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SAUDI CENTRE FOR THE REHABILITATION
AND TRAINING OF BLIND GIRLS IN JORDAN

BRAILLE COMPUTER TRAINING MANUAL AND INFORMATION ACCESS GUIDELINES FOR THE BLIND IN THE ESCWA REGION

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Preface

The present manual within the overall framework of the project "Establishing the regional computer training centre for blind girls/women" in Amman, Jordan was prepared under the 1998-1999 programme of work of the Economic and Social Commission for Western Asia (ESCWA). The project is being jointly implemented by ESCWA and the Saudi Centre for Rehabilitation and Training of Blind Girls in Jordan. The document contains three parts: chapter I is a brief summary of the inception and progress of the project, and chapter II is a technical training manual on Arabic and English Braille for the computer. Chapter III contains a practical set of guidelines for ensuring accessibility for blind individuals in the ESCWA region.

The manual in the Arabic text, which contains two sections, one for teachers and one for students, is presently available in Arabic and Arabic Braille. It was originally scheduled to be published after the implementation of the first year of training, in order to reflect the actual operational input of the training process itself and to make it beneficial to the instructors and students in the future. Subsequently, its scope was expanded to enable it to be utilized widely by other Arabic trainers and trainees on Braille computer using similar equipment.

It is hoped that this document will be useful to any Arab institution initiating the establishment of a similar computer training centre for blind persons in the future. The document provides technical know-how that can be replicated and widely utilized in the region, in order to enhance the quality of life of blind persons.

This particular document is only one step in our continuing programme for improving the lives of disabled persons in the region. Readers' comments and contributions are welcome, as they will help to increase our knowledge of the size, characteristics and needs of disabled citizens in the Arab world. Such contributions, in turn, would facilitate the formulation of appropriate policies and programmes for blind individuals in the ESCWA region.

For blind readers, please note that this document is available in accessible formats (Arabic and English Braille and electronic format). These accessible documents can be obtained from:

Human Development Section
Social Development Issues and Policies Division
ESCWA
P.O. Box 11-8575
Riadh El-Solh Square
Beirut, Lebanon

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ESCWA also wishes to recognize Hala Jawhari, Director of the Centre, for her manifold contributions to the success of this project. A non-governmental organization, the Centre serves as both beneficiary and training site for this project.

Deepest appreciation is extended to the donor agencies for their generous financial contributions to this project, including the Arab Gulf Programme for United Nations Development Organizations (AGFUND) and the donors to the United Nations Voluntary Fund on Disability. Without their support, ESCWA could not have produced this document. Thanks are also extended to the Government of Saudi Arabia for its overall financial assistance to the Centre and to the Government of Japan for its contribution, under the auspices of the Japan International Cooperation Agency (JICA), of a Braille embosser and other peripherals, as well as the services of two experts.

Finally, ESCWA is most grateful for the ongoing support of His Royal Highness Prince Raad Bin Zeid, whose moral and in-kind contributions, including the donation of a Parkinson Braille typewriter and printer, greatly enhanced the merits of this project.

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I. ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA/SAUDI CENTRE FOR REHABILITATION AND TRAINING OF BLIND GIRLS JOINT PROJECT ON "ESTABLISHING THE REGIONAL COMPUTER TRAINING CENTRE FOR BLIND GIRLS/WOMEN" IN AMMAN, JORDAN

Pursuant to the World Programme of Action concerning Disabled Persons, and to General Assembly Resolution 43/98, which urges Member States to develop services and facilities to promote the rehabilitation and equalization of opportunities of disabled women, the Economic and Social Council adopted resolution 1991/21 on disabled women in which it recommended that United Nations agencies and regional commissions cooperate more closely at the operational level (with non-governmental organizations) to give continuing attention to issues involving women with disability.

In fact, Arab women and girls experience a double handicap. This results not only from their impairment but also from negative social attitudes. Disabled women have been denied the opportunity to realize fully their potential and to integrate into Arab societies, regardless of significant progress made towards improving the status of women in general. For example, disabled women's participation in the labour force is very limited in the region. The negative social attitudes towards impaired women constitute a social handicap and represent a much more serious problem than the impairment itself. Taking into consideration these factors, ESCWA organized the Regional Seminar on the Role of the Family in Integrating Disabled Women into Society, held in Amman from 16 to 18 October 1994. During the Seminar, the participants expressed the view that vocational training programmes for Arab disabled women were often too biased towards traditional skills such as sewing and knitting and did not meet the requirements of the current labour market. It was recommended that such training programmes should be adjusted to include more modern skills, such as computer operation.

Prior to this, ESCWA had undertaken a series of activities at the regional level related to issues of computer-based accessibility for disabled users. These included the technical study, *The Introduction, Adaptation and Transfer of New, Appropriate Technologies for Disabled Persons in the ESCWA Region* (E/ESCWA/SD/1992/5) and an exhibition of accessible technologies and technical aids, organized during the Conference on the Capabilities and Needs of Disabled Persons in the ESCWA Region, held in Amman from 20 to 28 November 1989.

In 1994, based on the recommendations following from these events and publications, ESCWA formulated for the consideration of potential donors a project document for Braille computer training. The project was designed to be carried out in collaboration with a local non-governmental organization. The project idea was positively received; in early 1995, the project document was officially signed by the donor agencies, and preparatory activities began. It was decided that the newly established Regional Computer Training Centre for Blind Girls/Women would be housed in the Saudi Centre for Rehabilitation and Training of Blind Girls, a local Jordanian non-governmental organization.

This project reflected a new endeavour for ESCWA, where the challenge was to implement an action-oriented operational project in the field of social development, working in cooperation with a local non-governmental organization. The latter was to be fully involved in the design, implementation and follow-up stages. Participation by outside volunteers was seen as an integral part of this innovative project. With a view to encouraging the spirit of volunteerism as well as the development of civil society, both international volunteers, such as those from Japan Overseas Cooperation Volunteers/JICA, and citizen volunteers were invited to contribute.

The project aimed at upgrading the literacy levels of Arab blind girls and women by training them in basic computer skills and at enhancing their employment opportunities in the open labour market. The main output of the project was the establishment of a regional computer training centre for Arab blind girls and women. The centre was to be utilized to train Arab girls invited from countries throughout the region, as well as

to train instructors at the regional level. The full utilization of the resources of this centre is viewed as crucial to the development of a pool of manpower resources for the region in the field of Arabic Braille training.

With these objectives in mind, the Regional Computer Training Centre for Blind Girls/Women was officially opened in April 1995, at the site of the Saudi Centre for the Rehabilitation and Training of Blind Girls in Amman.

Specialized equipment was required for the Centre. For this purpose, a German company, SUEBIA Marketing Services, was identified and contracted by ESCWA to supply Braille keyboard display terminals (the so-called "paperless Braille terminal" with eight Braille pins that pop up and down), and Arabic/English Braille software for text conversion. At the time, SUEBIA Marketing Services, with its Jordanian representative was the only available supplier in the market for user-friendly and widely-used Arabic Braille software and hardware. With this comprehensive system, the text is entered on a regular keyboard by a trained blind end-user and the output (processed text) is read on the paperless Braille display instead of on a standard computer screen. However, at the initial stage of the project, output was verified only through the Braille display, as the embosser printer was not yet available.

In 1997, the Government of Japan donated to the Centre SUEBIA's latest model of the Braille embosser printer, a standard Hwelitt-Packard printer and other peripherals, under their bilateral Overseas Development Agencies (ODA) scheme. Once the paperless Braille terminal was equipped with the embossed Braille printer, the preservation of permanent Braille text became feasible. As a result, it was possible to produce many Braille textbooks as well as this Manual in the form of permanent Braille documents for blind users.

The first phase of the project witnessed significant progress. The initial training programme was conducted during the scholastic year 1996/97. In the first half of the programme, training was carried out by the chief trainer and another part-time trainer from Japan Overseas Cooperation Volunteers (JICA). In the second half of the term, a full-time assistant teacher was contracted for more intensive training purposes. The two Braille terminals were utilized on a full-time basis, five days a week. A total of ten girls were successfully trained. The trainees were Jordanian students boarding at the Saudi Centre for Rehabilitation and Training of Blind Girls. By the end of June 1997, all ten trainees had successfully completed their training at the Centre with grades of either excellent or good. A graduation ceremony was held under the patronage of His Royal Highness Prince Raad Bin Zeid, who awarded a training certificate to each graduate.

In the second training phase, 1997/98, another group of eight Jordanian trainees enrolled at the Centre. Training was conducted by one instructor who functioned as a technical expert as well as full time teacher. The collection at the Centre's Braille library was expanded, and selected reading materials were made available in Braille to the students as well as to Braille readers from outside. In this connection, one of the graduates was contracted to type Arabic documents from audio tapes or live voice reading. The blind typist was to be assisted by sighted person(s) in reading as well as collecting the texts to be typed. Also, another blind instructor was to be trained, on an experimental basis, in order to ensure sustainability of this training. In the future blind graduates of the program may be able to train other new trainees at the Centre.

In view of the progress so far achieved by this project, and within the purview of the project's future training phase, ESCWA initiated an expansion of the programme in order to accommodate a number of trainees from the Gulf Cooperation Council countries as well as from other ESCWA member countries and areas outside Jordan, including Lebanon and the West Bank. Beginning in September 1998, a group of Jordanian and Palestinian guest students were expected to initiate training at the Centre, with a few students from the Gulf joining later on. Project funds are expected to cover their travel and the Centre initiate training will offer the full-board accommodation at its dormitory for the duration of training (two months).

ESCWA hopes to replicate this project in other countries and areas of the region, provided that the necessary funds are made available. ESCWA is already assisting in the establishment of a Braille computer project for a non-governmental organization in the West Bank, which is the first independent, a satellite project born out of this regional project. Another new effort is underway to establish a national Braille centre in Beirut, which will function as a regional Arabic Braille document library as well as the headquarters for the Lebanese national Braille network. The Beirut project is expected to utilize fully the Internet, a technology which was not readily available in the region at the inception of this project.

II. GUIDELINES FOR ACCESSIBILITY OF BLIND INDIVIDUALS TO ELECTRIC INFORMATION

Introduction

Technology transfer from the industrialized to the non-industrialized countries and across significantly different language and cultural groups, as envisaged within the new international economic order and the emerging global technological environment, will ultimately benefit everyone in these countries, particularly individuals with disabilities.

A recent review of the impact of technology on employment by a high-level panel at the National Academy of Sciences in the United States of America reported that technological change is an essential element of a dynamic, expanding economy. It confirmed that both current and projected levels of technological change would not produce a significant increase in unemployment, although some individuals might face painful and costly adjustments. This conclusion is based on the fact that the increase in productivity that accompanies technological change will raise incomes and the standard of living for those workers who are still employed. Workers whose wages rise will find themselves able to consume more, and this in return will create more employment for workers in other industries such as the service sector. The current recovery and dynamic expansion of the economy of the United States support the view that after all aggregate adjustment has taken place, more people are at work and at higher wages overall than before.[1]

For disabled persons, technology is a powerful tool and a gift. For able-bodied persons, technology simply makes things easier, but for people with disabilities, technology makes things possible. An example of this is the personal computer (PC), which allows individuals to perform certain tasks faster and more efficiently than they otherwise could. Access to the Internet among other things, makes it possible for people to purchase goods displayed on the monitor of their PCs. Another advance in technology, interactive television, allows people in the industralized countries to do their banking, reserve seats on flights and purchase tickets merely by pressing a few keys on the remote control. Electronic mail (e-mail), the marriage of the telephone modem and the computer, is now available to almost everyone in the developed countries as well as in many developing ones. E-mail has also made it possible for some employees to work at home.

For blind persons, the PC has a most profound significance. It can provide a sense of personal accomplishment as well as a means for achieving economic independence. It can also offer them freedom from the isolation that is often the result of their impairment. Computers can also talk to the blind and respond to the commands of those who cannot manipulate keyboards. By means of the Braille display or speech synthesizer, blind users can "read" nearly all documents in electronic format. With the assistance of the same devices, blind end-users in the industrialized countries are accessing information networks on the Internet, where they can read daily newspapers that are updated constantly. They can also search for information, study the information retrieved and output data in Braille, speech or large print format, according to their preferred mode. All of these technologies can be transferred to the ESCWA region. With this in mind, a pilot project on computer training for blind girls and women was initiated by ESCWA in 1996. For this project, regular personal computers were connected to special peripheral devices, the SUEBIA Marketing Services' electronic Braille display terminal (EBT-144) and the Braille embosser printer (Magnum 860 I). Professional Arabic/English bilingual Braille software (Professional Braille version 2.20) was also utilized for this pilot project. Significant progress was made during the first two years of this project, achieving basic computer literacy among the blind girl trainees. It is hoped that this project will be replicated widely in the Arab region, ensuring the accessibility of blind persons to electronic information as well as to written documents.

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[1] International Labour Office, *New Technologies and the Employment of Disabled Persons*, edited by H. Allan Hunt and Monroe Berkowitz (Geneva, International Labour Ogranization, 1992).

Documentation for this training manual is available for blind end-users in Arabic and in Arabic and English bilingual Braille format. The English version of the manual will be available in 1999.

This ongoing pilot project on "Establishing the regional computer training centre for blind girls/women" in Amman is innovative in its nature. While it is desirable for its scope to be expanded and for the project to be replicated in the entire Arab (or Arabic-speaking) region, it is at the same time very important to develop practical guidelines at the regional level for acquisition, planning and procurement in order to ensure the accessibility of blind users, or blind employees, to electronic office equipment. These guidelines could be widely used by academic institutions, government agencies and even private enterprises. In this regard, the models in the United States (*Guidelines for Implementation of Section 508 of Public Law 99-506)* and Japan ("Japanese Electronic Equipment Accessibility Guidelines" by the Humanity Electronics Research Committee of JEIDA, the Japan Electronic Industry Development Association) may be used as a reference in developing accessibility guidelines/laws in the region. Furthermore, guidelines listed in the accessibility and communication section of the *Agenda for Action for the Asian and Pacific Decade of Disabled Persons 1993-2002*[2] were used in developing the preliminary guidelines listed below prepared by the Economic and Social Commission for Western Asia for blind end-users and manufacturers in the Arab region. However, it is recommended that this preliminary set of guidelines be refined and further developed; the opinions and comments of regional experts are invited in order to help to produce a more comprehensive set of guidelines on information accessibility for blind and other disabled users in the entire ESCWA region.

The suggested guidelines are composed of three main sections. The first section includes a tangible set of recommendations for immediate implementation. The second section contains medium-term guidelines for implementation. Finally, the third section details long-term guidelines for manufacturing and procurement in the workplace and for documentation. The target date for the actions contained in the first set of recommendations is at or before the end of the year 2000. The time frame for the second set of guidelines is 2005, and the long-term guidelines may be achieved by 2010.

A. GUIDELINES FOR IMMEDIATE IMPLEMENTATION

The first set of guidelines should be implemented immediately, as the technologies required are already available and actions can be taken with the addition of a reasonable level of financial support:

1. Efforts should be made to increase the availability of personal computers and other electronic equipment that blind users may operate with special peripherals (special aids that provide access to electronic equipment), such as large print displays, Braille display keyboard terminals, Braille embosser printers, speech synthesizers for output and Braille keyboards for input;

2. In institutions providing services for blind users, such as schools, vocational rehabilitation centres and public libraries, efforts should be made to introduce Arabic/English Braille computer equipments including Braille display keyboard terminals and high-speed Braille embosser printers. The former are a pre-requisite for computer training of blind individuals, and the latter are required to emboss Braille texts and build up Braille document libraries.

3. With respect to the above-mentioned Arabic/English Braille computer equipment, the high quality products by SUEBIA Marketing Services[3] or by similar companies, that offer bilingual products in Arabic and English would be of great use for blind individuals in the Arab countries;

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[2] *Agenda for Action for the Asian and Pacific Decade of Disabled Persons 1993-2002*, for the region served by the Economic and Social Commission for Asia and the Pacific (ESCAP); and resolution 48/3 adopted by the General Assembly at its forty-eighth session.

[3] SUEBIA Marketing Services of Schorndorf Germany may be contacted at tel. 49-7181-979307 or fax 49-7181-979306, Grundackerweg 42, 73614 Schorndorf, Germany, Geschaftsfuhrer, Peter Wassermann, HRB 1135 Schorndorf, USt. – IdNr. DE 1.466.18.252. The contact person is Peter Wassermann.

4. The training manual (chapter II) will serve as a very useful textbook for those instructors who undertake the training of blind students for the first time. Experienced instructors will also be able to use this manual for reference purposes;

5. At the regional level, there should be a mechanism for the exchange and dissemination of electronic Braille documents in order to avoid duplication of work. In this regard, in the future, modem communication systems fully utilizing the Internet may serve to transmit documents between two remote service stations;

6. Regarding documentation, all disability-related background papers, final reports and proceedings of meetings should be made available in electronic format, in ASCII text so that blind users can read them with an accessible output device (Braille display keyboard terminal, large print, embosser) of their own choice. Attention should be given to the fact that a blind user cannot read ordinary printed materials;

7. Owing to the lack of qualified Arabic Braille instructors, the training of instructors should be promoted in order to enlarge the pool of human resources in the region. This ESCWA pilot project may function as a regional training center for Arabic Braille instructors;

8. Other institutions serving the blind in the Arab region should consider replication of the joint ESCWA/Saudi Centre for Rehabilitation and Training of Blind Girls project on "Establishing the regional computer training centre for blind girls/women".

B. GUIDELINES FOR INTERMEDIATE IMPLEMENTATION

It is anticipated that the following guidelines would be implemented within a few years' time, as the technologies required for implementation are under development. The financial resources needed for implementation are also relatively limited.

1. Regarding the input of English texts, the combination of scanner and Optical Character Recognition (OCR) may be used as an alternative to typing; however, good quality Arabic OCR has not yet been developed, signifying an urgent need for the development of this capability;

2. For English documents, a speech synthesizer may be used as alternative to Braille reading. A speech synthesizer is particularly effective for blind users who lost their eyesight in adulthood or for those who cannot read Braille well. In this regard, there is an urgent need to develop a high quality Arabic speech synthesizer;

3. Computer user manuals stored on electronic media should be accessible to blind persons. At present almost all computer manuals are prepared with visible characters and this situation is extremely unfavourable for blind users. However, today, almost all printed Arabic materials are processed with word-processors, and with a slight additional workload, this type of electronic information could be arranged in an electronic manual that blind end-users could read by the use of Braille print, a Braille keyboard display terminal, large print or synthesized voice;

4. In relation to the above-mentioned provision of documentation, the publishers of books in Arabic should guarantee blind individuals' access to the printed texts in electronic data format, allowing some flexibility in copyright regulation;

5. With the intensive use of Arabic Braille terminals, the market for these products should expand, consequently reducing their unit price, so that individual blind speakers of Arabic could afford these peripherals.

C. GUIDELINES FOR LONG-TERM IMPLEMENTATION

The following guidelines were prepared in accordance with the existing accessibility guidelines in developed countries such as the United States and Japan. As guidelines for the region they are ambitious, and continuous intensive efforts at the regional and national levels will be required for their effective implementation. However, for those who employ disabled individuals, such as public sector agencies, these will serve as a benchmark for the preparation of similar guidelines. Also, local manufacturers of Arabic software and hardware (either Arab companies or foreign ventures) can utilize such guidelines, in order to reach all segments of population and expand their markets.

1. *Guidelines for manufacturers*

(a) Manufacturers of Arabic software should provide a tactile means for recognition of the function keys (Esc, Del, Print screen), with a view to reducing the time lost in searching. Manufacturers may consider providing replacement keycaps printed with Braille characters or adhesive tape printed with Braille or other tactile symbols for application to the key tops;

(b) It is recommended that manufacturers disclose the connection interface specifications of the standard keyboard or alternative input device since such disclosure would make it easier to design the latter device. Information to be disclosed should preferably include not only electrical specifications, but also information necessary for the performance of applications;

(c) It is recommended that manufacturers of Arabic products provide a function that enlarges the display by specifying any area of the character screen, including the input work area on the display, by means of the cursor moving key on the keyboard or a mouse. A function that brings up an expanded graphic screen is also recommended for low-sight users. Magnification should be within a range of 2 to 15 times;

(d) As Windows is the most widely used operating system, a viable solution for Windows in Arabic for blind users should be found.

2. *Guidelines for the work place*

(a) Both public and private agencies/companies should be encouraged to make sure that both handicapped and able-bodied employees have equal access to electronic office equipment such as computers;

(b) Employers should ensure that blind users are supported in manipulating data and related information resources to attain end results equivalent to those of able-bodied employees;

(c) Government offices and other public sector agencies should welcome vendor creativity in meeting the functional requirements of blind employees. Vendor solutions may range from third-party solutions (separate hardware and software products) to built-in hardware enhancements. Operating System (OS) enhancements such as speech-synthesized OS ("talking" DOS) should be encouraged;

(d) As an alternative to the above-mentioned enhanced OS solutions, the layering method, which is the inclusion of additional levels of special software between the operating system and the blind end-user, should be considered. This, however, could limit the mobility of employees using such equipment at different worksites;

(e) For the users of speech-synthesized output, a headset and jack or a speaker with a volume control knob should be available so that blind employees will not disturb others;

(f) Employers should ensure that blind users have full access to work-related documents and be responsible for supplying copies of them in ASCII format, suitable for computer-based Brailling or speech output.

3. *Guidelines for setting up national legal provision for accessibility*

(a) In order to promote the accessibility of blind individuals to information and enhance their working environment in the Arab world, serious efforts should be made to develop a set of guidelines for accessibility at the national and regional levels;

(b) Accessibility guidelines already established in the developed countries may be used as a point of reference to achieve this objective. In Japan, information processing equipment accessibility guidelines were issued in 1990. These were developed with the cooperation of the Japan Electronic Industry Development Association. The Committee for Diffusion and Promotion of Development of Information Equipment Capable of Coping with Requirements from Physically Handicapped worked out these guidelines. Finally, the Ministry of International Trade and Industry (MITI) endorsed them as a measure to encourage Japanese manufacturers to follow them. Although these guidelines are not compulsory in nature, historically the leverage of MITI guidelines in Japanese industries is powerful and cannot be underestimated;[4]

(c) In 1986, the Congress of the United States re-authorized the Rehabilitation Act of 1973, as amended (Public Low 99-506), adding section 508 on electronic equipment accessibility to ensure that disabled persons may use electronic office equipment with or without special peripherals. Congress mandated that these guidelines for electronic equipment accessibility be established and adopted and that public agencies should comply with them with respect to electronic equipment, whether purchased or leased. Section 508 of Public Low 99-506 placed new responsibilities on the Department of Education and the General Services Administration. The guidelines also made a significant impact on the development of the above-mentioned Japanese guidelines, across the board. The Guidelines *Access to Information Technology by Users with Disabilities,* as well as additional information can be obtained from the Department of Education and the General Services Administration of the Government of the United States;

(d) In addition, the United Nations publication, *Standard Rules on the Equalization of Opportunities for Persons with Disabilities* includes several recommendations related to accessibility. Copies of *Standard Rules* can be obtained from the Disabled Persons Unit, Department for Policy Coordination and Sustainable Development, United Nations, Room DC2-1302, New York, NY 10017;

(e) Many other publications related to the accessibility of disabled users to electronic information exist;

(f) It is highly recommended that a meeting on the development of guidelines to ensure accessibility for disabled persons be held at the Arab regional level. Such regional intervention is desirable owing to the common language (Arabic) in the region and the potential for market expansion and the reduction of unit prices of special hardware, software and peripherals.

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[4] Further details about these guidelines can be obtained from: Electronic Equipment Division, Machinery and Information Industries Bureau, Ministry of International Trade and Industry, Kasumigaseki 1-3-1, Chiyodaku, Tokyo 100, tel. 81-03-3501-1511 (ext. 3341); fax 81-03-3580-6073; or from the Systems Section, Information Industry Department, Japan Electronic Industry Development Association, Machinery Industry Promotion Board, 3-5-8, Shiba-Koen, Minato-ku, Tokyo 105, tel. 81-03-3433-1923; fax 81-03-3433-6350.