

Name of the Project : Project on "Accessible E-learning Support"
(無障礙電子學習支援計劃)

Name of Applicant : Hong Kong Blind Union
(香港失明人協進會)

Introduction

It is envisaged that e-learning may, in the long run, prove to be the most significant educational advance ever for students, including those with disabilities. This is manifested by the fact that the internet has already provided unparalleled access to learning, often directly into people's homes. The web, with assistive technology, has opened up vast learning opportunities for disabled persons. The availability of different media types also enables further educational opportunities. Sound and refreshable Braille can be used for teaching students with visual impairment while graphics, sound, animation and video can be used for teaching those with dyslexia. Nonetheless, majority of the print disabled students are not yet able to benefit from the e-learning initiatives due to the following major obstacles:

- unavailability of accessible e-text books
- affordability of assistive devices
- lacking knowledge in accessible e-learning

Goals and Objectives

To bridge the learning gap and digital divide between students with and without disabilities, the proposed project aims to assist print disabled children to make the best use of e-learning in their academic pursuit, like their able-bodied peers do.

The specific objectives of the project are:

- to substantially increase the provision of accessible electronic learning materials to students with print disabilities;
- to make available assistive hardware/software in affordable price to students with print disabilities;
- to facilitate e-learning developers, teachers and parents to embrace the skills and knowledge in using and designing accessible e-learning materials for students with print disabilities.

Needs Assessment

Children with print disabilities are unable to read conventional printed materials due to vision impairment, physical disability or learning disability.¹ Although the manners in which the disability occurs are very different, individuals diagnosed with print disabilities all share one characteristic: they cannot access print in the standard way.

Textbooks are important learning tools but for many disabled students, learning materials in printed text is a barrier to their participation in the general education curriculum. School children with dyslexia commonly have difficulties in reading printed textbooks. Most of the visually impaired students just cannot see ordinary printed information and the key problem they encountered usually lies with the timely availability of accessible learning materials. In Hong Kong, Braille books for students with visual impairment are mainly produced by the Centralized Braille Production Centre (CBPC) which is supported by the Education Bureau. In 2008/09, CBPC translated and produced a total of 408 titles of books and 759 volumes of articles² in Braille format. A recent survey³, however, revealed that more than 70% of the visually impaired integrators interviewed could not get all the needed Braille textbooks within the first three months after commencement of the school year. It seems that the demand for accessible books cannot be met by a sole supplier.

The Government's IT policy has successfully boosted the local students in the use of PC and internet. Nowadays, when our students log on to the internet, they can enjoy worldwide access to vast educational materials, from science to the arts, from history to the most up-to-date high-tech developments. Students can easily find supplementary materials for their schoolwork and projects. Unfortunately, majority of the students with sight problem in Hong Kong are still deprived of the benefits brought about by the digital age. It is because most of the assistive tools available in the market are developed by the western countries and they cannot support Chinese language. Besides, many of these tools come with a prohibitive high-price tag, which is unaffordable by our average families. Worst still, most online and electronic educational resources are just not accessible to visually impaired students even using assistive devices.

The Education Bureau has recently driven further its strategic utilization of digital technology to improve learning experience. The e-learning initiatives encompass software applications, digital content, e-classroom, mobile systems, teaching methods, etc. These valuable initiatives, however, may not benefit the visually impaired students. In addition to the accessibility and affordability issues mentioned above, relevant experience of the teaching party also constitutes a major factor for its failure or success. With the help of assistive tools, visually impaired students can manipulate computers in a screen-less mode and operates applications solely via keyboard. On the other hand, teachers mainly use visual interface and mouse to operate their computers and most of them have little knowledge, if any, on the assistive tools. Hence, it is difficult for the teachers to direct visually impaired

¹ Reference drawn from the Individuals with Disabilities Education Act 2004, USA.

² 2008-09 Annual Report, Hong Kong Society for the Blind.

³ 接受融合教育視障中學生現況調查報告、香港失明人協進會、2010年8月。

students to use e-learning systems and services in ways that is familiar and operable to them. By the same token, other local students with print disabilities are facing similar hurdles and likely to be left out in the e-learning initiatives.

Applicant's Capability

The Hong Kong Blind Union (HKBU) was established in 1964. It is the first self-help group organized and managed by people with visual impairment in Hong Kong. It aims at promoting the spirit of self-help and mutual-help among people with visual impairment as well as striving for equality, independence and opportunities for the local blind people. HKBU is now operating four service units to provide social, recreational, vocational, educational programs as well as IT support services for our members to promote their full participation in community affairs.

HKBU has been promoting the integration of local visually impaired students into mainstream education since early 1970s. We are offering different kinds of support services to students with visual impairment, particularly through the works of our Trailwalker Vocational and Educational Resources Centre located in Kwun Tong.

HKBU has started to promote the development of information and communication technology (ICT) to facilitate the use of computers and assistive tools by visually impaired persons since early 1980s. We have developed several ground-breaking softwares and ICT services that subsequently led to the winning of the Hong Kong ICT Awards⁴.

Below is a summary of our milestone achievements in this aspect.

1991	Assisting the China Braille Publishing House ⁵ to computerize its Braille production into electronic system.
1993	Hosting of an ICT Conference ⁶ with participants from Hong Kong, China and Taiwan.
1999	Establishing the Information Technology Advisory Committee in HKBU.
2000	Assisting the Guangzhou Disabled Persons' Federation ⁷ to set up an IT training centre.

⁴ 香港資訊及通訊科技獎

⁵ 中國盲文出版社

⁶ 失明人中文電腦應用研討會

⁷ 廣州市殘疾人聯合會

2002	Development of "Easy Dots" ⁸ - the 1st Chinese input method software for visually impaired persons to use in Windows environment. The software got the Bronze Award of the Hong Kong ICT Awards 2006: Digital Inclusion (Open) Award 2006.
2003	Development of "Easy News" ⁹ system - the first telephone Chinese newspapers service. Through the system, our visually impaired members can listen to 9 local newspapers via a fix-line or mobile phone. This talking newspaper system got the Certificate of Special Mention of the Best Digital Inclusion (Service) Award, Hong Kong ICT Awards 2007.
	Development of "Easy Read" ¹⁰ - a text-to-audio software for use of visually impaired persons to hear the contents of books stored in MP3.
2006	Publishing of the Accessible Digital Technology Newsletter ¹¹ - the world's first monthly Chinese electronic journal on IT application for visually impaired persons.
2008	Development of "Sunshine" ¹² - a screen reading software for visually impaired persons. "Sunshine" got the Bronze Award of the Best Digital Inclusion (Production / Application) Award, Hong Kong ICT Awards 2008.
2010	Development of the "Braille Instant Translation & Editing" ¹³ (BRITE) system for translating Braille into English or Chinese texts and vice versa.
	Development of a new screen reading software basing on NVDA open source codes for use of visually impaired persons in Windows 7 environment.
	Organization "Overcoming Digital Divide - Web Accessibility & Visually Impaired Users Capacity Building Campaign" ¹⁴ - a two year project supported by Digital Solidarity Fund.

⁸ 點寫易軟件

⁹ 聲聞通系統

¹⁰ 讀頌易軟件

¹¹ 無障礙數碼科技通訊

¹² 陽光讀屏軟件

¹³ 亮點雙語及點字雙向翻譯系統

¹⁴ 消除數碼隔閡 - 推動無障礙網絡及視障使用者能力提昇運動

Rationale

With regards to visually impaired students, electronic media has its unique values which are conducive to enhancing learning effectiveness. When comparing with conventional Braille books, learning materials in accessible digital text formats have the following distinguished merits:

- they are more portable and less bulky as the files can be stored in the various handy media and devices;
- students can have access to the learning materials in school at the same time as their able-bodied peers do;
- students can communicate more efficiently with their teachers and schoolmates as they are using the same media and interface;
- students can learn Chinese more effectively by using softwares for reading text files with functions to interrogate the meanings of Chinese words and terms¹⁵;
- students can make notes, highlight and insert reference links on the learning materials stored in digital format;
- it is possible for the students to search the texts easily when reading the files with assistive devices;
- it is convenient to check the meanings of words by using appropriate software or on-line dictionary.

In fact, there are already endeavours in many countries to promote or provide accessible learning materials to students with print disabilities in specialized formats, e.g. audio and electronic text, for them to gain information from conventional print materials. The followings are just a few examples:

- Recording for the Blind & Dyslexic¹⁶
- National Center on Accessible Instructional Materials¹⁷
- Bookshare¹⁸
- Royal National Institute of Blind People¹⁹

¹⁵ It is difficult for local visually impaired students to learn Chinese by using Cantonese Braille which is coded purely by Cantonese phonetics. They usually have problems in differentiating Chinese characters with similar pronunciations.

¹⁶ <http://www.rfbd.org>

¹⁷ <http://aim.cast.org>

¹⁸ <http://www.bookshare.org>

¹⁹ <http://www.rnib.org.uk>

- UK Association for Accessible Formats²⁰
- Vision Australia²¹
- National Educational Association of Disabled Students²²

As described in the 2000 Report of the Canadian Association of Educational Resource Centres, in providing accessible learning materials to fulfill the special needs of print-disabled students, "*access means that students have the right material at the right time in the right format. The materials must meet the following criteria: ease of use, timeliness, appropriateness of formats, effective teaching and learning methods, and promotion of independence in accessing the learning resources.*"²³ Such provision is indeed a pre-requisite for disabled students to take part in e-learning. It is therefore the goal of the planned project to bridge the local service gap to suit diverse pedagogies and needs of students by rendering various kinds of accessible e-learning support services.

In Hong Kong, the Chief Executive announced in his 2008-09 Policy Address the plan to enhance students' ability for self-learning and interactive learning, and to promote the use of e-books. A working group was then formed to examine the development of textbooks and e-learning resources in October 2008. In its report, the Working Group recommended that²⁴:

"The sustainable development of e-Learning depends on the co-operation and joint efforts of various sectors to give appropriate support. The Government should take the lead to create an appropriate environment for e-Learning and make it become students' major mode of learning."

"The Government should formulate concrete measures to ensure that all students can participate in e-Learning regardless of their socio-economic status, physical or intellectual status."

It is against such background that HKBU intends to initiate a pilot project to address learner diversity and to build an inclusive e-learning environment. Through the new services proposed, we hope to ensure that students with print disabilities can benefit from the e-learning development in Hong Kong.

²⁰ <http://www.ukaaf.org>

²¹ <http://www.visionaustralia.org/info.aspx?page=2170>

²² <http://www.neads.ca/>

²³ http://www.slais.ubc.ca/courses/libr500/06-07-wt2/www2/S_LaBelle/students.htm

²⁴ Report of the "Working Group on Textbooks and e-Learning Resources Development", Education Bureau, 2009, P.43-44.

Conceptual Framework

In response to the challenges and special needs of the print-disabled learners described in the "Needs Assessment" section, we will adopt a three-prong approach to tackle those problems so as to enhance their participation in e-learning:

Production of accessible e-learning materials

We will produce guidelines and best practices for the production of e-learning materials for content developers and publishers. With regard to the most-needed textbooks, we will strive to liaise with publishers for a soft copy of their publications. If for any reason that such soft copy is not available, we will revert to transcribing the print copy into e-format equivalent. To expedite the delivery of e-textbooks, we will deploy the leading-edge scanning and OCR (Optical Character Recognition) technologies in the production process. The quality and accuracy of the end-products, however lies on the labour-intensive formatting and proof-reading process. We will leverage our kernel staff manpower by recruiting volunteers through our established channels.

Assistive tools research & development

We believe that technology-based assistive tools are vital in enabling equal access to information and e-learning for those with vision impairment or learning disabilities. Over the past decade, we have accumulated much experience in assistive tools and service development, example like successfully developed the "Easy Dots" Chinese input software and the Sunshine Cantonese screen reader; set up of "Talking Daily News through IVRS (Interactive Voice Response System)". We will further strengthen our efforts to design and develop low-cost assistive devices that can meet the educational needs of our local students with print disability. We will also keep track and collect information on updated development of assistive tools and accessibility standards.

Training & support

Technology, guidelines and laws are important, but it is people who make the difference. It is critical to have experienced teachers who understand the non-visual approach necessary for teaching functionally visually impaired students. Families also play a key role in guiding their visually impaired children, especially those in early childhood, in adopting e-learning. Our project will organize workshops, hands-on demonstrations and provide phone-in consultancy services for e-learning developers, teachers and parents to enhance and refresh their skills and knowledge on accessible e-learning and assistive technologies. We will also assist schools to make their learning materials and intranets accessible and promote the development of standard e-book format in order to cultivate a more inclusive e-learning learning environment.

Target

- primary and secondary students with print disabilities studying in mainstream and special schools;
- their parents and schools;
- agencies serving students with print disabilities.

Expected No. of Beneficiaries

The project targets to meet the educational needs of students with print disabilities. It is estimated that nearly 400 visually impaired children and more than 10,000 students with dyslexia are currently receiving education in local ordinary primary and secondary schools. These children as well as their teachers and parents can benefit from the project.

Services of the Project

- Production of e-learning materials
 - to make available e-textbooks and other learning materials accessible to students with print disabilities with priority be given to the integrators;
 - to source e-books from publishers and e-book providers;
 - to convert and format e-learning materials into accessible digital formats for students with print disabilities;
- Training and support
 - to compile guidelines on accessible formats of e-learning materials e.g. e-text books, e-notes, intranet contents, etc. for reference of publishers and teachers;
 - to provide technical support and consultancy service to students, parents and teachers on the use of assistive devices;
- Assistive tools design and development
 - to evaluate latest technical aids and apply them to local context to meet the needs of students with print disabilities;
 - to develop suitable softwares for the use of the target students.

Deliverables

- to convert at least 400 titles of textbooks, including reference books, into accessible e-text format for primary and secondary students with print disabilities upon request;
- to convert at least 600 volumes of other learning materials, e.g. printed notes and handouts, into accessible e-format for primary and secondary students with print disabilities upon request;
- to compile a guideline on accessible formats for e-learning materials for reference of publishers and teachers;
- to set up a website for the project to provide relevant information on accessible e-learning;
- to develop a software enabling students with print disabilities to read Math problems through a synthesizer and presented via a braille display.
- to provide consultancy service on the acquisition and deployment of assistive technologies²⁵, and also advisory service on e-learning accessibility for concerned agencies, e.g. publishers, special and ordinary schools upon request;
- to organize at least 10 training workshops on accessible e-learning (80 participants) for pertinent schools and organizations;
- to organize at least 10 demonstrations (80 participants) for concerned parents and students on the use of assistive devices.

Implementation Plan & Time-line

As pledged, our services include the production of e-text learning materials; compilation of guidelines on accessible standards; setting up of a theme website; providing consultation and supports to teachers, parents and publishers; development of accessible softwares in two years' time.

For e-book production, the enactment of the Copyright (Amendment) Ordinance 2007²⁶ allows concerned welfare organizations to make copies of a book in specialized format, including electronic version, to facilitate the access to the book by persons with visual impairment for their personal use. For dyslexia students, we would help them to seek the consents of the publishers before converting the textbooks into electronic text format for them. We will also to liaise with publishers for a soft copy of

²⁵ Including assistive tools and devices such as Braille displays, screen reading softwares, note-taking devices, magnifying softwares, CCTV, etc.

²⁶ http://www.ipd.gov.hk/eng/intellectual_property/copyright/copyright_ordinance.htm

their publications and then convert it into accessible format so as to speed up the process in e-book production.

Apart from the staff team, the project will recruit and train up a pool of volunteers to assist in the production of accessible e-learning materials to meet the demand. Unlike traditional Braille book production, conversion of print materials into electronic format does not require the staff and volunteers involved to be proficient in Braille. It will be easier for the project to recruit and train people with basic computer literacy to assist in e-learning materials production.

The implementation schedule will be as follows:

May – June 2011	<ul style="list-style-type: none"> • office renovation • recruitment of project staff • recruitment and training of volunteers for converting the materials into accessible e-format • purchase of equipment • promotion and publicity • setting up of a database system to register users' information and the conversion of copyrighted textbooks in compliance with the requirements of the Copyright Ordinance • liaison with publishers and schools • design of questionnaires to collect feedback from various users • other preparation works
July 2011 – April 2013	<ul style="list-style-type: none"> • services provision <ul style="list-style-type: none"> - production of accessible e-textbooks, e-notes & e-references, priority will be given to meeting the demand of disabled integrators - training and consultancy services, including organizing workshops and demonstrations for teachers and parents - arranging an overseas study tour to collect information on e-learning assistive aids and support services for print disabled students - compiling guidelines on accessible formats - constructing a theme website - developing a screen reading software and other assistive software gadgets and distributing them to the needy students

	<ul style="list-style-type: none">• continuous promotion and publicity of the project• liaison with publishers, schools and concerned organizations as needed• progress monitoring• regular reporting as required
May – July 2013	<ul style="list-style-type: none">• evaluation and report compilation

Innovation & Impact of the Project

Our project helps to develop, promote and facilitate technology-based products and services that provide equal access to e-learning for students with print disabilities. It is the first of its kind in Hong Kong with major focus on assistive technology for education.

An innovative attempt of the project is to develop a localized, affordable²⁷ screen reader (text to speech software) for use by print impaired students. This software will be the first one that can read Mathematical symbols and equations with English, Cantonese and Putonghua voice outputs. It will make the learning and teaching of Mathematics much easier for print impaired students and their teachers. In fact, many visually impaired students are discouraged by their schools to study Mathematics at senior secondary level. Yet, Mathematics is one of the four core subjects of the new Hong Kong Diploma of Secondary Education to be implemented in 2012.²⁸ The University Grants Committee has already announced that the four core subjects in the secondary school curriculum are mandatory requirements for entry to local universities²⁹. The new software that the project is going to develop can greatly facilitate the students with special needs to learn Mathematics and thus widen the choices for their tertiary studies.

It is anticipated that the demand for accessible learning materials will keep on growing in view of the introduction of the new senior secondary curriculum of which liberal studies has become one of the core studies that require students to make reference to a wide range of cross-subjects learning materials. Our project can help to meet the educational needs of print disabled students by supplementing the conventional provision and to enhance the capacity of schools in catering for student differences in the midst of the recent educational reform.

Indeed, the Government has long recognized that for successful application of ICT in education to take root in Hong Kong, quality and sufficient e-learning resources must be available for all students. To foster such development, the project is intended to be an effective and efficient e-learning solution for students with print disabilities. It will contribute to educational equality for this group of students by enabling them to learn along side with their able-bodied peers in class and at home or wherever they choose. It will also help to pave the way forward for wider provision of inclusive e-learning environment in local mainstream schools for disabled integrators. It is hoped that with enhanced support provided by the project, children with print disabilities would be able to succeed better in schools.

²⁷ The license for a screen reader may cost more than HK\$10,000.

²⁸ http://www.hkeaa.edu.hk/DocLibrary/Media/Leaflets/HKDSE_pamphlet_Eng_1410.pdf

²⁹ http://334.edb.hkedcity.net/doc/eng/ER_of_UGC_e_20101011.pdf

Sustainability of the Project

The new software developed by QEF funding can be used by print disabled students to facilitate their learning for a couple of years even without upgrading. We will also make use of the equipment purchased, including hardware and software, to produce accessible learning materials for print disabled students after the project has completed.

After the commencement of the pilot project, HKBU will try to liase with concerned government departments and potential funding bodies to solicit long-term resources to continue the needed e-learning support services for students with print disabilities.

Performance Parameters

- number of textbooks in accessible electronic text format produced;
- number of other learning materials in accessible electronic text format produced;
- number of consultancy services, including phone calls answered, provided for concerned special and ordinary schools delivered;
- number of workshops for pertinent schools organized;
- number of demonstrations for concerned parents and students arranged;
- a software that can read Math problems be developed;
- number of copies of the software distributed to target students;
- a website with information and guidelines on accessible formats be established;
- feedback from the students, teachers and parents on various services delivered.

Evaluation Method

- data analysis of service output records;
- questionnaires will be designed and used to collect the views and feedback from different kinds of service users.

Dissemination & Publicity

- Publicity of the project and its services will be done through the mass media, concerned government departments, schools and organizations³⁰ as well as the membership network of HKBU.
- Information on accessible formats can be disseminated through the project theme website.
- More than 5,000 copies of the new software will be distributed to those print disabled students in need free of charge.

³⁰ The Hong Kong Association for Specific Learning Disabilities has already indicated their support for our project.

Budget (for two years operation)		HKD	HKD
Office equipment			155,500
• 5 computers & softwares		35,000	
• high-speed scanner & OCR		100,000	
• 1 notebook computer		8,500	
• 1 projector & screen		12,000	
Assistive devices & equipment			467,000
• 4 refreshable Braille displays		100,000	
• 4 screen reading softwares		44,000	
• 2 note-taking devices (audio & Braille outputs)		80,000	
• 2 scan & read devices		40,000	
• 1 embosser with audio & touch graphics aid & drawing pad		65,000	
• 2 magnifying softwares		8,000	
• 2 set of CCTV with transformer		30,000	
• e-books & e-book readers		100,000	
Staff cost (including MPF)			1,154,400
• 1 project manager		600,000	
• 1 project officer		327,600	
• 1 IT officer		226,800	
Contracting out book production services (scanning, typesetting, indexing, formatting, proof-reading and etc.)			1,536,000
Website development & hosting			80,000
Accessible software development (new software that can read Math problems)			200,000
General expenses			159,000
• Training program expenses		20,000	
• Telecommunication expenses, postage, printing & stationery, sundries and etc.		139,000	
Contingency			78,000
	Total :		3,829,900

Asset Usage Plan

The Grantee should plan the deployment of assets that cost \$1,000 or more per item upon project completion.

Category	Item Description /	No. of Units	Total Cost	Proposed Plan for Deployment (Note 1)	Justification(s) (Note 2)
book & VCD	<ul style="list-style-type: none"> e-books and e-book readers 		100,000	The project team will continue using the equipment purchased, including hardware and software.	to sustain the project impact by producing accessible learning materials for print disabled students upon project completion.
computer hardware	<ul style="list-style-type: none"> personal computer & software 	5	35,000		
	<ul style="list-style-type: none"> notebook computer 	1	8,500		
computer software	<ul style="list-style-type: none"> screen reading software 	4	44,000		
	<ul style="list-style-type: none"> magnifying software 	2	8,000		
Others	<ul style="list-style-type: none"> high-speed scanner & OCR 	1	100,000		
	<ul style="list-style-type: none"> projector & screen 	1 set	12,000		
	<ul style="list-style-type: none"> refreshable Braille displays 	4	100,000		
	<ul style="list-style-type: none"> note-taking devices 	2	80,000		
	<ul style="list-style-type: none"> scan & read devices 	2	40,000		
	<ul style="list-style-type: none"> embosser with audio & touch graphics aid & drawing pad 	1	65,000		
	<ul style="list-style-type: none"> CCTV with transformer 	2	30,000		

Note 1: for use by school / organization / in other projects (please provide details of the department / centre to which the asset will be deployed and the planned usage of the asset in activities upon project completion).

Note 2: areas related to educational use / sustain the project impact.

Report Submission Schedule

遞交報告時間表

I / My school / My organization commit(s) to submit proper reports in strict accordance with the following schedule:

本人/本校/本機構承諾準時按以下日期遞交合規格的報告：

Project Management 計劃管理		Financial Management 財政管理	
Type of Report and covering period 報告類別及涵蓋時間	Report due day 報告到期日	Type of Report and covering period 報告類別及涵蓋時間	Report due day 報告到期日
Progress Report 計劃進度報告 1/5/2011 - 31/10/2011	30/11/2011	Interim Financial Report 中期財政報告 1/5/2011 - 31/10/2011	30/11/2011
Progress Report 計劃進度報告 1/11/2011 - 30/4/2012	31/5/2012	Interim Financial Report 中期財政報告 1/11/2011 - 30/4/2012	31/5/2012
Progress Report 計劃進度報告 1/5/2012 - 31/10/2012	30/11/2012	Interim Financial Report 中期財政報告 1/5/2012 - 31/10/2012	30/11/2012
Final Report 計劃總結報告 1/5/2011 - 30/4/2013	31/7/2013	Final Financial Report 財政總結報告 1/11/2012 - 30/4/2013	31/7/2013