

December 31, 2006

To: Walter Anderson

From: Lloyd Etheredge

Re: How the UN Can Bring the Best Resources for Science and Math Education, K-12, to All Students, Worldwide

Proposal

That the Secretary General convene a Science Education working group, including Presidents of leading scientific societies and foundations interested in science education, with the mandate to: 1.) Evaluate current resources and 2.) Achieve international (online) curriculum resources for K-12 science and mathematics education that are equal to the best in any country.

Background

In the new global information age online resources, available anywhere, can be available everywhere at almost zero marginal cost. Thus, we are living in a new era that powerfully favors using Internet-based technologies for international cooperation.

Three components have been required for a bold, imagination-capturing, startup package to address “digital divides” and motivate projects for UDC participation in the benefits of the new era: 1.) Affordable computers/terminals for UDC Internet linkups; 2.) Affordable “big hop” and “last mile” Internet connections to villages, schools, clinics, and other sites, even in remote locations; 3.) “Must have” content that will provide real and important benefits and justify the expense.

In an earlier paper, I outlined a plan for an UN-sponsored purchasing cooperative that would, as needed, steeply reduce the costs of 1.) and 2.) - and (for example) the MIT laptop of Third World schools will become available this spring at \$100 - \$150 (depending upon

the volume of purchases).¹ Thus, the new invitation from the Secretary General for online content occurs in a wider context - a bold, world-changing, movement in which other organizations are already participating - that can reach every school and student.

- I emphasize curriculum resources (rather than, for example, textbooks) because the first (and achievable) step in an UN effort should focus upon support for K-12 science and math teachers in all countries. They are in the best position to develop courses appropriate to their students, in local languages. [Offering K-12 online courses, directly, probably will not work well: motivation, for most students, requires a teacher-student relationship until they are very advanced.] A cornucopia of ideas and resources for science projects and demonstrations, lesson plans, problem sets, and teaching techniques can enrich the experiences that busy and overworked teachers (often, whose job includes teaching many subjects to students at different levels) in UDC/rural settings can provide.

- In some areas of science - e.g., ecology and environmental science - even the data systems to teach about emerging issues in UDCs are not available in textbooks. Basic teaching about such topics as weather forecasting and meteorology (especially relevant for villages that rely upon agriculture) also benefits from online current data.

- These roadmaps and plans should include online *collaboration systems* among scientists and K-12 teachers in all countries, to share ideas and resources, rather than simply exporting curriculum materials from advanced countries. There may be ways to develop K-12 courses that are uniquely beneficial to poorer countries: For example, a human biology curriculum can be organized to provide basic health-related information. In the spirit of agricultural

¹ Associated Press, "Low Cost Laptops Could Transform Learning," The New York Times, January 2, 2007. Online. Orders for several million MIT One Laptop Per Child machines have been received for delivery later in 2007 to Brazil, Argentina, Uruguay, Nigeria, Libya, Pakistan, Thailand and the Palestinian territory. It would be straightforward for the UN to organize a project to support, as needed, an Internet link for each school and its science/math teachers.

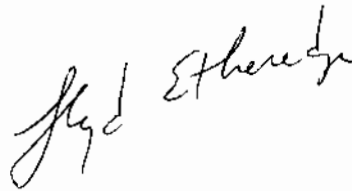
extension services, courses can link the study of genetics and scientific method to experiments that can improve local crop yields.

Implementation

At this point, a bold vision and a light touch of UN leadership probably are more important than new money. Most scientific societies have programs to support K-12 education, and they are enthusiastic about educating future scientists. Besides the world's leading scientific societies (multidisciplinary and multinational, like AAAS and the New York Academy of Sciences; and disciplinary), the Annenberg Foundation (www.learner.org) has a splendid major initiative to support K-12 teachers, with online resources and exciting links to current research about science teaching. The International Science Council (www.icsu.org) is an international umbrella organization for science that has had an interest to strengthen science education in all countries, predating the new information age.

Additional Comments

Once underway, organizing projects to strengthen K-12 science & math education for students in all countries can be extended to other standard courses (e.g., resources and research to improve the teaching of foreign languages).



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