask questions about the science and math behind technology because they have never known a world without it. Students need both hands-on experiences and mentors who guide them to ignite their curiosity.

This plan seeks to strengthen existing in-class computer science (CS) offerings and create new CS curriculum opportunities for math and science teachers that incorporate and satisfy the new state discrete mathematics standards. This in turn will encourage more Oregon students to select CS and related programs in Oregon universities.

Project Plan

Resources

TechStart is a 501(c)3 nonprofit that promotes wider access to technology education for K-12 students in order to strengthen the skills they need to thrive in the global economy. Founded in 2003 by the Software Association of Oregon, TechStart has created an immensely effective strategy to expose a significant number of students to technology classes and activities each year by empowering their teachers.

Key accomplishments of the organization include:

- Since 2003, TechStart has provided technology training to over 700 K-12 teachers, creating a knowledgeable pipeline of educators who use technology to engage students in the classroom and in after-school activities.
- With an average outreach of 150 students per teacher each year, TechStart has increased access to technology education to more than 100,000 Oregon students.
- TechStart added a 2-day Computer Science for High School (CS4HS) track to our existing 5-day training curriculum that introduces computer science concepts to math and science teachers in Oregon, and exposes computer science teachers to a new approach to teaching these concepts.
- We introduced the CS Unplugged curriculum training and implementation assistance at the 2009 CS4HS / SuperQuest event, TechStart's professional development series for K-12 teachers. CS Unplugged is a proven method to teaching core computer science concepts in a fun, human-centered atmosphere without the use of a computer.

Above all else, TechStart brings a proven track record of professional development and curriculum development operational excellence to this proposal. In our most recent course evaluation survey, **100%** of respondents said that our workshops were relevant to their needs and met their objectives and that our instructors were very knowledgeable.

Key Team Member Biographies

Chris Brooks is the president of the board of directors for the TechStart Education Foundation. He is a seasoned industry technology executive, having served as the Chief Technology Officer of Corillian Corporation and leading their product technology organization from startup through IPO and to a successful acquisition in 2007. He is a dedicated volunteer in K-12 technology and computer science education in the state of Oregon and was instrumental in bringing CS4HS and CS Unplugged to Oregon in 2009.

Mitch Fry is the computer science transfer program coordinator and CS instructor at Chemeketa Community College. He has 20 years of undergraduate teaching experience in Computer Science and 10 years of work experience as a software engineer and engineering manager in the technology industry at HP, Sybase, Webridge, and Electrogas. Mitch holds undergraduate degrees in Education and Computer Science, and a graduate degree in Computer Science from OSU. He also volunteers with the Oregon FIRST robotics league, Oregon Game Project Challenge, and has served as a board member for several nonprofit and community organizations.

Natasha MacDonald is the executive director for TechStart. She has 13 years of experience working in technology and management within the nonprofit and education sectors. Prior to joining TechStart, Natasha worked as a technology director at a high school where she managed strategic technology initiatives, including project planning, budgeting, procurement, implementation, teacher training and curriculum integration. Natasha has an MBA from the University of Oregon. She was invited to and participated in the NCWIT/BPC (Broadening Participation in Computing) K-12 Outreach Practices workshop in June 2009 and can draw on several connections made at the conference to apply lessons from other programs and states facing similar challenges.

Terrel Smith is an experienced technology teacher at Sherwood High School and current President of the OCSTA. He will also be serving next year as Past President of OCSTA to provide continuity of support for the mission of OCSTA. Terrel has been a vanguard in Oregon for using teenager's natural interest in computer games to inspire an interest in game programming and computer science course work. He has been a frequent presenter at the SuperQuest teacher training workshops. Terrel has also been involved in the national effort by the Association for Computing Machinery and National Computer Science Teachers Association to increase computer science and engineering enrollment in secondary schools.

Stevie Viaene is a recently retired technology and computer science teacher from Tigard High School with 30 years of experience. She has taught adjunct courses for several colleges and community colleges, as well as teacher workshops. She is currently a member of the TechStart board of directors and is teaching classes for Saturday Academy in a variety of computer science related areas. She is a past recipient of the Oregon Technology Educator of the Year award.

Budget

Proposal Budget			
Oct 1, 2009 - Sep 30, 2011			
	10/1/2009	10/1/2010 –	Biennium
	–	9/30/2011 –	Subtotal
	9/30/2010	9/30/2011	Subtotal
Salary Expenses			
Project Manager - 25% of FTE @ \$60k, including benefits	\$15,000	\$15,750	\$30,750
Subtotal	\$15,000	\$15,750	\$30,750
Services and Activities			
Conference Facilities (housing & food)	\$30,000	\$45,000	\$75,000
Travel for visiting instructors	\$4,000	\$4,800	\$8,800
Stipends for instructors	\$9,000	\$14,000	\$23,000
Stipend for math and science teacher conference outreach	\$500	\$1,000	\$1,500
Teacher curriculum development	\$5,000	\$5,000	\$10,000
Pilot teacher stipends	\$4,500	\$9,000	\$13,500
Outside Evaluator Services	\$7,500	\$7,500	\$15,000
Subtotal	\$60,500	\$86,300	\$146,800
Supplies & Equipment			
Direct mail campaign - teachers	\$1,500	\$2,750	\$4,250
Course Materials and Supplies	\$2,500	\$4,500	\$7,000
Online tools for evaluation surveys	\$400	\$400	\$800
Technical Share Library	\$1,500	\$1,500	\$3,000
Miscellaneous	\$1,000	\$1,500	\$2,500
Subtotal	\$6,900	\$10,650	\$17,550
Additional Funding Sources			
In-Kind and Industry Support	\$12,400	\$42,700	\$55,100
Grand Total – ETIC FUNDS	\$70,000	\$70,000	\$140,000

Note: TechStart brings additional funding sources from industry and other grants to offset additional costs beyond the scope of the funding for this biennium.

Salary Expenses Description

This proposal will leverage TechStart staff to coordinate and execute the project plan described in this proposal. This will include coordination of subcontractors (primarily educators

developing, implementing, and teaching curriculum), event planning for professional development, coordination of evaluation activities, and project reporting.

Services and Activities Description

The services and activities portion of this proposal is primarily geared towards professional development events and stipends for educators developing, piloting, and replicating computer science and digital math curriculum. This program plan also includes the use of outside evaluation services to assist in survey development and analysis and conduct both formative and summative evaluation. This will be done in two stages: once after the first year in order to adjust curriculum and training, and again at the conclusion of the program.

Supplies and Equipment Description

The supplies and equipment portion of the proposal includes direct mail supplies and expenses for marketing, printing and production of course materials, online survey tools to assist with evaluations, and physical components (DVDs, books, etc.) required for the technical share library component of the project.

Other Collaborators

This program involves collaboration with two groups working toward similar goals: the Oregon Computer Science Teachers Association (OCSTA) and Chemeketa Community College (CCC). We have been working with these organizations to plan the program rollout and will continue to work with them to implement evaluation metrics. Additionally, TechStart will hire an expert consultant to assist in forming our evaluation logic model, metrics and implementation plan.

Chemeketa Community College

The Chemeketa Community College district covers more than 2,600 square miles in Oregon's Mid-Willamette Valley. It includes Marion, Polk, most of Yamhill, and part of Linn counties. There are 3 campuses located in Salem, McMinnville and Woodburn along with outreach centers in Dallas, Brooks, and West Salem. A total of 64,237 people enrolled in classes and workshops for the 2006-2007 academic year at Chemeketa. Chemeketa offers more than 40 career and technical certificates and AAS degrees, college transfer degrees and courses, high school completion (early college program and GED programs), lifelong learning courses and workshops. Additionally, college credit now (CCN), non-traditional, and expanded options programs are offered through just about every high school in the Chemeketa district coordinated through the Mid-Willamette Education Consortium. In the 2007-08 school year, 2,753 high school students in the region took 5,621 classes (CCN and Expanded Options classes).

Oregon Computer Science Teachers Association

The Oregon Computer Science Teachers Association (OCSTA) is the statewide organization of K-12 and higher education computer science teachers. The OCSTA officers help plan and execute a wide range of activities promoting CS education, including SuperQuest, the Oregon Game Project Challenge, and the Willamette Programming Contest and Spring Conference. Finally, TechStart brings a strong level of industry collaboration to the project, both in terms of funding support and software industry involvement. By leveraging industry funds and expertise, this ETIC grant will be magnified significantly and TechStart will be able to scale this project after the biennium.

Project Activities

We will strengthen existing in-class computer science offerings and create new computer science curriculum opportunities for math and science teachers to use directly in the classroom. By leveraging the effective infrastructure of our long-standing and successful technology teacher training program, SuperQuest, we plan to introduce CS4HS, a proven computer science curriculum from Carnegie Mellon University. By augmenting our SuperQuest program with CS4HS training, we will reach a wider audience of teachers and increase our impact on K-12 Oregon schools by doubling the number of teachers reached in 2010, and a further 50% increase in 2011. The proposed project will:

- Build on the successful 2009 pilot of a 2-day CS4HS program to motivate existing CS teachers and introduce CS concepts to existing math and science teachers in Oregon.
- Introduce CS Unplugged curriculum training and implementation assistance. CS Unplugged is a proven approach to teaching core CS concepts in a fun, human-centered atmosphere.
- Develop, train, and deploy new Discrete Mathematics, aka “Digital Mathematics”, curriculum that will provide a solid bridge between state math standards and computer science fundamentals.
- Provide incentives to teachers who will pilot this new Digital Math curriculum.

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. As we have proven in our pilot program in the summer of 2009, we can 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 (Oregon Science Teacher Association, 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.

Schedule

Quarter Ending	Planned Activity and Measurable Outputs	Responsible persons by title	Milestones with target dates
December 2009	Completion of CS4HS fall in-service training 2009 (Alice)	Project Manager	Achieve growth target, subjective feedback on quality of new content
December 2009	Interim reporting including evaluation and assessment of CS4HS 2009 including baseline data from pilot program	Project Manager	Report submitted Dec 21, 2009
January-June 2010	Pilot of 3 Digital Mathematics teachers and curriculum deployment	Pilot Teachers and Curriculum Developers	Experience report documented and submitted July 31, 2010
January 2010	Marketing and communication plan for CS4HS 2010	Project Manager	
March 2010	Initial Planning for CS4HS 2010	Project Manager	Project Plan delivered Mar 1, 2010
June 2010	Evaluation metrics and planning established for CS4HS 2010	Project Manager & any third party evaluators	Survey and other measurement instruments identified and documented
July 2010	Experience reporting for Digital Mathematics pilot offering	Pilot teacher(s)	Experience report completed including guidance for further curriculum development for 2010-2011 school year
October 2010	Completion of CS4HS 2010	Project Manager	Achieve second year growth target, subjective feedback on quality of new CS4HS content
January – June 2011	2nd Phase of Digital Mathematics pilot courses and revised curriculum; 6 pilot classes/teachers, curriculum developed that is sufficient to submit to ODE for Discrete Math credit approval	Pilot Teachers and Curriculum Developers	Experience report documented and submitted July 31 2011
30 days after project completion	Final report including evaluation & assessment	Project Manager & any third party evaluators	Report Submitted August 15, 2011

Intended Results

Outputs

- Conduct a total of six teacher training sessions: two one-day fall conferences, two one-day spring conferences, two 3-day summer sessions and two 5-day summer sessions
- Marketing/Outreach: Attend at least two teacher outreach conferences each year; send at least one direct mail campaign per year and keep teachers informed through regular email blasts.
- Pilot Computer Science course with expanded discrete math material to three different schools by end of 2010 and six different schools by end of 2011.
- Produce two experience documents at the end of each year from pilot and implementation of Digital Math coursework.
- Develop and host a shared resource library for teacher support containing both professional development materials and classroom activity materials.
- Pilot teachers will conduct a pre and post survey to track changes in students' attitudes about computer science.

Outcomes

- Train 175 teachers in CS4HS and Digital Math curriculum by the end of 2010 and 260 by the end of 2011.
- Increase the number of teachers incorporating computer science and digital math into their classrooms 25 % by the end of 2010 and an additional 50 % by the end of 2011. These increases are based on the following:
 - In 2008-09 TechStart provided teacher training to 130 teachers. Our goal for 2009-10 (as indicated in our first outcome) is to increase this number to 175.
 - However, we realize that it is not possible for all teachers who receive training to implement new computer science or digital math curriculum in their first year of training. We have assumed that 90% of teachers trained will implement the desired curriculum during the current school year in 2009-10.
 - For 2010-11, we assume that we will have a slightly greater return of 93%.

School Year	Total # of teachers trained	# of teachers who will implement curriculum	% of increase over prior year
2008-09 (baseline)	130		
2009-10	175	162 (90%)	25%
2010-11	260	243 (93%)	50%

- As currently done in the Salem area, students may receive 1/2 credit in math and 1/2 credit in Career Related Learning (CRL) towards high school graduation, and may also qualify for credit for CS160 based on agreements from OUS schools.
- Student attitudes toward computer science as topics of study and potential career areas will become more positive, as tracked by pre and post surveys.

Impact

- Our successful delivery of teacher training, support, and relevant curriculum will lead to an increased number of Oregon students who will feel comfortable pursuing computer science

technology as a possible career path choice.

- Through our teacher training, we will increase the number of schools in Oregon that offer either a Math elective in Digital Math or offer modified curriculum in an existing math course to include computational thinking concepts.
- We will increase the number of Oregon students that have an opportunity to learn computational thinking and computer science concepts and skills.
- Students who eventually earn college degrees in computer science, engineering, and information technology will be highly likely to be in a family-wage career field.
- Incorporating computer science topics in mainstream courses will expose more women and minority students to computing as a possible career choice, and break down the barriers and perceived “geekness” of technology studies.
- As local students enter college with a background knowledge in computer science, their post-secondary education can be specifically targeted to their chosen areas of interest and at a higher level.
- This project will "Pump the Pipeline" for both teachers and students of computer science in our state, our ultimate goal.

Evaluation Plans

TechStart will utilize an outside evaluator to guide the evaluation methodology and execution for this project.

Formative Evaluation

- 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 pursue computational thinking / CS courses based on the discrete math and programming content in the course.

Summative Evaluation

- Measure our success in achieving project outputs and outcomes; make adjustments to the project plan as needed to ensure outcomes and outputs remain achievable.
- 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.

Proposing Organization Commitment Form

Legal Name of Organization: **TechStart Education Foundation**

Our organization will commit to implement the project as described in this proposal if it is accepted and funded.

Comments:



2009-09-29

Signature of authorized official

Date

Print Name: Natasha MacDonald

Title: Executive Director Phone: 503-228-5429

Email Address: natasha.macdonald@techstart.org

Mailing Address:

111 SW 5th Avenue

Suite 120

Portland OR 97204

Collaborating Organization Commitment Form

Legal Name of Organization: Chemeketa Community College

Our organization will commit to participating in the project described by this proposal if it is accepted and funded.

Comments:

Chemeketa Community College supports TechStart's discrete math project proposal and is committed to assisting TechStart with curriculum development, class piloting in connection with our CS160 high school delivery classes, materials collection and development for a discrete math technical resource library for high school teachers, and supporting the SuperQuest summer workshops.

Signature:  Date: September 28, 2009

Print Name: Ron Hulett

Title: Associate Dean of Business, Computer Science, and Electronics Phone: 503-399-2522

Email Address: ron.hulett@chemeketa.edu

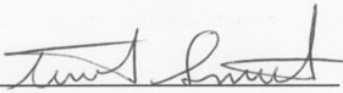
Mailing Address:
Chemeketa Community College
4000 Lancaster Drive NE
P O Box 14007
Salem, OR 97309

Collaborating Organization Commitment Form

Legal Name of Organization: **Oregon Computer Science Teachers Association**

Our organization will commit to participating in the project described by this proposal if it is accepted and funded.

Comments:

Signature:  Date: 9-27-09

Print Name: Terrel Smith

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