MIT Council on Educational Technology
Collaboration for Geographically Distributed Groups Proposal

The goal of this project is to investigate and evaluate the use of Sun's Wonderland 3D immersive environment as a collaborative tool for communicating with distributed project teams and as a platform for providing collaborative access to educational materials.

The Center for Educational Computing Initiatives (CECI) has been training teams of students in the use, design and support of iLab[1] services and experiments for several years. Supporting three categories of students in their work with iLabs is the main focus of this proposal.

- MISTI students who spend several weeks each summer at an international university working with local lab developers and teaching classes.
- Foreign students who spend several days to months working at CECI with the iLab development team before returning to work on iLabs at their own universities.
- MIT graduate students who will spend time at our partner universities while iLab RAs.

Our goal for all three categories of student exchanges is to promote the iLab Project and the use of OCW materials, and to develop long term relationships with participants from our partner universities. The MIT iLab development team spends at least 20% of its time supporting these remote students.

Our current tools to communicate with and to support students in the field are email, a shared WIKI, and Skype conversations. It is difficult enough to sustain the rapport developed during a face to face visit, using these tools, but trying to debug a problem or participate in a design session is almost impossible. A current debugging session usually involves the use of multiple emails, exchange of screen captures and error logs, and hours long Skype conferences where screens are read, input is dictated over the connection, and results are read back.

The primary goal of this project is to investigate and evaluate the use of a collaborative virtual world to support these needs. We believe the use of such a tool for distributed support might have an exciting educational dividend at MIT, by encouraging its use in combination with the iLab architecture to provide remote access to lab equipment in a virtual environment. CECI's experience in using 3D applications for education has demonstrated the value of these tools.

Sun's immersive 3D environment Wonderland is an emerging technology designed to facilitate collaboration between geographically distributed team members. While similar to other 3D immersive environments such as Second Life, Wonderland focuses on providing open source tools for collaboration. These tools include high quality spatially localized audio, shared whiteboards, HTML and pdf viewers, streaming video, and shared virtual desktops. Since Wonderland is open source, we can develop custom tools and modules to meet our own requirements. In particular, we are already investigating the possibility of designing a Wonderland module that would allow a student avatar to immerse himself or herself in the midst of a TEALsim[2] simulation.

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[1] The iLab Project, http://ilab.mit.edu/wiki

[2] The TEALsim simulations received the 2007 Physics Classic Award from Merlot for Faraday's Law applications in electromagnetism, see http://taste.merlot.org/MERLOTAwards/2007awards.html

Debugging a site installation, sharing an experiment, or having a design meeting using Wonderland would allow several geographically distributed participants to gather in a virtual space and observe the application, while having a much more natural interaction. Using the shared desktop, in the virtual meeting space, all would see the results and could discuss them, different members of the group could take control of the application, documents could be exchanged and code reviewed, and concepts and issues could be worked out on the white board.

We would also like to investigate the educational advantages of taking the simulations and other TEAL materials and moving them into a collaborative 3D environment. CECI has extensive experience in using Java 3D to build the TEALsim interactive physics simulations, which have been widely recognized in the academic community. We propose to design a module in Wonderland that presents a TEALsim simulation and allows students to interact with it collaboratively.

Specific Goals and significance:

- Evaluate suitability for supporting remote collaboration,
- Provide rich environment to help support MISTI students abroad.
- Change the process of debugging technical problems at remote sites.
- Evaluate Wonderland for its appropriateness in delivering 3D physics simulations for collaborative purposes in an immersive environment.
- Explore using Wonderland to provide collaborative access to additional TEAL experiments available through iLabs.
- Assess results

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iLab graduate students, iLab global partners, MISTI students in the field

Year One Milestones:
- Train MISTI students (China and Australia - 2009)
- Install Wonderland Server
- Create simple world with a set of collaborative tools
- Participate in debugging and design sessions with remote team members
- Evaluate performance and suitability

Major categories of funding:	Year One	Year Two	Total
Salaries and Employee Benefits:	21,713	23,701	45,414
Equipment:	4,000	0	4,000
Travel:	0	1,000	1,000
Total:	25,713	24,701	50,414