

OPAS Investment Sub-Proposal

DRAFT

Segment:

Computer Science Curricula and Professional Development – Classrooms

Contact Name:

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Vision Statement:

All Oregon students will have unsurpassed opportunity to discover and learn about computer science and technology via classes offered at the middle and high school level by providing teachers and coaches access to robust professional development and curriculum.

Long-term Goals

The long term goal of this initiative is to dramatically improve the accessibility and quality of computer science education in Oregon’s schools with the intent to double the number of students who are prepared for and choose professional careers in computer science, software engineering, and information technology. It is estimated that such programs are currently available in less than a quarter of Oregon high schools and a much smaller fraction of middle schools. This initiative will focus on doubling the current number during the next 5 years.

Investment Description

The following are key areas for investment proposed for support by OPAS

- Expansion of number of highly qualified computer science teachers
Support will be directed to geographic cluster expansion of the SuperQuest professional development program to under-served regions of Oregon. Delivery: establishment of local centers of excellence to execute single-day and week-long teacher training programs, led by experienced teachers, on topics such as beginning programming, AP computer science, and game programming.
- Support for Regional Centers of Excellence in Computer Science
In concert with SuperQuest expansion, support will be directed at schools that demonstrate potential to become Regional Centers of Excellence in Computer Science as a means to provide hubs of coordination for future professional development expansion. Delivery: funding for equipment, training, and coach subsidy in target schools likely arranged by ESD.
- Start-up support for computer science and technology “coaches” in high schools
The schools in Oregon that have been most successful in sustaining high quality computer science programs all have highly dedicated teachers that volunteer substantial hours outside of normal school operations to coach students,

- coordinate after-school programs, and collaborate with their peers. This extra-curricular work is difficult for many teachers to justify or afford as it is generally resulting from donated teacher time. Delivery: provide funds to compensate “Technology Coaches” at target schools (e.g., proposed centers of excellence) in a similar manner as athletic coaches.
- Statewide expansion of Game Programming project contests
Support will be directed at regional expansion of the pilot game programming contest conducted in 2008 to a statewide program. Expectation is to leverage synergy with professional development expansion to expand coaching pool for student teams. Delivery: funding for marketing, administration, and technology support to scale the existing pilot program to a statewide contest within 3 years.
 - Initiatives to engage under-served demographics
Schools that serve lower-income populations generally lack the resources or demand to establish computer science curriculum. By leveraging the unique capabilities of TechStart Education Foundation to partner with industry, support will be given to establish programs that provide access to classes and competitions to under-served populations. Delivery: funding for coach recruiting, training, and placement programs to target under-served schools and districts.
 - Communication and community engagement will focus on two areas: a. making schools aware of the value of a strong computer science program and encouraging addition or expansion of a computer science program, and b. leveraging the Software Association of Oregon in the local community to actively support computer science programs that are started or expanded in their area.

Private and Federal Support

Opportunities exist to use the proposed funding as a leadership tool to leverage other investments from federal, state and private sources. At the state level, once a program is established by a school and incorporated in its core budget, sustainability will largely come from on-going operating budgets. Federal funds are also routinely accessible for programs of this type, especially in the form of Perkins grants. However, the proposed funds have the potential to significantly influence the type and quality of programs which schools adopt as part of this federally funded program. Federal NSF Math Science Partnership Program funds have played a very important role in allowing OIT to pilot many of the ideas contained in this proposal, and further funding from this source will be sought where available. Private and industry funding will be most attractive as a matching source in response to requests from local schools to their community businesses and private individuals in the community they serve. TechStart's unique relationship with the Software Association of Oregon should be viewed as a key potential driver for additional industry support, especially for expansion into geographies that align with member company interests.

Results and Benefits

Short-term: The funding requested for the 2009-11 Biennium will include the program elements described above. The intended impact is to implement new and significantly

improved and expanded computer science programs in 10-15% of Oregon high schools and begin to create regional centers of excellence to facilitate further expansion throughout the state. This will result in new or expanded computer science programs in at least 25 additional high schools and the launch of 4-6 centers of excellence with one year of start-up assistance and transition support for a second year as the schools move to a locally sustainable model. At the end of this Biennium it is anticipated that there will be computer science programs in approximately 40% of Oregon's high schools.

In the medium and long term it will be important to ensure that the gains made through this initiative are sustained and extended the reach to all suitable schools in the State. Some schools are not candidates due to their focus on a specific magnet area (ex: arts, medicine). During the first two years of this program assessment of the Oregon environment and results of the first two years will be used to set a quantitative long range goal and investment plan. At this point it is anticipated that a long range goal should be to further double the impact with the expectation long term of participation by 80% of Oregon high schools and eventually a comparable number of middle schools.

In total, these results will approximately triple the number of Oregon students with exposure to computer science and information technology. This should be expected to make a significant impact on the pipeline of students interested and prepared for careers in these fields. Oregon will benefit by an expanded technical workforce and much greater opportunity for Oregon students to have high paid careers in the technology industry.

Future Plans and Resources

This program is envisioned as a 5-6 year initiative to fundamentally reshape the nature of pre-college computer science education in Oregon. The specific future goals will be shaped by successes and challenges encountered during the first two years. At this point it is anticipated that the program cost and structure will be similar during the next 4 years. However, it is also expected that a larger fraction of resources will shift toward developing the middle school clusters once programs have been introduced into 50% of Oregon's high schools. Also, it is expected that innovations in delivery will need increased focus as effort is increasingly focused on smaller and more rural schools.

Measuring Results

Metrics which will be supported specifically through this proposal are basic summative measures which will focus on growth, sustainability, and student mastery. These metrics are chosen as most critical for this stage of the program. The following are metrics which are planned for inclusion:

Growth

- Number of participating schools with CS curriculum
- Number of participating students in CS coursework
- Number of participating schools with after-school coach-led programs

- Number of participating students in after-school coach-led programs
- Number and type of classes offered
- Number of schools participating in state-wide programming contests
- Number of teachers trained (by type, background)
- Transfer from after-school to curriculum
 - Number of schools that transition from after-school to curriculum
- Sustainability
 - Retention rate for school programs
 - Retention rate for trained teachers

It is desirable that partners be recruited to do more fundamental education research in conjunction with this proposal. Topics of great interest include formative impact on students' academic outcomes and career choices, formative impacts and opportunities for participating teachers and other such information which could guide further development of this program. Such work is expensive and often difficult since it requires access to restricted data and may require longitudinal studies. We have only included funding for a core evaluation using key metrics. We will encourage partners to seek additional funding and perform additional education research in conjunction with this proposal.

Proposed Investment

Component	Cost
Leadership, administration, and reporting	\$50,000
SuperQuest geographic expansion	\$175,000
Game programming contest expansion	\$20,000
Regional centers of excellence	\$125,000
Under-served demographic initiatives	\$40,000
Technology coaching	\$50,000
Marketing and communication	\$15,000
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Total	\$475,000