

# SAHK

Citation: Mo, K. Y. H. and Cheng, W. K. (2004). *Impacts of ICT for Children and Adults with Special Needs on Quality of Life and Learning*. Book of Abstracts of the 7<sup>th</sup> International Conference of Human Services Information Technology Application (pp. 73). Hong Kong.

**Abstract: The Spastics Association of Hong Kong (SAHK) has been serving people with special needs from infancy to adulthood for more than forty years. Rapid advancement in Information and Communication Technology (ICT) has made a tremendous impact on our clients at different stages of life. ICT training and applications not only enhance equal opportunity in learning and living, but also significantly improve their quality of life and our program varieties in preschools, schools and sheltered workshops. With continuous improvement in the ICT accessibility to people with special needs, there shows great promise to promote their interaction with the community and make their dreams come true.**

## **Introduction**

ICT has become an integral part of the modern life. It plays an important role in business, education, recreation as well as rehabilitation. As an organization devoted to the education and welfare of people with special needs, SAHK has envisaged the use of ICT for enriching the life of our clients early in the late 1970s. With more than two decades of employing ICT in education and rehabilitation, we would like to share our experience on its impacts to our service users. In spite of multiple challenges on their way to grow up, we hold a strong belief that people with cerebral palsy or other developmental disabilities are entitled to have an equal opportunity to live and learn as their ordinary counterparts, to have full participation in the community and to lead an active life filled with dreams and aspirations.

## **ICT Development in SAHK for its Clients**

People with special needs are characterized by severe motor impairment that begins early in life with or without associated impairments in vision, hearing and speech. Despite the fact that quite a number of them are of sound mentality, some has grown into a “locked-up” mind with a “locked-up” body as a result of being bounded by a “locked-up” world.

To cope with the wide range of needs of our clients, specialists from different disciplines are required to work closely together in selecting and adapting training software and computer-aided assistive devices to customize for individual’s needs. We endeavored to make the ICT world more accessible to our clients particularly for those with multiple disabilities or severe motor impairment.

Date back from the late 1970s, our early attempts focused on constructing self-developed computer-aided assistive devices for our clients. However, owing to the rapid advancement and

cost reduction in technology as well as the lack of technological support and resources for research and development in the non-government organizations, we had shifted our attention to adapt the commercially available products. Another important reason for switching from “self-developed” to “buying-in” was the maintenance and backup services accompanied with the commercial products.

With the joint effort of the Association and service users, ICT is currently integral to our clients’ lives. It helps to maintain or improve their functional capabilities and bring them to a world that is barrier-free.

### **Roles of ICT in Different Phases of Life**

#### The Preschoolers – from Plain to Interactive

The current trend in education tends to begin the use of computer at early age. In exercising the principle of equal opportunity in learning, our Association had made every effort to equip our preschool centers and staff for ensuring our little clients to have early contact with computers that will be one of their indispensable tools throughout the entire life.

Despite limitations in physical, cognitive, social and communicative functioning, ICT provides these kids with stimulating media that integrates with our training and educational programs for promoting development in different areas of life. With the fascinating visual and auditory stimulation and instant feedback to a proper action, computer programs are excellent teaching tools that create an interactive and enjoyable atmosphere for learning (figure 1). Large-screen projection helps to draw attention of our easily distracted clients, arouse their interests and extend their concentration span in class (figure 2). Repetitive learning with meaningful and vivid images is particularly useful for children with poor memory.



Figure 1: Multimedia training packages are excellent teaching tools that create an interactive and enjoyable atmosphere of learning for preschoolers.

Wide varieties of stimulating teaching materials are essential for effective learning by clients with multiple disabilities. These training packages can be ready-for-use commercial products or self-made by our staff using the off-the-shelf software (e.g., Powerpoint, Pagemaker, Frontpage, a number of compilers, etc). They should be carefully selected or specially made to meet a wide spectrum of needs of their users. We have established a centralized directory with systematic analysis of the applications and limitations of each package for easy reference by our staff. This

serves as a software library that pools together the efforts of individual centers for resources sharing.

Basic computer literacy is enhanced by various input devices activated by different body parts together with an adaptive environment (e.g., seating and working table) for accommodating their impairments and at the same time encouraging the clients to make an optimal use of their available abilities in motor, visual and auditory areas. To facilitate the transfer of the acquired computer literacy at home, parent education will also be given.

In fact, ICT applications have brought about a revolutionary change not only in learning, but also in teaching. During the SARS outbreak last year when all clients are refrained from schools, the internet allowed our staff to continue teaching with the clients at home. Furthermore, e-learning platform has been established for allowing the home bound clients to receive home-based education from our pres-school staff.



Figure 2: Large-screen projection by LCD projector draws attention, arouses interests and extends concentration span of preschoolers.



Figure 3: Notebook computer installed with text-to-speech software that converts input text into voice as augmentative communication. The computer can be mounted on the table top of the user's wheelchair.

### The Schoolers and Adults – from Constraint to Independence

When the preschoolers enter special schools, they will be given more autonomy and freedom in using computers. Despite intensive therapy, limitations in mobility, communication and coordination may still exist. These limitations may disrupt their participation in classes.

ICT plays a crucial role here. Students with difficulty in writing can make use of the computer with adaptive input for typing homework. Students with speech disorder can be benefited from ICT in form of augmentative communication. Notebook computer installed with various sophisticated text-to-speech software can be mounted on wheelchair (figure 3) for allowing wheelchair bound students to express complicated needs, feeling and thought, to make friends and to enjoy an active social life. ICT has also been employed in physical training in form of biofeedback. By employing ICT together with specially designed hand-activated switches, students can improve hand function (e.g., grip strength, finger control, etc). These switches can also be adapted to be activated by different body parts for improving their muscle strength, movement range, body balance and eye-hand coordination.

By introducing our students to the world of internet, they can get in touch with the outside world in spite of their physical constraints. In the knowledge era, information is power. Moreover, internet provides them with a leveled platform to interact with their normal counterparts. Furthermore, by participating in a wide range of self-selected web-based learning, they are given with the autonomy to upgrade themselves. Internet serves to set free their mind out of their “locked-up” body.

After graduated from school, these students will step into a new phase of life – their career life. Much attention has been paid to infants and adolescents with special needs. Comparatively little work on their adult life has been reported in the literature. However, adult life is, in fact, a major part of one’s life span and is particularly important for people with life-long disabilities. In this paper, we would spend more time on discussing the impacts of ICT to the adults with special needs with two cases illustration.

Work plays a crucial role in adult life. Most students with severe degree of involvement will enter our sheltered workshops. Before the introduction of ICT to the workshops, only very limited jobs were suitable for the severe handicaps. Most of them participated in very simple jobs that were, in essence, bears no contribution to the production line. Those with good mentality found these jobs not only boring, but also buried their talent and potentials. Some perceived themselves as non-productive workers who had been underestimated and were subjected to the daily indignities of an adult life.

ICT assists our adult clients to develop their career in computer-related production. We began with simple data entry and word processing services in the 1980s. This was followed by desk-top publication and banner making in the early 1990s and then webpage design and content update in the late 1990s. It gives rise to wide varieties of job opportunities including webpage designer, editor, programmer, writer, graphic designer, etc for the severe handicaps. Some has brilliant achievement in these jobs.

ICT also adds color to the leisure life of our adult clients. It extends their social circle without limits and provides them with wide varieties of choices for cultivating interests and hobbies under their own free will.

In the forthcoming sessions, we would like to share with you two of our adult cases who have attained special achievements on their career. They represent the fruits of ICT applications in enriching one's life irrespective of one's level of disabilities.

### **A Poet and Programmer - Pui Ling**

Pui Ling suffers from cerebral palsy with severe hypertonicity and movement disorder resulting in severe structural deformities in spine and extremities. She cannot speak and is total reliance on third parties in all daily chores. She enjoyed reading and used to read newspapers or books by asking a stand-by helper to position the reading stuff and turn pages. With increasing popularity of ICT among persons with special needs and after repeated attempts, she ended up with using a suck-and-blow device on a scanning keyboard for operating her computer (figure 4). This customized support allows her to gain access into the internet that overwhelms her with seas of interesting information in multi-media format.

After years of participation in the internet, she enjoys shopping in “e-bookstore” and browsing her favorite e-books particularly biography of her idols. She composes prose regularly and has published her first book 《輪椅上的小鳥》(A Little Bird on Wheelchair) that can be found in local bookstores. Her prose reveals her enthusiasm in life and her flying heart



Figure 4: Pui Ling using a suck-and-blow input device for controlling her computer.

After publishing her first book, she has been invited to give talks in churches, schools and community centers conveying her positive thinking to the public. She communicates with her augmentative communication device by suck-and-blow action. Her story has inspired lots of losing souls by encouraging them not to give up in harsh condition.

### From Computer User to Software Designer

Pui Ling used to have difficulty in learning how to use “Automatic Teller Machine” (ATM) for withdrawing and depositing money. She had therefore engaged herself in developing a computer program that teaches people with special needs to use ATM. This “function-oriented” software has been put onto the directory of our software library. Being a user with special needs, Pui Ling understands the requirements from the user's perspective and developed her program accordingly. There is no wonder why the program developed by Pui Ling turns out to be one of the most popular teaching packages among our schools.

### From Reader to Poet

Pui Ling's flair for writing has not been hindered by her physical limitation. She is now working on a poetry book. Though she has to spend much effort and time in typing her work with the suck-and-blow device, her writings are loaded with charm that has won the hearts of her readers that in turn drive her to work harder.

Despite the fact that Pui Ling was born with severe degree of involvement in multiple areas, she has never given up. Her stunning achievements have gained her an armful of glittering prizes including: Outstanding Disabled Person Awards (傑出傷殘人士獎) in 1992; Chartered Marathon of Life Awards (渣打人生馬拉松獎) in 2002; the 2<sup>nd</sup> Runner-up of the Chinese Webpage Design Competition (香港展能節中文電腦網頁製作比賽季軍) in 2003....., etc.

### **The City Hero – “Sky”**

“Sky” is a cheerful and sociable young man suffering from cerebral palsy with severe physical impairment. He controls his power wheelchair by chin movement. “I don't feel restricted, nothing can confine me and my mind can roam freely like a bird in the sky,” “Sky” said. He is interested in wide varieties of subjects like logics, physics, computing science..., etc in the internet.

### From Computer Learner to Web-based Commentator

“Sky”'s first contact with computer can be dated back to his school time. His enthusiasm for computer had been rooted at that time. His social circle was restricted as a result of his poor mobility and communication. However, he never lets any limitation stands in his way.

Advancement in ICT is a turning point for “Sky”. With joint effort of rehabilitation engineers and allied health professionals for improving his accessibility to the computer world, he is now surfing in the internet with a head pointer in an adaptive working environment integrated with adaptive seating (figure 5).



Figure 5: “Sky” using a head point as input device for controlling his computer.

By equipping “Sky” with these tools, he managed to type by nodding his head. While surfing on the internet, he identifies his role model, Prof. Stephan Hawking. By chatting with others via the internet, he is given the power to express himself and to communicate. He builds his personal webpage with chat rooms on hot topics. He makes online friends and shares his viewpoints with others. Physical constraints no longer hide his voice on public issues. He received echoes in his

own chat rooms particularly on political and social issues. This is most encouraging to “Sky” and has left him with a sense that “I have to do something to set things right”.

As always, “Sky” aimed high. He has determined to be a web-based commentator to fight for the rights for himself and the others. Make it or not in the end does not really matter, “Sky” in many ways has already won as a life warrior.

#### “Robotic Leg” and “Robotic Mouth”

What propels “Sky” is a burning desire to level the playing field. He once said, “In the cyberspace, I am an eagle with outspread wings, soaring high with the others”. “Sky” makes friends, gains knowledge, cultivates hobbies, and participates in social issues in the virtual world.

In the real world, “Sky” has a strong desire to move and talk freely. He dreams of turning himself into a “man-machine hybrid equipped with a ‘robotic leg’ and a ‘robotic mouth’”. The former allows him to walk in the community while the latter enables him to communicate face-to-face with others.

In reality, he controls his power wheelchair with a chin-control device (figure 6). He is also given with a notebook computer that is mounted on his power wheelchair (figure 3). Augmentative communication is provided by text-to-speech software that reads aloud the Chinese words that are typed into the computer with his head pointer.



Figure 6: “Sky” controls his power wheelchair with a chin control device.

In November 2003, “Sky” has been appointed as one of the HK delegates to attend the Asian and Pacific Disability Forum (APDF) Conference in Singapore and shared his experience on augmentative communication from the user’s perspective (figure 3). Accompanied with him are a physiotherapist from his workshop and a welfare worker from his hostel. Being an ambitious young man, “Sky” is now working hard towards his aspiration – to be a critic and fighter on local social and political issues in the internet.

#### **Discussion**

The two illustrated cases do not have much experience in using computer at their early age. They are learnt from ground zero at a later age. Behind the scene are thousands of hours of practice and uncountable failure in adaptations in order to get move and catch up. However, both have successfully beaten the odds and move up.

At present, most of the newcomers to our sheltered workshops have already acquired a concrete foundation of computer knowledge in preschool and school. They are well equipped for the computer-related jobs in the sheltered workshops. It is believed that they will be more prepared to actualize themselves in the ICT world and gain recognition from the outside world. ICT provides them an equal footing in the playing field to compete with the normal rivals.

ICT applications have demonstrated itself as promising means to “lead out” the talents and potentials of people with special needs. On the other hand, it demands the specialists in rehabilitation and education to work in close collaboration with the commercial sector to customize for individual users.

As the ICT world is dynamic and rapidly advancing, new technology may bring about new impact. It is therefore important for the academic institutes to incorporate the state-of-the-art technology for enhancing the man-machine interface so that more severely handicapped people, from children to adults, can be benefited.

Last but not least, we still have a long way to go in realizing full participation in the community in that there is a whole lot of problems such as public education, public accessibility, etc, for which there is, as yet, no known ICT solution.



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