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This electronic bulletin is designed to keep subscribers updated on developments in Sigma Xi's international activities and to provide links and articles on topics of interest to researchers around the world. To submit an item to the newsletter, send an e-mail to: international@sigmaxi.org. You can also read this newsletter online at: http://sigmaxi.org/programs/international/newsletter.shtml.

Adaptive Technology for Developing Countries Part 1: Personal Computers

Acquiring and maintaining personal computers in developing and transitional countries is often a challenge. First and foremost, the cost of a personal computer (PC) can be prohibitive relative to the local economy. Countries that do not produce their own computers, for example, can add import taxes of 100% or more. If one is able to procure a PC, then there are additional obstacles to deal with, including the unavailability or high cost of electricity, frequent power interruptions, temperature, humidity and/or dust. The average PC built for consumption in Europe or the US assumes a temperature-controlled environment with a reliable electrical supply, limited airborne particles from the outside environment and frequent upgrades of hardware and software. Such a PC does not function well when placed in a radically different environment with some of the aforementioned challenges. Several groups around the world have established projects to make PCs more affordable and robust in developing and transitional countries.

The project currently receiving the most publicity is the "$100 Laptop" from the Media Lab at the Massachusetts Institute of Technology (MIT). At the World Summit on the Information Society (WSIS) in Tunis, the group displayed a working prototype that was not quite finished. The current specifications for the $100 Laptop include: a 1-megapixel, 7.5" dual mode (color/black & white) screen; a 500MHz processor; a choice of either four rechargeable C-size batteries or two batteries and a hand-crank for recharging without an electrical source; a Linux operating system; a 1GB flash memory drive; and the capacity to use wireless Internet connectivity (Wi-Fi). Some originally planned features such as the built-in camera and the DVD-ROM drive had to be abandoned because of cost, but the laptop will include several USB ports to be able to connect to such devices externally. The Media Lab has received substantial corporate sponsorship for the project and is currently talking to government officials in several developing countries about purchasing the laptops for their students and potentially producing them locally. A fully functional laptop is expected to be completed in February 2006, with production commencing at the end of 2006 or later. The design of the Jhai PC from the Jhai Foundation also utilizes a flash memory drive and incorporates USB ports and wireless capability. The Jhai PC systems have incorporated locally generated power such as solar or bicycle-generated power. The SolarPC group expects to debut the SolarLite PC by the beginning of 2006. Educational organizations ordering in large quantities will be able to purchase the SolarLite for US$100. This small, solid-state computer does not have any moving parts and uses a 12-volt power supply.

The $100 Laptop, the Jhai PC and the SolarLite projects all aim for one computer per user, but adaptive technology models for sharing computers have also been developed. One example is the Simputer, designed to accommodate even novice computer users who are illiterate. Approximately the same size as a personal digital assistant (PDA), the Simputer has a 200MHz processor, 24MB of flash memory and a touch screen and runs on three AAA-size batteries. It uses open-source software and a browser for the Information Markup Language. The Simputer has been made more affordable through the use of smart cards. Personal information is recorded on each user's smart card, and the device can be shared by replacing the smart card with that of the new user. Another example of shared computers is the

Ndiyo system, which uses ultra-thin clients called "nivo" (network in, video out) whose purpose is to display an interactive computer desktop over a network. In this system, two or more nivo devices are connected to a PC server running open-source software.

Government-funded programs such as Brazil's PC Conectado and Malaysia's PC Gemilang are often mentioned in connection with adaptive technology projects. However, PC Concectado, PC Gemilang and similar initiatives do not focus on adaptive technology, but rather on developing the country's capacity to manufacture the latest computer technology. These programs produce traditional, higher-speed desktop systems priced at US$250–700 to reach the segments of the countries' respective populations who are able to afford these prices.

It is clear from the current status of adaptive technology and the number of defunct adaptive technology projects that the challenges are not trivial and that no one solution will work for all situations. Because of the potentially tremendous impact new adaptive technology can have on development, it will be exciting to see what the future holds for this field.

Links

$100 Laptop	http://laptop.media.mit.edu
Jhai PC	http://www.jhai.org/jhai_remoteIT.htm
Ndiyo	http://www.ndiyo.org
Simputer	http://www.simputer.org
SolarLite	http://www.solarlite.org

Part 2 of this series will cover adaptive technology for Internet access.

New Science and Education Reports

Several new studies and reports have been published that provide recent data on international science and education. The Relevance of Science Education (ROSE; http://www.ils.uio.no/forskning/rose/) study on children's perception of science and technology (S&T) is an international cooperative study based at the National Centre for Science Education at the University of Oslo in Norway. This study surveyed 14- to 16-year-old students in 44 different countries, and the statistics are based on the data from 40,000 students in 32 countries. The authors noted the paradox that students in the most S&T-driven economies in the world experience a lack of interest in studying or pursuing careers in S&T. The ROSE study asked several questions in order to test the hypothesis that young people in these countries might have negative or even hostile attitudes towards S&T. No such hostility was found in either rich or poor countries. Conversely, all students seemed rather positive towards science and technology, with students in developing or transitional countries being more positive. One of the main goals of ROSE was to learn more about factors contributing to attitudes about S&T and motivations to learn S&T with an eye toward make science education more relevant and meaningful for learners in ways that respect gender differences and cultural diversity.

The Organization for Economic Cooperation and Development (OECD) has released its 2005 "Education at a Glance" report. The study provides indicators on the performance of education systems around the world, examining who participates in education, what is spent on it, how educational systems operate and what results are achieved. The data focuses on the 30 OECD member countries but also includes some partner countries. Among other findings, the report notes that clear returns on education can be measured in terms of individual job prospects, individual earnings and overall economic growth. The complete 2005 Education at a Glance report is available online: http://snipurl.com/jys6 .

Finally, the European Commission has published results from the latest "Eurobarometer" survey, which has been called the "world's biggest survey in terms of geographical coverage and frequency." The two surveys published had overlapping themes: Europeans, Science and Technology (S&T; http://snipurl.com/jysu) and Social Values, Science and Technology (S&V; http://snipurl.com/jyt4). The

S&T survey was previously conducted in 1992 and 2001, but this was the first time the S&V survey was performed. Approximately 1,000 people in each of 32 countries were interviewed by specialists from the respective countries. The majority of those interviewed would like more information on science and technology and seem rather dissatisfied at the way in which they are currently informed about research aims and progress, especially by scientists. [Sources: *UNESCO's Connect;* http://snipurl.com/jytp || *World Education News and Reviews*; http://www.wes.org/ewenr/ || *RTD Info*; http://snipurl.com/7p85]

International Fabrication Laboratories

With the help of host countries, the Massachusetts Institute of Technology (MIT) is setting up fabrication laboratories, or "FabLabs," around the world. In practice, these laboratories contain commercially available, industrial-grade fabrication and electronics tools that use open-source software and programs written by researchers at the Center for Bits and Atoms (CBA). By giving users around the world the ability to locally conceptualize, design, develop, fabricate and test almost anything, FabLabs aim to provide an opportunity for individuals to use various technological means to build things that solve local problems.

For example, a rancher in Norway used a Fab Lab there to devise radio collars for his sheep that send information about whether the flock is moving, what the temperature is, and other data he uses to care for the sheep. The concept was inspired by a popular MIT course called "How to Make (Almost) Anything" that enabled people without a technological background to conceptualize their own ideas. For each FabLab, MIT pays for equipment (approximately US$25,000 in capital equipment and US$5,000 in consumables), and the host country provides the location for the lab. CBA began setting up FAB Labs in 2002, partially funded by a grant from the US National Science Foundation. FabLabs are currently operational in Costa Rica, Ghana, India, Norway, South Africa and the United States. A new organization, The Fab Foundation, is being launched to coordinate the growing international network of FabLabs. For more information on FabLabs, see http://fab.cba.mit.edu. [Source: *SciTech Library Newsletter*; http://snipurl.com/86tv]

Book Digitization Projects in the News

Over the past few months, several organizations have publicized the initiation or milestones of large-scale book digitization projects. Google has announced the availability of thousands of public domain books through its Google Book Search service (http://books.google.com), formerly known as Google Print. Three different views are available, depending on the copyright and author/publisher permission of the individual. Everything is available in "snippet" view, which displays the book information plus a few sentences of the search term in context. For copyrighted books whose author/publisher has granted them permission, the "sample pages" view allows the user to view a limited number of pages in the book. Finally, books that are no longer under copyright can be viewed in their entirety. Google is currently contending with two lawsuits from author/publisher groups asserting that the corporation is engaging in copyright infringement.

The Internet Archive, Yahoo! and several other organizations launched the Open Content Alliance (OCA; http://www.opencontentalliance.org), whose slogan is "building a digital archive of global content for universal access." The OCA is slated to be a collaboration of cultural, technology, nonprofit and governmental organizations from around the world that will help build a permanent archive of multilingual digitized text and multimedia content. Addressing two major criticisms of the Google digitization project, OCA is emphasizing that they will encourage the greatest possible degree of access to and reuse of collections in the archive while respecting the content owners and that they will archive material from around the world. Shortly after the OCA was formed, Microsoft announced their membership in the alliance and their intention to launch MSN Book Search. Microsoft has pledged US$5,000,000 to digitize approximately 150,000 books in the initial years of the OCA. Google, Microsoft and Yahoo! reportedly hope to make their respective book digitization projects profitable through models such as pay-per-

view, pay-per-page, pay-per-chapter, subscriptions, and the inclusion of advertisements. [Source: *Open Access News*; http://www.earlham.edu/~peters/fos/fosblog.html]

Virtual Health Library

The Latin American and Caribbean Center on Health Sciences Information, developed by BIREME, the Pan-American Health Organization and the World Health Organization, created and maintains a Virtual Health Library (VHL; http://regional.bvsalud.org) whose objective is to provide equal access to information and scientific, technical and factual knowledge on health across the Latin American region. In practice, the VHL helps to develop the regional capacity of the countries to produce, organize, index, publish, disseminate and use scientific information in decision-making processes and health-related activities. The VHL offers several categories of resources, including scientific literature, document access, directories/portals and communication (which includes communities and newsletter). Resources can also be viewed according to themes such as adolescence, bioethics, etc. Approximately 20 of the countries in the region have local VHL websites. The VHL also links to the Scientific Electronic Library Online (SciELO), allows for searching by Medical Subject Headings (MeSH) and provides members access to the Cochrane Library. One of the notable features under the document access category is the Cooperative Service for Accessing Documents (SCAD). SCAD is an automated document delivery service serving more than 10,000 authorized individual and institutional users. Since the framework for the project was established in 1998, the VHL has continued to expand and grow in utility.

Open-Access Journals Gaining in Popularity

CIBER, an independent publishing think tank based at University College London, recently published their study: "New Journal Publishing Models: An International Survey of Senior Researchers." The report was commissioned by the Publishers Association and the International Association of Scientific, Technical and Medical Publishers. More than 5,000 senior authors in a variety of disciplines from Australia, France, Greece, India, Mexico, the UK and the US were surveyed, and CIBER compared their results to a similar study carried out in 2004. Notably, knowledge of open-access journals as well as publishing in them increased significantly from the previous year. In the 2005 study, 29% of the senior authors have published in an open-access journal, compared with only 11% in the 2004 study. The study found that the most enthusiastic advocates of open-access journals tend to be younger researchers from Africa, Asia and Eastern Europe. [Source: *Open Access News*;
http://www.earlham.edu/~peters/fos/fosblog.html]

New Global Information Commons

The International Council for Science's Committee on Data for Science and Technology (CODATA) inaugurated a new initiative at the World Summit for the Information Society in Tunisia to construct an online "open access knowledge space" dedicated to facilitating various methods of open access and re-use of publicly funded scientific data and information. The "Global Information Commons for Science" Initiative has three stated goals: to make people more aware of the benefits that easy access and use of scientific information will bring to society, to promote the wide adoption of effective ways of increasing the availability and use of publicly funded research findings, and to encourage and coordinate members of the global scientific community who are already trying to achieve the first two objectives. Resulting from a workshop held in at the United Nations Educational, Scientific and Cultural Organization (UNESCO) headquarters in September 2005, the initiative aims to support the sharing of research tools and materials among researchers by providing a global platform for members to promote existing initiatives, broker new ones where more effort is needed, build partnerships and share experience, and develop and publicize principles, guidelines and best practices. [Source: *SciDev.Net*; http://www.scidev.net]

New Fellowships for African Physicists

UNESCO recently launched a new fellowship program to allow PhD candidates in physics from sub-Saharan Africa to finalize their research and receive training at the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy. Initially funded by the Japanese government, the Mori Fellowship Program is named for a for-

mer Prime Minister of Japan. Mori Fellows will spend six months per year for two years at the ICTP, receiving training in mathematics and physics, which could include areas such as climate, fluid dynamics, oceanography and seismology. The first 20 Mori Fellows have been studying at the ICTP since September. [Source: *A World of Science*; http://www.unesco.org/science/index.shtml]

Did You Know?

The **Jefferson Science Fellows Program** is now accepting applications. Administered by the US National Academies, the program offers senior academic scientists and engineers the opportunity to advise policy-makers in the US Department of State on science and technology. Fellows will have a one-year assignment in Washington, DC that may also involve extended stays at US foreign embassies or missions. Applications are due by 1 December 2005. See http://snipurl.com/38hz for further information. [Source: *Sci-Tech Library Newsletter*; http://snipurl.com/86tv]

The **Open Society Institute and the Public Library of Science (PLoS)** are offering grants to universities in developing countries to cover **one-year PLoS institutional memberships**. PLoS waives processing fees on accepted articles for faculty, staff, and students at member institutions. Applications are due by 15 December 2005, and details are available at http://snipurl.com/kb3a . [Source: *Open Access News*; http://www.earlham.edu/~peters/fos/fosblog.html]

The **Science Foundation Ireland** is currently accepting proposals for the **2006 E.T.S. Walton Visitor Awards**. Early and mid-stage career researchers are eligible to apply for grants to sponsor visiting researchers up to 12 months. Proposals must be submitted online and received by 16 December 2005. Go to http://snipurl.com/k5gv to be directed to the program's Web site. [Source: *GrantsNet*; http://grantsnet.org]

The **Pirelli *Internet*ional Award** is an award for the diffusion of scientific and technological culture worldwide via multimedia technology on the Internet. Awards will be granted in the categories of physics, chemistry, mathematics, life sciences and information and communication technology (ICT). A total of approximately €130,000 will be awarded in prizes. Submissions for the 2005 award must be received by 31 December 2005; nominations must be submitted at: http://www.pirelliaward.com .

The next administrative deadline for **International Foundation for Science Research Grant** proposals is 31 December 2005. Projects must be related to the sustainable utilization of the biological and/or water resources, including topics such as agriculture, soil science, forestry, biodiversity, environmental chemistry, natural products, food science, etc. Applicants must be young researchers in developing countries. With a maximum value of US$12,000, the IFS Research Grant is intended for the purchase of the basic tools needed to conduct the proposed research project and to arrange fieldwork activities for the project. The grants are renewable and may be awarded a total of three times. For more information, see http://www.ifs.se .

The **Royal Netherlands Academy of Arts and Sciences** is soliciting nominations for international **2006 Heineken Prizes** in the fields of biochemistry and biophysics, medicine, environmental sciences and cognitive science (see http://www.knaw.nl/heinekenprizes). Nominees should be active scientists who are expected to continue their research activities for at least ten years. The deadline for nominations is 1 January 2006. [Source: *GrantsNet*; http://grantsnet.org]

Additional Readings of Interest

Special issue of the European Commission's *RTD Info* on "Science Dialogues"
http://snipurl.com/k9s7
This issue has articles on topics such as open access; television; radio; science cafés; scientific education; science and society; scientists and journalists; scientific hoaxes; and the Internet.

Upcoming Events

UNESCO's Science, Technology and Innovation for Sustainable Development; Havana, Cuba; 1–3 December 2005
f.ortiz@unesco.org.cu

International Conference on Computational and Experimental Engineering and Sciences (ICCES '05); Chennai, India; 1–6 December 2005
http://icces.org/cgi-bin/ices05/pages/index

European Commission Conference on Social Sciences and Humanities in Europe: New Challenges, New Opportunities; Brussels, Belgium; 12–13 December 2005
http://www.cordis.lu/citizens/conf_20051212.htm

Third Global Conference on Oceans, Coasts, and Islands; Paris, France; 23–27 January 2006
johnston@udel.edu

ICTP School on Wireless Networking for Development; Trieste, Italy; 6–24 February 2006
http://wireless.ictp.it

7th WFEO World Congress on Engineering Education: Mobility of Engineers; Budapest Hungary; 4–8 March 2006
http://congress.mti.bme.hu

4th World Water Forum; Mexico City, Mexico; 16–22 March 2006
http://www.worldwaterforum.org

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