Utilization of Assistive Technology for Computer Access
: The Challenges

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Abstract. In accessing and utilizing computer systems for information retrieval or as reading and writing tools , persons with disabilities face challenges in using computers with assistive technology devices such as which of them are suitable and available for users with disabilities to use , where and who the users can acquire the products from, and how they acquire the products. According to the limited of varieties and availibility of assistive technology devices in market in Asia region, the authors would like to propose the collaboration on establishment of Asia Assistive Technology Consortium aiming to pool and share resources of assistive technology. This consortium should be a platform forum of balanced teams of scientific, engineering, clinical, manufacturing and market people to develop, create and transfer technology to ensure that the useful products reach consumers without duplication and redundancy of reseach in our region.

Keywords. Assistive Technology, Accessibility, Information, Government. Asia Assistive Technology Consortium

1. Introduction

Nowadays computer access becomes available to more people in our global society, but there is a diverged group of users that is still generally overlooked. Such is one of users with disabilities. These are users who have physical and mental impairment that become barriers to access computers. For example some users cannot see what is being displayed on a monitor screen, some cannot type on keyboard or move a mouse, or some cannot hear an output from speakers and some don't know the process of how to use   the computers. Providing computer accessibility to such groups of people is to remove barriers that prevent them from using information, services, and products that many non-disabled persons have enjoyed the benefit.   There are various technologies and products developed to enhance computer accessibility for persons with disabilities. However, some groups of people with disabilities in some regions of the world such as those in Thailand face are unable to benefit from such advancement. In order for them to utilize assistive technology devices for computer access, three questions must be answered: Which assistive technology products should a user with disability use? Where and who can users with disabilities acquire such products from? And how do they acquire assistive technology products they need to be able to access computers?

2. Challenges to Utilization of Assistive Technology for Computer Access

2.1 Which assistive technology products should a user with disability use?

Most users such as those in Thailand do not know where to start looking when they need assistive technology products for computer access. Some do not even realize it is possible for them to be able to operate on computers just like non-disabled persons. There are computer accessibility products for just about every type of disabilities in the market. Each one is different from another in functionality, technology employed, and purpose. No single computer accessibility product works well for all persons with disability. A product may work well for one user while another user may find it inefficient. Selecting which products to use is important. Together with an on-screen keyboard software, a disabled person with neither arms may find that using a trackball mouse with her other functioning body parts such as her right foot helps her operate a computer better than a voice commander software. Another user with neither arms nor legs has may find a voice commander software a more efficient tool for computer access. Others may find that only a head stick works just as well for them. Persons with disabilities need to know which computer accessibility products work better for them if they were to operate a computer system as efficiently as they can.   Most persons with disabilities in Thailand still do not know what they could use to enhance their access of computers while some do not even realize such

is a possibility.

Not only a user's case of disability but also other preferences such as working environment, language and culture do factor in deciding which assistive technology products should be employed to help him or her operate a computer better. In order to make computers more accessible, people with disabilities such as those with visual or hearing impairment require language and culture customization of assistive technology products used. Assistive technology products with language and cultural customization are not available to all cultures and languages, especially to those of smaller population figures. A country challenged with issues of language and culture customization of assistive technology may still face problems such as insufficient resources required to develop their own technologies for such customization.

2.2 Where and who can users with disabilities acquire assistive technology products from?

The assistive technology market is highly fragmented due to varied needs and requirements for computer accessibility. In a smaller market such as one in Thailand, local distributors of oversea products and investors who will commercialize a technology developed locally are not attracted to the business because of low volume in demand. For most persons with disabilities, even if they know which products should meet their needs, they find no place to purchase the products they want locally. Ordering those offered by oversea distributors challenges them with issues such as security, added cost, and time.

To users in many countries like Thailand, most assistive technology products including adaptive computing technology products are usually distributed, if not also innovated and manufactured, by oversea agents. Unlike other oversea products for non-disabled persons which, usually after adequate exposure to local consumers, draw demand sufficient enough to attract local distributors or sometimes enough for the oversea agents themselves to set up their own local distributors, an assistive technology product finds its customers among a minuscule percentage of population in each country. In addition, the ongoing changes of assistive technology makes it much more difficult for distributors to keep their inventories up to date with the influx of new products. Local distributors become a rarity in a market of such low demand volume-wise as a result. Should users try to purchase assistive technology products directly form oversea agents, what they might encounter such as the ordering methods, the payment transaction methods, delivery costs, time spent, delays, the absence of the physical products before purchasing and the likes make such business an almost impossibility among customers in some cultures such as those in Thailand where they are not accustomed to do business in such circumstances. There are also issues about security and language barriers when customers place oversea orders. Users within such circumstances usually find themselves unable to obtain assistive technology products in spite of knowing what products they require in particular.

Sometimes assistive technology products in demand are developed locally. However, often these innovations do not find their way to the users, as in the case in Thailand, because investors who will manufacture and distribute them are disinterested by the low volume of demand in a highly fragmented market of assistive technology products.

2.3 How do users with disabilities acquire assistive technology products they need to be able to access computers?

Assistive technology products are costly. Because of the low demand volume-wise for each product, the cost per unit in both manufacturing and development are higher for assistive technology products than those for products appealed to larger markets. Hence, higher price tags for assistive technology products in general. Furthermore, when assistive technology products, distributed by agents from countries with higher consumer price indices, arrive in other countries with much less consumer price indices, the price tags of those products appear to be much higher to the customers. A large number of users with disabilities in Thailand find that some assistive technology products distributed by companies in North America meet their requirements to enhance their computer accessibility but cannot acquire the products because they do not have access to sufficient financial resources to make the purchases.

2.4 Other issues: Inaccessible formation.

There are still further issues regarding problems in enhancing computer accessibility for persons with disability. One of which is the inaccessibility of information by itself regardless of the employment of assistive technology on the user end of computer operation. Information, although accessed through state-of-the-art assistive technology products available, may still be inaccessible by a user with disability because the information is in a form incompatible with the tools accessing it. A web page, for example, may contain information that a screen reader used by a visually impaired person cannot access. Similarly, an application software may have command menus that a screen reader cannot access.

3 Responding to the challenges

In responding to the above issues, various approaches may be called for. Some of which are as the following.

3.1 Provide information and services on selecting assistive technology products for users with disabilities to public.

A private or government agency may be organized to respond to inquiries from users with disabilities about what assistive technology products for computer accessibility they should use. Since, to some countries such as Thailand, a large number of assistive technology products are distributed by oversea agents, information about the products are available to users only through internet. It should not be presumed that users with disabilities who seek computer accessibility have access to such sources information since computer access is a prerequisite to online information. Redistributing assistive technology information by centralizing it reduces time and cost of gathering information by users with disabilities. It is important, however, that the agency be unbiased toward providing information and advices to users in selecting assistive technology products. In addition, the agency's personnel should be well knowledgeable of assistive

technology and computer accessibility so that they are able to advise users with disabilities on selecting appropriate assistive technology products according to users' preferences such as disabilities, working environments, or language and culture customization.

3.2 Support research and development of assistive technology to enhance computer accessibility.

As mentioned earlier, users in some cultures may have to develop their own assistive technology accordingly to their languages and cultures preferences due to unavailability of such customization in existing assistive technology products. The research and development, however, may be costly. In a culture whose population figure is thin, a non-profit organization may be organized to conduct researches and developments in assistive technology since private investors are unlikely to orchestrate such tasks themselves due to such market's low demand volume where business profitability is hardly justified. As in the case in Thailand, the government supports research and development of assistive technology by funding a government agent called National Electronic and Computer Technology Center whose one of the departments focus on research and development in the area of assistive technology. However, a government may support research and development of assistive technology conducted by private investors by providing some form of subsidization to the organizers. A further benefit of this approach is that it reduces the cost per unit of assistive technology products developed, and hence encourages private enterprises to enter the assistive technology market.

3.3 Increase demand volume by accommodating similar languages and cultures into assistive technology products developed.

Among countries whose languages and cultures are similar, a joint research and development in assistive technology may benefit organizations in each country in various ways. On one hand, it can reduce the cost of research and development organizations in each country bear upon. On the other, larger demand volume due to broader prospected users reduces the cost per unit of assistive technology products both in research and development, and in manufacturing, thus, encourages private investors to enter the assistive technology market. Regional development and manufacturing should also lower other costs such as logistic and labor, especially in regions where labor costs are generally lower. As a result, enterprises and consumers should both benefit from more efficient pricing. Furthermore, in joint research and development programs, organizations with personnel of different expertise may compliment each other.

3.4 Provide to the public assistive technology products or computer systems accessible to people with disabilities.

A government may organize various mechanisms to support people with disabilities in accessing computers as part its bid to bridge the digital divide. It may provide public computer systems accessible to people with disabilities. It may provide assistive technology products directly to people with disabilities in by way of renting at low rates or subsidizing purchases of assistive technology products for computer accesses by users with disabilities.

3.5 Promote accessibility of information.

Information, especially public information, must be accessible to all people. A government, for example, may enforce that all public information provided by government agencies be accessible to all people including people with disabilities. Computer systems with necessary assistive technology products may be provided to the public as well as information accessible by the system.

3.6 Collaboration on Regional based to conduct research and development as well as technology transfer to industry.

The author would like to propose the regional collaboration on assistive technology development by pooling the scientists, engineer, therapists manufacturer and marketer who are interested in developing assistive technology to work together to bring products to markets in regional based. With aiming to enhance the uses with disabilities to access computers without difficulty, the working team should share the knowledge and supply informatioon among various teams. This will avoid duplicate and redundancy work in the region. Then uses with disabilities will benefit from this kind of collaboration. Hence, we should consider to start working together to establish Asia Assistive Technology Consortium.

4   Conclusion

There are various approaches to bridge digital divide that sets apart users with disabilities from non-disabled users. These approaches, however, must provide, at the least, solutions to three issues challenging users with disabilities in many regions of the world: Which assistive technology products should a user with disability use? Where and who can users with disabilities acquire such products from? And how do they acquire assistive technology products they need to be able to access computers? Commitment from the government in some degrees is a prerequisite to the success of these approaches. Computer systems provide accesses to abundant information available to the public. A group of users are unable to access computer systems, thus, unable to access information the majority of computer users have access to. Such are users with disabilities. Information must be accessible to all people and not excluding those with disabilities. Lastly, consider to collaborate among leading nations to work together on assistive technology development and transfer in order to deliver the products to regional market, Asia Assistive Technology Consortium is proposed.

5   References

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