

DIGITAL DEVELOPMENT DEBATES

Deaf people help each other: Solar powered hearing aids in Botswana and Brazil

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People with disabilities are one of the most marginalised groups in society, especially in the developing world. Many of the hearing impaired could escape this situation easily if only they had access to affordable hearing aids. Employees from the SolarEar company, deaf themselves, have therefore developed a practical, ecological and affordable solution: the first solar powered, rechargeable hearing aid in the world. It is produced in Botswana and Brazil and is scheduled for production in China and India next year. The workers at the SolarEar company train each other in international workshops on a deaf-to-deaf basis.

Deafness – a heavy burden

The World Health Organization (WHO) estimates that seven per cent of the world's population are hearing impaired. That's a total of 312 million people, two-thirds of whom live in developing countries.

People with disabilities account for a higher percentage of the unemployed than the national average, have less access to education and training, and statistically have a higher incidence of HIV/AIDS. Problems begin at school. Since there are only very few schools for the deaf in developing countries, children with disabilities have to cope with prejudice from both fellow classmates and teachers who believe they are incapable of learning as much as other children. Many of hard-of-hearing children lack basic communication skills. Without these skills and proper schooling, they are denied a fair chance of being hired when they grow up. Society's lack of awareness of their potential and misinformation among employers aggravates the problem.

The high prevalence of hearing impairment in developing countries is due to the lack of prevention measures as well as too few medical professionals to offer treatment or therapy. Hearing loss leads to unnecessary poverty and hardship in the families and communities affected, as well as in society as a whole. It is estimated that hearing disabilities cost governments up to three percent of gross national product (GNP).

The blessing of hearing aids

It is widely believed that children with hearing loss can never learn to communicate through the spoken word. Luckily, these assumptions are no longer valid: earlier identification of hearing loss and technological advancements have made it possible for more children with all degrees of hearing loss to access sound and learn how to speak and hear.

Think for just a moment about the life-changing impact this can have on a person's future. Children attain language in the first six years of life. More than 90 % of what babies learn is from incidental listening, and with listening comes spoken language. As we grow older, we bond with our families, develop friendships, and engage in the larger community. Children with hearing loss are usually excluded from this process – unless they can acquire listening and spoken language skills through hearing aids. But there are serious obstacles for obtaining these aids in developing countries in particular.

The WHO estimates that each year a total of 30 million people – two-thirds of whom live in developing countries – require a hearing aid. It is estimated, however, that only about nine million hearing aids are produced a year. So even if they were distributed evenly, these nine million units would cover less than one-third of the world's annual needs. To compound the issue even further, only one

million are delivered to developing countries. The six major hearing aid companies who control 90% of the world market are concentrated in North America and Europe.

Standard hearing aids, moreover, are sold primarily by multi-national corporations and have an average price of US-\$ 2,000 – a huge amount for people in developing countries. Furthermore, these countries often lack professionals training to fit a hearing aid as well as the expensive audiology equipment needed to provide services from an initial hearing screening to creating a mould for a hearing aid. Developed countries have one professional for every 20,000 people, while developing countries only have one for every two to six million people.

Another huge problem in developing countries is the affordability and accessibility of batteries. A standard size hearing aid battery costs one dollar and lasts one week, making them unaffordable for many. Furthermore, these batteries are generally sold only in large cities.

Solving (more than just) the battery problem

To tackle the problems of deaf people in poorer countries, SolarEar developed the first solar powered rechargeable hearing aid which includes a solar charger and universal rechargeable batteries. This hearing aid has the same quality as the ones produced by the five big major hearing aid companies in the US and Europe, but is 10 to 15 times cheaper. Since it runs on solar power, it is an option even for people without access to electricity.

Many of our products were invented and are manufactured by deaf workers who never finished 9th grade in school. The company chose these young deaf people because people who speak sign language have better hand-eye coordination than most others. This special ability is indispensable for micro-soldering the hearing aid components.

Company founder Howard Weinstein and deaf youths in Botswana started developing the new technologies in 2002 and created over 40 technical jobs at that time. The first project was implemented in Botswana and created jobs for 12 deaf youngsters. It has been replicated in Brazil and is now being scaled in China and India. Within five years, we plan to found 15 subsidiaries in different locations and hire over 3,000 deaf workers. This will not only provide deaf people with income, but also show society that people with a disability can work and set an example for other companies. This will, in turn, enable the regional economy to grow.

Fighting stigmas: hearing aid with iPod-like design

SolarEar's most recent invention is an iPod-like hearing aid. It is a body-worn hearing aid with a case that contains the amplifier with a cord and an ear mould. Given that it is larger than a normal behind the ear (BTE) hearing aid, the components used can be larger too. They are thus less expensive than micro-components. Furthermore, the iPod-design will help eliminate the stigma of wearing a hearing aid. Finally, the biggest cause of hearing aid failure is humidity. Wearing an aid behind the ear dramatically increases the moisture that can get into it. By contrast, a hearing aid worn on the body can easily be protected from moisture, and its larger size makes it less susceptible to humidity.

This new product will help less advantaged children in developing countries get low cost hearing aids, which will enable them to be mainstreamed into local schools. SolarEar wants to sell over 1,000,000 body-worn hearing aids over the next two years via an established micro-entrepreneur distribution channel. The micro-entrepreneurs will work on a micro-consignment basis doing screenings and fitting the hearing aids in their small villages. Profits will be used to hire and train workers with disabilities, as well as to finance SolarEar's innovative deaf-to-deaf technical training program and its deaf empowerment programs.

One of these empowerment programs was implemented when the firm expanded into Brazil. Watching the workers from Botswana teach their colleagues from Brazil during a 6-month electronics and micro-solder course was amazing for all the parties involved. The personal journey they all made was phenomenal: leaving very rural Otse in Botswana and arriving in São Paulo, a city of 17 million people, 12 hours later. It was the first time the Brazilian youngsters involved had a deaf teacher. They began to realise that they themselves could – and certainly would – also become teachers. In Brazil, furthermore, people who are black tend to be at the low end of the social economic spectrum. Having black teachers therefore also helped eliminate a great deal of prejudice.

South-South and deaf-to-deaf technical training

Most international technical training today is North-South, that's to say from a developed to an underdeveloped country, such as someone from the US providing training in Bolivia. Rarely is it South-North – Angola to Japan, for instance – and almost never South-South. SolarEar's training courses are exceptional for being South-South, and also for involving someone with a disability teaching other disabled people.

In the next few months, workers from Brazil will hold the same kind of course they once participated in for Hindu and Muslim youths in Kashmir, India. It will be the first program of its kind to include members of both religions in this troubled and divided region. The hope and expectation is that these youths will see that they have more in common with each other than they do with their own fellow citizens, since they share a common culture – a deaf culture. It is, of course, important to understand that sign language is no more universal than spoken languages. To hold the trainings, the SolarEar workers learn each other's language and create signs for the words they don't have in their national vocabulary.¹

The products discussed above were featured in National Geographic's November 2010 edition under the title: "Brilliant Eco-Inventions – Designs to Solve the World's Problems". Other products manufactured by the deaf workers in Brazil are now on exhibit in the Alexander Graham Bell Museum in Canada next to the first hearing aid invented by this famous scientist, and at the Smithsonian Museum in the United States.

But the SolarEar program does more than just manufacture innovative products. Our work force and our technology helps us have a substantial social impact. SolarEar workers have demonstrated -- and continue to demonstrate -- that anything is possible.

¹ Watch this video for an idea of how this works:
<http://www.youtube.com/user/solarear#p/a/u/0/SbnlJCfKPFc>