

Proposal for a Professional Learning Community development of instruction in programming using a games platform

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Project Goals

Develop student understanding of basic programming structures and language.

Enhance interest of computer science among student populations that are normally underrepresented in computer science.

Increase number of students who consider careers in computer science and related areas.

The Issues

- Enrollment in computer science programs at post-secondary institutions are in decline and demand is increasing.
- The number of women and minorities in undergraduate computer science programs varies among universities in Oregon. At OSU 93 students received bachelor's degrees in computer science during 2004-2005. Of those students, 5% were minorities and 11% were female. At PSU 72 students received bachelor's degrees in computer science. Of those students, 30% were minorities and 22% were female.
- During 2005, 68 high schools in Oregon (30%) indicated they offered at least one course in computer science or programming that is not listed at AP or IB. Fourteen schools (6%) offer either AP or IB computer science courses. Eleven high schools (5%) offer career and technical (CTE) programs with elements of computer science or computer programming.
- There is no specific teaching license that covers computer science unless the computer science course is part of a CTE computer technology program. Currently there are 31 active teaching licenses with computer technology endorsements in Oregon.
- Computer science courses are considered to be electives under current graduation requirements. New graduation requirements elevate the importance of CTE courses and open possibilities for computer science to partially meet graduation requirements in math.
- Computer games interest both males and females, but the preferred style of game differs by gender.

Proposal

The CS taskforce has discussed the use of a game platform as a tool to introduce computer programming at the high school and increase interest in computer science as a career. The game platform has potential for producing high interest in students. A game design platform that provides scaffolding for different programming skill levels and allows development of a variety of game genre would allow teachers to accommodate the interests of all students and avoid the gender bias normally associated with computer games. Such a project involves both development and dissemination of curriculum. Traditional methods of accomplishing those tasks frequently use a team of curriculum developers, a pilot site for testing curriculum, and a workshop to disseminate the curriculum to other teachers. Recent research in professional development demonstrates that such a method is consistently ineffective if the desired results are improved student performance and changes in teaching.

An alternative process that is showing promising results blends the act of development and testing. Groups of teachers collaborate as part of a professional learning community to create lessons and test those lessons in their own classrooms. In addition, they share results from their own experience to modify lessons. This professional learning community (PLC) approach results in curriculum that survives the complexities of the classroom and becomes a much more integral part of the classroom experience.

Suggested Process

Select teachers – The selection process could involve existing groups of teachers or the creation of a new group. The members of the group must have a commitment to developing and teaching lessons in computer science that are based on the chosen platform. As much as possible, schools should represent geographic and demographic diversity. This diversity would demonstrate issues or problems that can develop as the use of the game platform expands into other schools.

Develop expertise – A critical part of the process is to have the PLC develop a thorough understanding of their task. Not only will they need to know about the software, but they also need to understand something about careers in computer science and issues around gender and computer science. Most of this information would be provided in a workshop format to give time for teachers to understand and put the new information into the context of their own setting.

Identify student outcomes – It is extremely important that the group have a clear understanding of the desired outcomes so that lessons they develop remain focused.

Develop lessons – PLC members work collaboratively to develop lessons that they think will help students reach the identified outcomes.

Teach lessons – Each teacher teaches and reflects on the lessons. Ideally another PLC partner would observe the lesson to identify ways of improving the lesson.

Reflect and refine – PLC members meet to reflect on lessons they have taught and make refinements that they feel would improve student outcomes.

Collaboration Issues

One of the critical points of a PLC is the continuous collaboration. Most examples of a PLC take place in a single school or district so teachers are able to meet face-to-face reasonably frequently. There are examples of national projects that brought teachers from several schools together to collaborate. The obvious problem with this is the cost. Another option is to blend face-to-face collaboration with online collaboration. Electronic collaboration has had a mixed record. One thing that is clear regarding online collaboration is that there must be a facilitator to help teachers use the online system. There are a variety of emerging resources that might serve as online collaboration platforms. Exploring these collaborations could be a secondary research agenda for the project.