

**Educating Blind and Visually Impaired
Students: Policy & Strategy**

Socio- Academic Approach

“A Practical Experiment - Al-Quds Open University”

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هدفت هذه الدراسة إلى تسليط الضوء على فئة مهمشة في المجتمع الفلسطيني بشكل عام وفي المستوى الجامعي بشكل خاص ألا وهي فئة الطلبة المكفوفين والمعاقين بصريا في الجامعات الفلسطينية، و تم استنباط هذه الدراسة من التجربة العملية و الرائدة التي قامت بها جامعة القدس المفتوحة في مجال تأهيل و تدريب الطلبة المكفوفين في المستوى الجامعي.

وقد أدرج الدارس في هذه الدراسة الوسائل و الطرق المتبعة في تعليم المكفوفين في المستوى الجامعي و آلية التعامل معهم و آليات الامتحانات و التقييم و المؤهلات التدريبية اللازمة للمدرب، هذا بالإضافة إلى الوسائل و الأدوات التدريبية المساعدة.

وفي نهاية هذه الدراسة تحدث الدارس عن التجربة العملية التي قادتها جامعة القدس المفتوحة في مجال تأهيل و تدريب الطلبة الجامعيين من ذوي الإعاقات البصرية و الآليات و أدوات التدريب، أسلوب التقييم، الإنجازات والمشاكل التي ظهرت خلال و بعد عملية تدريب الطلبة المكفوفين.

وقد توصلت الدراسة بأن هناك حاجة ماسة لتسليط الضوء و إعطاء أهمية أكبر للطلبة من ذوي الإعاقات البصرية في المستوى الجامعي و لا بد من تعميم تجربة جامعة القدس المفتوحة في جميع الجامعات الفلسطينية الأخرى.

و تقدمت الدراسة بعدد من التوصيات كان منها :

- 1- الحاجة إلى زيادة الوعي عن وضع المكفوفين و حاجاتهم في المجتمع الفلسطيني و المؤسسات العاملة فيه.
- 2- المدرسين الأكاديميين لا بد أن يملكوا المعلومات الأساسية في كيفية التعامل و تعليم الطلبة المكفوفين.
- 3- لا بد أن يكون هناك دعم مادي و تربوي أكبر للطلبة من ذوي الإعاقات البصرية.
- 4- لا بد من أرباب الأعمال توفير فرص عمل أكثر للطلبة الخريجين من ذوي الإعاقات البصرية.
- 5- لا بد من توفير بنية تحتية مناسبة في الأماكن العامة لذوي الإعاقات البصرية.
- 6- لا بد من توفير مصادر المعلوماتية بشكل أكبر لذوي الإعاقات البصرية، خاصة في المكتبات العامة.

Abstract

The purpose of the study is to highlight a marginalized sector in the Palestinian society and particularly at the university level, which is represented by the visually impaired and blind students.

This study was derived from the practical and exceptional experiment which was launched by Al-Quds Open University in rehabilitating and educating the visually impaired and blind students at the university level.

The researcher has pointed out not only the techniques and mechanisms of educating blind students at the university level but also the ways to deal with them and the mechanism of testing and evaluating those students. Further attention is given to the required qualifications and skills that the educator of blind and visually impaired students should have along with the training equipments and tools.

At the end of this study the researcher discussed and covered the practical experiment which was led by Al-Quds Open University in rehabilitating and educating blind and visually impaired students at the university level, focusing on the mechanism of educating those students and the educating tools and equipments. The study is also dealing with the evaluation method, the achievements and obstacles that were found during and after the training process.

The conclusion of this study indicates that there is an essential need to focus more on those students who have visual impairments at the university level and the experiment of Al-Quds Open University should be followed by other Palestinian universities.

This study presents some recommendations in the field of educating and rehabilitating blind and visually impaired students. Some of these recommendations are:

- 1- The awareness of blind needs should be raised in the Palestinian society and its organizations.
- 2- There should be more financial and social support for rehabilitating and training visually impaired students.
- 3- Employers should afford more employment opportunities for trained blind students after their graduation.
- 4- There should be well prepared and planned infrastructure in public places for blind people.
- 5- Knowledge resources should be available for blind people especially in public libraries.
- 6- The university academic staff should have the minimum knowledge of how to deal with and teach blind students.

Table of Contents

.....	2
Abstract.....	3
1-1 Introduction	6
2-1 Study Problems	6
3-1 Study Objectives	7
4-1 Study Importance	7
5-1 Terminology	7
1-2 Study Literature	9
1-1-2 Computer-Related Training.....	9
2-1-2 Working with Visually Impaired Students and General Courtesy.....	10
3-1-2 Guiding Blind Students inside the Classroom:	10
4-1-2 Guiding Blind Students outside the Classroom:	11
5-1-2 Educating Students with Visual Disabilities	12
6-1-2 General Strategies of Educating Students with Visual Impairments	13
Printed Material.....	13
Lectures.....	13
Practical and Fieldwork.....	15
Educator Presentation	15
Laboratory	15
Group Interaction and Discussion	16
Reading	17
Research.....	17
Testing.....	17
7-1-2 General Classroom Modifications.....	18
8-1-2 Educator Qualifications & Skills.....	18
1-2-2 Assistive Technology	19
2-2-2 Purpose of Assistive Technology	19
3-2-2 Types of Assistive Technology	19
1-3-2-2 Writing Technology	19
2-3-2-2 Reading Technology	20
3-3-2-2 Listening Technology	21
4-3-2-2 Memory Technology.....	21
4-2-2 what assistive technology issues should be addressed in Education?.....	22
5-2-2 Buying a Computer for Blind or Visually Impaired Persons	22
Al-Quds Open University Learning Approach	24
1-3 The Practical Experiment of Al-Quds Open University in Educating Blind and Visually Impaired Students.....	24
2-3 Training Tools and Equipments	24
1-2-3 Screen Reader (JAWS 6.1).....	24
2-2-3 Braille Screen	25
3-2-3 Braille Embosser	25
4-2-3 Win Braille	25
3-3 Training Tracks.....	25
4-3 Evaluation Method	25

5-3 Training Process Procedures	26
1-5-3 Pre-Training Procedure	26
2-5-3 Training Procedure	27
6-3 Obstacles.....	28
7-3 Prospective Development and Improvement.....	28
8-3 Conclusions and Results.....	28
9-3 Recommendations	29
Bibliography	30

1-1 Introduction

The world of technology is going to its maximum growth at the academic levels. This growth covers most of the students sectors regardless to their levels. However, the most marginalized student sector is represented by the disabled students. Disabled students are only part of a wider picture. Thus, this study is attempting to focus on a unique learning approach that Al-Quds Open University adopted and dedicated all human and material efforts in order to achieve and realize its noble goals.

Some blind and partially sighted students are educated in mainstream schools alongside sighted students. Others may attend special schools for blind and partially sighted children or special schools with other physical or learning disabilities, but not at college or university levels.

The experiment of Al-Quds Open University is considered as an unprecedented step in learning approaches since such experiments are not found in all other Palestinian universities except the Islamic University in Gaza.

The approach of Al-Quds Open University in rehabilitating and educating blind and visually impaired university students came from the deep conviction and belief of Al-Quds Open University that students with disabilities have the same right to access the world of technology compared with their sighted peers. This can be achieved through enrolling them into a normal academic life, strengthening their academic expectations and bridging the gap that has too often existed between what students with disabilities learn and what is required in regular curriculums. This will promote the students' independence and economic well-being and enhance their quality of life through using the latest technology combined with time-tested adaptive methods.

At the end of this study all audience will be exposed to various blind and visually impaired education-related outlooks such as assistive technology, education courtesy, working with blind students, guiding blind students inside and outside the classroom, methods of education, testing & evaluation, the classroom environment, educator qualifications and skills, training equipments and tools, obstacles, recommendations and conclusion. Moreover, the audience will be exposed to the practical experiment of Al-Quds Open University as a new learning approach- *facts and achievements*.

1-2 Study Problems

The study tried to focus on the following problems found in the Palestinian universities:

- 1- The lack of knowledge in educating and rehabilitating visually impaired students;
- 2- The lack of resources in educating the visually impaired students.

Therefore, this study is attempting to focus on the real needs of blind and visually impaired students at university level and presenting the essential methods and techniques in educating, rehabilitating, testing and evaluating blind students. Beside that, the study draws attention on the practical experiment of Al-Quds Open University in rehabilitating and educating blind and visually impaired students.

1-3 Study Objectives

The objectives of the study are the followings:

- 1- To present the appropriate methods and techniques in educating blind and visually impaired students at university level.
- 2- To demonstrate the obstacles that the blind and visually impaired students face in the Palestinian universities.
- 3- To present the practical experiment of Al-Quds Open University in educating and rehabilitating blind and visually impaired students.
- 4- To figure out some recommendations which will help in raising the academic performance of those students who have visual impairments.

1-4 Study Importance

The importance of the study comes from:

- 1- Its uniqueness: this study is considered one of the few studies that deal with blind and visually impaired students at university level.
- 2- The coverage of the scientific methods in educating and rehabilitating blind and visually impaired students.
- 3- The coverage of the practical experiment of Al-Quds Open University will be considered as a new learning approach at the Palestinian universities in learning disabled students.
- 4- The results of this study may change the way of educating blind and visually impaired students especially at university level.

1-5 Terminology

Disability: it can be defined as a restriction or lack (resulting from an impairment) of ability to perform any activity within the range considered normal for a human being.

Visual impairment: it is the consequence of a functional loss of vision, rather than the eye disorder itself. Eye disorders which can lead to visual impairments can include retinal degeneration, albinism, cataracts, muscular problems that result in visual disturbances, corneal disorders, diabetic retinopathy, congenital disorders and infections.

The terms **partially sighted, low vision, legally blind, and totally blind** are used in the educational context to describe students with visual impairments. They are defined as follows:

1. "Partially sighted" indicates a type of visual problem that brings a need for special education;
2. "Low vision" generally refers to a severe visual impairment, not necessarily limited to distance vision. Low vision applies to all individuals with sight who are unable to read the news at a normal viewing distance, even with the aid of eyeglasses or contact lenses. They use a combination of vision and other senses to learn, although they may require adaptations in lighting or the size of print, and sometimes, Braille;

3. "Legally blind" indicates that a person has less than 20/200 vision in the better eye or a very limited field of vision (20 degrees at its widest point);
4. Totally blind students learn via Braille or other non-visual media.

Total blindness only accounts for about 10% of those with severe visual impairments.

Approximately 80% of visually impaired students have some usable vision.

Large Print: is defined as that text font has a size of 16 point or more: it is one of the simplest ways of increasing accessibility for students with a visual impairment.

Research carried out by the Royal National Institute for the Blind showed that 36% of blind and 75% of partially sighted people are able to read large print comfortably.

Braille: is a system based on sequences of raised dots to represent letters and words. Moon is a similar system to Braille, but with raised shapes rather than dots. It takes a long time to become fluent in Braille, and is mainly used by those people who are visually impaired when young, rather than those who lost their sight due to old age. Although the actual numbers of Braille users is small, it is a useful medium, and can also be used by deaf blind people. Diagrams, tables and other pictorial information can be produced as a tactile diagram of raised lines.

Tactile graphics: are images that are designed to be touched rather than looked at. The concept and content of the graphic are represented by a set of tactile symbols selected to be easily read and understood.

Magnification software: The majority of computers currently being produced have some kind of magnification software, which can be used to view any information on the screen in the required size. In Microsoft Windows, look under: Programs — Accessories — Accessibility — Magnifier. Windows 95 also has accessibility options whereby the resolution, color and size of the text can be changed. Other more specialized magnification software is also available commercially.

CCTV Cameras: can also be used to enlarge printed text where magnification software is not practicable. A CCTV camera can be used to enlarge books maps, journals etc, without the need to scan material into a computer. It is also useful for enlarging reference material that is problematic to remove from the libraries.

Specialist software: Voice activated software is used by some visually impaired students which allow the student to dictate information into the computer so that it can be produced in the required medium. Software can also be used to read back what the student has written.

Audio tapes: Lectures and seminars can be recorded onto audiotape for referral at a later date, or to be transcribed into another medium.

Readers: transfer material from text media onto audio tape for the visually impaired student to listen to.

Note takers: Some visually impaired students may require a note taker to attend lectures with them. This allows the student to concentrate on information presented in the lecture. The note taker is often an undergraduate or postgraduate student.

Amanuenses: An amanuensis (scribe) may be used in exam situations. The amanuensis is usually a graduate student from a related Academic Department, with an understanding of the subject and of the terms which may be used. The amanuensis writes only what the blind student says and does not help or advise the student on the subject.

Mobility Trainers: A qualified mobility trainer guides the students around the University campus and the surrounding area so that they become familiar with the environment. Students can also be taught routes (both walking and public transport) to the University from their accommodation, and routes to any placements that may be part of their study.

Non medical helpers: Non medical helpers are recruited to support the student in different ways: for example, they may collect and return the student's library books, undertake practical work under the student's instruction, and generally do practical tasks that the student finds difficult because of their visual impairment.

Braille label maker or Braille Labeler: It is a device which makes embossed Braille labels on a wide adhesive tape with a removable backing. With the backing removed, the label can be stuck to most non-porous surfaces. Braille Labeler can also be found as software but in this case it should be combined with Braille embosser.

P.S. For more related definitions, see the Assistive Technology section

2-1 Study Literature

Literacy is the ability to read fluently and understand materials in the appropriate medium. It is important for a student:

- To get appropriate instruction in his chosen medium. That includes homework assignments and adequate instruction time every day.
- To be given training and access to the medium most suited to his/her needs. If the student can read print but can only do one letter at a time, Braille is more appropriate.

The choice of medium should not be dictated by which is easier to teach, but by which is more beneficial to the student.

2-1-1 Computer-Related Training

In case you are using computer-related training materials then here are some general usage rules for visually impaired students which will help them to minimize the eye discomfort:

- Ensure the height of the computer screen is below normal eye level — this is particularly important for users of bifocal glasses.
- Sit further away from the screen, because eye strain increases as tasks are closer.
- Reduce the brightness level of the screen.
- Reduce reflective glare from the screen by using a polarized filter.
- Balance the illumination on documents used at the computer to that of the screen.

- Take regular breaks.

Here are some general design rules that can help to ensure that the visually impaired student will be able to read from the screen:

- Adopt relatively simple fonts, or those that are more similar to those encountered in everyday reading.
- Keep the lines of the texts relatively short.
- Avoid visual distractions e.g. bold colors, flashing and moving elements.
- Keep backgrounds plain to avoid visual interference with text.
- Provide clear signposting and navigation.
- Ensure that all images have text tags describing their contents.

It should be noted that many of the above guidelines will make it easier for everyone to read Web-based documents from the screen and especially that web-based curriculums are coming widely in remote-distance learning approaches.

2-1-2 Working with Visually Impaired Students and General Courtesy

Sighted people (students and educators) used to look at blind and visually impaired people as an abnormal group and think that the disabled people always need to be helped and compassioned since they are poor people. The presence of all these ideas is caused by the wrong way of dealing with blinds. Both sighted and visually impaired people have the same rights and duties, but each has his/her own means of living according to his/her own needs.

Blind and visually impaired students should be treated normally and **do not** try to make the disabled individual feel that he/she is underestimated or isolated.

The following paragraphs contain some tips which will guide an educator on how to deal with visually impaired students:

2-1-3 Guiding Blind Students inside the Classroom:

- Identify yourself by name: don't assume that the student who is visually impaired will recognize you by your voice, even if you have met before.
- Tell the students if a room they are familiar with has been rearranged.
- Don't leave obstructions where they walk.
- Don't worry about using phrases that refer to sight, e.g. 'see you later', as most visually impaired people would not be offended.
- When working in a group of people like a seminar and this group includes a blind person then ask everyone to introduce himself/herself, so that the blind person knows who is in the room.
- Speak to the class upon entering and leaving the room or site.
- Call the student with vision impairment by name if you want his/her attention.
- Seat the student away from glaring lights (e.g. by the window) and preferably in front of the class.

- Use descriptive words such as straight, forward, left, etc. in relation to the student's body orientation. Be specific in directions and avoid the use of vague terms with unusable information, such as "over there", "here", "this", etc.
- Describe, in detail, pertinent visual occurrences of the learning activities.
- Describe and tactually familiarize the student to the classroom, laboratory, equipment, supplies, materials, field sites, etc.
- Give verbal notice of room changes, special meetings, or assignments.
- Offer written information to a person with a visual impairment, when appropriate.
- If possible, order the appropriate text books for the students in their preferred medium.
- If you are asked to guide a student with a visual impairment, identify yourself, offer your services and, if accepted, offer your arm to the student's hand. Tell them if they have to step up or step down, let them know if the door is to their left or right, and warn them of possible hazards.
- Orally, let the student know if you need to move or leave or need to end a conversation.
- If a student with a visual impairment is in class, routinely check the instructional environment to be sure it is adequate and ready for use.
- Be understanding of the slight noise made by writing machines. (i.e. Perkins Machine)
- Use an auditory or tactile signal where a visual signal is normally used.
- Always notify changes of class schedule in advance.
- It is not necessary to speak loudly to people with visual impairments.

2-1-4 Guiding Blind Students outside the Classroom:

- Ask if assistance is required but don't assume that it is. A person may wish to be guided or just require some directions.
- Ask how the person would like to be guided - some people will take your arm, others would prefer you to take their arm.
- If the person wishes to be guided, stand next to him/her and let him/her hold your arm just above the elbow. This means that the blind person will be walking slightly behind you, and will have advance warning of any changes in direction you may make.
- Walk at the blind persons pace.
- Explain changes in ground surface, for example moving from carpet onto tiles.
- Explain where you are going and what is happening, for example when you are waiting to cross the road, approaching obstacles, entering different rooms.

- When approaching stairs, explain whether they go up or down and approximately how many steps there are. Allow the blind person to be between you and the handrail.
- Don't leave people 'stranded'. If you are leaving them alone, make sure they have a wall or chair to hold, and they know where they are.
- Take your cue from the blind person. Ask if you are unsure of anything.

2-1-5 Educating Students with Visual Disabilities

In the traditional approach of hiring educators, an applicant for a job as educator in any special school for blind and partially sighted students must be qualified. With this qualification and suitable experience no further special training is necessary as a prerequisite to appointment (although most schools for blind students prefer to appoint staff who have some previous educating experience in mainstream schools). But, according to our classical approach of hiring academic staff at universities, these qualifications are not required for three main reasons as follows:

- 1- Local Palestinian Universities are not specialized rehabilitation centers for those visually impaired students.
- 2- University students are a combination of both sighted and visually impaired with a majority of sighted students.
- 3- The study at college level has a variety of major specializations which make it difficult to train all educators on how to train and teach the visually impaired students.

As a result there are some common techniques and methods which will enable our educators to teach those visually impaired students easily without any extra special training.

Students with visual impairments are constantly challenged by classroom instructional strategies. Although they can easily hear lectures and discussions, it can be difficult for them to access class syllabi, textbooks, overhead projector transparencies, maps, videos, written exams, demonstrations, and films. A large part of traditional learning is visual; fortunately, many students with visual disabilities have developed strategies to learn.

These students vary considerably. For example, some have no vision; others are able to see large forms; and still others can see print if magnified. They use a variety of accommodations, equipments, and compensatory strategies based upon their widely varying needs. Many make use of taped textbooks, extended time for exams or projects, a reader/scribe during exams, large print books, adaptive transportation, and Brailled materials.

For many students, advancements in modern technology have made learning much more accessible. Visually impaired students can utilize enlarged print or synthesized voice adaptations on the computer. Machines are available to enlarge the print of any printed material, to convert printed material into Braille, or convert printed material into a synthesized voice. Some students also use talking calculators or a tape recorder.

Visually impaired people are only limited in their ability to learn by the quality of their adaptations. In other words, once the problems stemming from their poor vision are dealt with and the appropriate modifications made to their program, regular performance should be expected of those for whom visual impairment is the only disability.

2-1-6 General Strategies of Educating Students with Visual Impairments

The various strategies given below will work for most vision impaired students but some will not. The degree of impairment and the student's background and training (like the degree of proficiency in Braille) will affect the usefulness of the various strategies and suggestions. The student with vision impairment will most likely need assistance in accessing instructional materials, taking notes, and/or taking tests. Accessible description will be necessary for pictures, graphics, or displays; the student's identification queries; and differentiation of items where touch will not discriminate; and in orientation and mobility aspects in unfamiliar situations.

- Bring to the student's attention
- A wide selection of magnifying devices are available that can be used by visually impaired students to assist persons in reading or working with objects that need to be observed.
- A screen reader can be used to read a computer screen to a visually impaired student.

Printed Material

- Handwriting is often difficult for visually impaired students to read. If you are marking work, use a black felt tip pen for maximum visibility, and write legibly.
- Provide printed material in the student's preferred format, for example Braille or large print.
- Use printed transparencies, rather than handwritten overheads.
- Use a clear font such as Arial or Comic Sans.
- Use font size 16 point or above.
- Keep the layout clear and simple.
- Avoid text on a patterned background.
- Printing on colored study may make text easier for some visually impaired students to read. Black text on a yellow background provides maximum contrast.
- Avoid using red and green ink.

Lectures

In general, the following is a list of suggestions that may assist an educator in instructing students with visual disabilities.

- Visually impaired students may need preferential seating. Student should be seated near the front of the class to hear clearly what is being presented and to see as much as possible. However, the student should be allowed the same anonymity as other students. Avoid pointing out the student or the alternative arrangements to the rest of the class.
- Get to know the visually impaired student early in the semester. Meet with him or her and find out what, if anything, she/he can see.

Approximately 80% of visually impaired students have some usable vision.

Like everyone, students with vision impairments appreciate being asked if help is needed before it is given. After you ask, wait for a response before acting.

- Provide a thorough orientation to the physical layout of the room, indicating the location of all exits, desks, raised floors, low-hanging objects, and the lecture position. When giving directions, say "left" or "right," "step up" or "step down." Convert directions to the visually impaired student's perspective.
- Although it is unnecessary to rewrite the entire course, you can help a visually impaired student by modifying the presentation of material to make it accessible. Allow the student to tape-record lectures or use a note-taker. Pace the presentation of material; if referring to a textbook or handout, allow time for students to find the information.
- You should not modify academic standards for visually impaired students. All students must meet the required level of understanding and performance competencies for the course, although there may be the need of modifying the evaluation or testing method.
- By using enhanced verbal descriptions in the class, blind students as well as the sighted benefit. In making comparisons or analogies, use familiar objects that don't depend on prior visual knowledge.
- Partially sighted students should not be overlooked. They sometimes have greater difficulty in college than do totally blind students, partly because they often try to "blend in" without using special assistance or asking questions.
- Provide a list of required textbooks and/or syllabi in advance to allow time for arrangements such as texts on tape, Braille of texts, or enlarged print.
- Permit lecture notes to be taped and/or provide enlarged copies of lecture notes where appropriate.
- Make available large print copies of classroom materials by enlarging them on a photocopier.
- Convey in spoken words whatever you write on the chalkboard.
- Read aloud subtitles when using media resources.
- Assist the student in finding note takers or readers as necessary.
- Inform students who are blind if you rearrange classroom furniture.
- Keep classroom doors fully opened or closed. Do not leave them ajar.
- Provide handouts in advance of the lecture.
- Notes may be required in Braille and diagrams or tables may need to be produced in tactile form.
- Describe any material you are writing down. Talk through any image or diagram.
- Speak clearly - the student may have few visual cues. Spell out any new or difficult words or names.
- Providing material such as booklists in electronic format rather than hard copy will allow the student to view in their preferred format.
- If you have problems when educating a student who is blind or visually impaired, first decide if the problem is related to the disability or is a problem that any student could have. Consult with the student if you have concerns about accommodations or his/her learning.

Practical and Fieldwork

- Some visually impaired students may use a non medical helper to support them in practical work, for example to explain diagrams that the student cannot see.
- Alternative provision may need to be made for practical fieldwork. A student who copes well in a lecture or seminar may be faced with difficulties when working outside.
- Have written information available for the student before the fieldtrip. A detailed timetable of the day and instructions for carrying out practical work will be particularly useful.
- There may be safety issues - think through any potentially hazardous situations and alternative arrangements that may need to be made.

Educator Presentation

- By verbally spelling out a new or technical word, educator will be helping the visually impaired student, as well as other students.
- Enlarged activity scripts, directions, or readings of a detailed lesson can be used for a low vision person and for describing tactile 3D models.
- Use an overhead projector to show step-by-step instructions. Mask all the instructions except the one(s) that you want followed.
- Use an opaque projector whenever possible to enlarge a text or manual.
- All colored objects used for identification related to a lesson, experiment, or other directions should be labeled with a Braille label maker or otherwise coded.
- Describe, in detail, visual occurrences, visual media, and directions including all pertinent aspects that involve sight.
- Use a sighted narrator or descriptive video to describe aspects of videos or laser disks.
- Describe, in detail, all pertinent visual occurrences or chalkboard writing.
- Where needed, have lesson or direction materials Brailled, or use an enlarged activity script ahead of time, for class handouts.
- Whenever possible, use actual objects for three dimensional representations.
- Modify instructions for auditory/tactile presentation.
- Use raised line drawings for temporary tactile presentations.
- Allow student to use a tape recorder for recording class presentations.
- Make all handouts and assignments available in an appropriate form: e.g., regular print, large print, Braille, or cassette, depending on the student's optimal mode of communication.
- Use a monocular or a private eye (electronic miniature television) for long range observations of chalk board or demonstration table presentations.

Laboratory

- Describe and tactually/spatially familiarize the student with the lab and all equipment that will be used.
- Consider alternate activities/exercises that can be utilized with less difficulty for the student, but has the same or similar learning objectives.
- Use an enlarged activity script, directions, or readings for a low vision student (or taped script for a student who is blind) for use with tactile 3D models.

- Make all handouts and assignments available in the appropriate form for the student: e.g., regular print, large print, Braille, or tape depending on the students' optimal mode of communication.
- If possible, assistance from an education specialist may be needed for converting laboratory materials from a visual to a tactile format.
- Have the student with a vision impairment do a trial run on the equipment before the activity.
- Allow more time for the laboratory activities.
- Always try to keep materials, supplies, and equipment in the same places.
- Use a micro projector to help the visually impaired student to examine images from a microscope.
- Place the student and/or tape recorder an appropriate distance from the activity to permit hearing and/or the recording of results or observations.
- Use an overhead projector or opaque projector to show step-by-step instructions.
- Use Descriptive Video for videos or laser disks. If Descriptive Video is not available, use a sighted narrator to describe movies, videos, laser disks, or slides.
- Provide means for the acquisition and/or recording of data in an appropriate and familiar mode to the student.
- Use tag shapes for showing relationships (such as distance comparisons) buttons or other markers on a "layout" board.
- A Braille label maker will be useful for identifying materials and containers in the laboratory for the vision impaired student who reads Braille.
- Make equipment available that the vision impaired student can access in interpreting and understanding the results of laboratory exercises (e.g. audible readout voltmeters, calculators, talking thermometers, talking compass, magnifiers, etc.
- Use a hot plate for heating instead of Bunsen burner.
- Label material, supplies, and equipment with regular print, large print, and/or Braille, as appropriate for the vision impaired student.
- Pair the vision impaired student with a sighted student. Then have the non-impaired student describe the activities and outcomes as they are observed.

A low vision projection screen can be use to magnify images up to 720X.

- Use a portable communication board to provide auditory scanning of laboratory materials such as: pictographic symbols, letters, and/or words.
- When using a computer, the student with a vision disability can use a voice input device or a remote voice system to verbally enter commands.
- If possible, prior to enrollment of a visually impaired student in class, obtain laboratory equipment that has adaptive outputs such as: a large screen, print materials, or various audio output devices.
- Various Braille devices can be used to assists vision impaired students when reading.

Group Interaction and Discussion

- Describe and tactually/spatially familiarize the student to the classroom.
- Place the student and/or recorder with an appropriate distance from the activity to permit recording of material.

- Use a tape recorder.
- If the student is partially sighted, be sure he/she is seated where lighting is appropriate.
- Use a note taker who takes notes in the appropriate mode.

Reading

- Paid or volunteer readers or writers can assist a visually impaired student with texts, materials, and library readings.
- Offer to read, or arrange to have read, written information for a person with a visual impairment, when appropriate.
- Arrange, ahead of time, for audio book acquisition of the text or other reading materials through the text reading systems, or audio output devices.
- Various Braille devices can be used to assist vision impaired students when reading.

Research

- Review and discuss with the student the steps involved in a research activity. Think about which step(s) may be difficult for the specific functional limitations of the student and jointly devise accommodations for that student.
- Use appropriate lab and field strategies according to the nature of the research.
- Various Braille Devices can be used to assist vision impaired students when reading.
- Suggest that the student use a tape recorder with a sighted person on the various activities.

Testing

Strategies that may be used include extra time, use of a reader or amanuensis, large print or Braille question study, use of a word processor. Alternative arrangements will not give the student an unfair advantage, or put them at a disadvantage, and the arrangements must not compromise the validity or professional accreditation of the examination.

- Visually impaired students usually need extended time for their exams and possibly a reader/scribe for assistance in reading and writing. Either the faculty member or volunteer can provide exam accommodations.
- Make arrangements for tactile examinations, if touch is not normally permitted
- Place the student being tested close to the activity if tactile examination is necessary.
- Present examinations in a form that will be unbiased to visually impaired students. Ask the student for the approach he/she finds to be most accessible.
- One possible accessible method is to record test questions on tape and have the students record their answers on tape.
- Use an enlarged activity script, directions, or readings to go along with the testing material.
- Various and appropriate calculators can be used during the test.

2-1-7 General Classroom Modifications

Position in the classroom- The student should be in the optimal position to clearly hear the instructor, and he/she should have easy access to any necessary texts. If his/her vision permits, he/she should be sitting in a place where he/she can see the chalkboard. He should NOT be isolated in seating area from the rest of the class.

Adaptation of printed materials - If the student requires large print photocopies of the overhead, or copies of blackboard notes, these should be provided regularly by the instructor or the person designated for this purpose, if available. Any accommodations made for the student should be provided on a regular basis, such as the enlargement of tests and the provision of extra exam time. In the higher grades and in post secondary institutions the student has to arrange for these modifications himself/herself and should be taught self-advocacy.

Physical education- In general, participation in most activities is fine, but the visually impaired student should not be forced into situations that he/she believes are unsafe.

Socialization- For a person with poor vision, body language isn't a cue, and initiation of conversation has to be verbal. In traditional circles, people feel that it is the job of the visually impaired student to socialize and if that fails to happen something he/she is doing is the cause. In reality, socialization is a two way street; the visually impaired student has to feel safe and comfortable before anything can happen, and the other students should be told that most forms of nonverbal communication are useless with him/her.

2-1-8 Educator Qualifications & Skills

A qualified and trained educator of blind and partially sighted students may work:

- In a school for blind and partially sighted students or other type of special school (as a class or subject educator);
- As a support educator in a mainstream school.

But, at university level educator is recommended to have the following minimum knowledge but it is not an essential.

The educator is recommended to know the methods for the development of special auditory and modified visual communication skills for students with visual impairments, including:

- Braille reading and writing, including use of the Braille writer and the slate and stylus, handwriting for students with low vision and signature writing for students who are blind,
- Listening skills and compensatory auditory skills,
- Typing and keyboarding skills,
- The use of unique technology for individuals with visual impairments,
- The use of alternatives to nonverbal communication, and
- The use of residual vision

The educator is also recommended to know the methods to teach vision specific academic skills, including:

- The use of a talking calculator,
- Tactile graphics (including maps, charts, tables, etc.),
- Adapted science equipment,
- Instruction in the use of print adaptations, optical devices, and non-optical devices, and
- To develop social and daily living skills that are normally learned and reinforced by visual means.

The educator is also recommended to know strategies to teach functional life skills relevant for independent transition to personal living and employment for individuals with visual impairments including:

- Methods for accessing printed public information,
- Methods for accessing public transportation,
- Methods for accessing community resources,
- Methods for acquiring practical skills (e.g. keeping personal records, time management, personal banking, emergency procedures.)

2-2-1 Assistive Technology

Assistive or Adaptive Technology (**AT**) can be defined as any item, services, and piece of equipment, or product system that helps people with disabilities to bypass, work around, or compensate for specific learning deficits. Computer-related aids and equipment for people with disabilities is often called "assistive", "adaptive", "access" or "enabling" technology. (**AT**) can be divided into two main groups: Hardware and Software. Hardware such as computers, tape recorders, and calculators. Software refers to programs that run on computers and tell the computers what to do such as voice recognition system.

2-2-2 Purpose of Assistive Technology

Assistive Technology (**AT**) enables people with disabilities to experience increased independence in daily living, fuller participation in employment and education, and broader opportunities in leisure and recreation.

2-2-3 Types of Assistive Technology

(AT) tools are not appropriate for all disabled people with different disabilities, but each has his/her own needs according to his/her disability. In other words, we can not consider tool "x" is appropriate for both "A" and "B" since each has different disability. The following section describes technologies that may help individuals with learning differences compensate for their problems.

2-2-3-1 Writing Technology

1. Word Processor is a well-known software that enables user to see and modify any written text onto computer screen, So user can add, delete, correct and format words and sentences before printing them out
2. Spell checkers is a utility that is embedded into word processor which enables user to check spelling and discover any misspelled word and it usually uses visually aide's indication on the checked word.

3. Speech synthesizers or Screen Reader is a system that enables user to read documents or texts from computer screen loudly through computer speakers. It is widely used in Braille and visually impaired software such as Jaws Software. Blind user can listen to each action that is processed on the computer through speakers instead of seeing it.
4. Proofreading or Grammar Checker is a utility that is added to word processor which enables user to check the grammar of the words and phrases such as using a singular subject for a plural verb in Arabic language so user will be notified by these errors and correct them accordingly.
5. Speech Recognition system is a system that enables user to communicate with computer by using human voice. User can operate or turn off computer by a voice command. On the other hand, it is useful to be implemented in the word processor since user can dictate words to the program through speaking to the computer using a microphone. There are two basic types systems: discrete and continuous speech. Discrete systems require a short pause of approximately 1/10 of a second between words. Continuous speech systems allow the user to dictate without pausing between words
6. Word Prediction is a utility embedded into word processor programs which enables user to write the initial letters of the word, then the software will predict the rest of the word such as writing “en” then the software will predict that you may want to write enable, enlarge, entitled, and so on, then user can select the intended word from the shown list.

2-2-3-2 Reading Technology

1. Optical Character Recognition (OCR) System or we can call it as a reading machine since some persons with specific disabilities can not read printed materials so by using the OCR system the user will have the ability to read the printed materials through using a specialized scanner which will input text into computer and by using the speech synthesizer system the user will be able to read the printed materials easily. On the other hand there is a pen reader which acts as a pen scanner so the user can read a single word from the printed page instead of whole the page.

The main difference between Speech Synthesizer and OCR systems is that in the Speech Synthesizer the document is primarily available as a soft copy but in OCR the document should be first converted into a soft copy.

2. Tape Recorders, persons with reading disabilities can use this method to read textbooks, and journals that already recorded previously .The sources of these materials are available in many places abroad such as Library of Congress- National Library for the Blind and Physically Handicapped.

3. Variable Speech Control (VSC) enables user to listen to the audio-taped materials either faster or slower than the original recorded speed so user can increase reading speed by 100% and decreasing it by 25%.
4. Talking calculators use a built-in speech synthesizer to speak number, symbol or operation keys as they are pressed. They also read back answers from completed calculations.
5. Screen magnifiers and Closed Circuit TV CCTV (Video magnifiers) these will magnify texts and graphics on the screen so that visually impaired persons can enlarge them to a size and resolution that will meet their individual requirements.

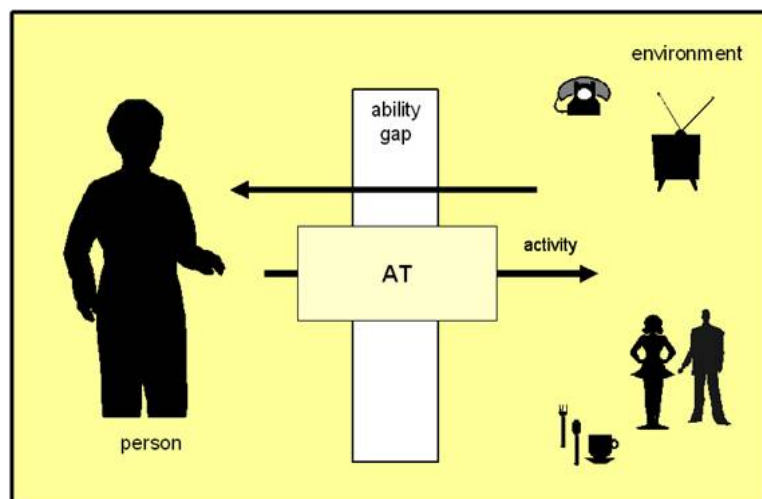
2-2-3-3 Listening Technology

1. Personal FM listening is a tool used for those who have difficulties in focusing on speaker so the listener will have a speaker attached to ear and speaker will transmit voice by using a microphone through a wireless system.
2. Tape recorder is useful for those who have difficulties in hearing, understanding and remembering information on the spot so that the user can record any audio such as educator or tutor instructions in the classroom and then play them back.

2-2-3-4 Memory Technology

Personal Data Managers: Persons with memory difficulties can use this method either as software or hardware. Software can be installed on computer and can be used to store information such as Phones Numbers, Names, Addresses, and Reminders then user can retrieve this information back when needed. Hardware such as PDA which can be used as a portable device to store and retrieve data. Some devices or software enable speaking feature so that the user can input the data or retrieve them via voice.

We can illustrate the relationship between the (AT) & disabled person by the following relationship:



Caption: Relationship between Disabled Person & (AT)

2-2-4 what assistive technology issues should be addressed in Education?

- What are the individual's currently unmet needs for access to communication, writing, and/or educational materials?
- What are the daily educational demands which require the use of assistive technology?
- Have the appropriate team members including parents been involved in the assessment process?
- What are the features/ capabilities of the technology that would assist the individual in accomplishing the daily classroom demand?
- Why is the selected equipment more appropriate than other alternatives?
- Have all the individual's environments been considered?
- Is the equipment necessary to achieve the educational goals?
- How will the individual manage the equipment in all environments?
- How will the use of assistive technology promote inclusion of the individual into activities in the school and community?
- Which members of the education team will be trained to use the equipment?
- How will the individual be trained to use the equipment?
- How will the family be involved with the individual and equipment?
- Will the tools and strategies:
 - a. Maximize student participation and interaction?
 - b. Enhance the dignity of the student?
 - c. Promote interdependence among students?
 - d. Build on student strengths?
 - e. Increase self-esteem?
 - f. Emphasize similarities instead of differences?
 - g. Transfer easily across school, home, and community settings?

2-2-5 Buying a Computer for Blind or Visually Impaired Persons

Here are some guidelines and tips for purchasing a new computer for blind or visually impaired person. Some of them are different from what you read in magazines or hear from friends, because these tips are tailored toward people who will be using assistive technology on their computers.

- **The Computer:** Buy from a name-brand company like Dell, Gateway, or Hewlett-Packard HP. These companies offer good technical support (though not for the assistive technology). They will be around tomorrow.
- **Memory:** At least 128 megabytes. Screen Readers software take up memory.
- **Hard Disk:** Minimum size: 10 gigabytes; hard disks are cheap; programs continue to get larger and larger. 10 gigabytes will allow you to store hundreds of MP3 files, and many more text or word processor files.

- **Processor Speed:** The typical user does not need the fastest computer on the market. 700 MHz is fast enough.
- **Operating System:** Windows XP professional will give you many more options for the assistive technology. There is no longer a current screen reader or screen magnifier for the Apple Macintosh. Very few people who are blind or visually impaired use Macintoshes.
- **Video System:** Get at least 4 megabytes of video memory. If you have some useable vision, buy at least a 17-inch monitor. If you have no useable vision, consider saving the money and not buying a monitor.
- **Sound Card:** Buy a sound card that is capable of playing sounds from multiple sources such as the Sound Blaster Live from Creative Labs, which will let you use one of the software synthesizers, Eloquence for example, that are included when you purchase a screen reader, and listen to audio over the Internet at the same time.
- **Mass Storage:** Include a built-in CD-re-writable drive. This will allow you to back up your files—CDs hold up about 650 megabytes of data.
- **Ports and Slots:** USB and Infrared ports are very popular now. Serial ports are disappearing from current computers. Many assistive technology devices use or used to use serial connections. You can purchase USB-to-serial converters if needed.

Al-Quds Open University Learning Approach

3-1 The Practical Experiment of Al-Quds Open University in Educating Blind and Visually Impaired Students

The next section will discuss the role of Al-Quds Open University in rehabilitating and educating blind and visually impaired students through its practical and unique experiment in this field.

Blind and Visually impaired training centers were established in the 1st April, 2005 from the deep conviction of Al-Quds Open University to facilitate the academic life for those students who have visual impairments.

There are only two specialized training centers in whole of the West Bank universities, one at the northern Palestinian districts at Jenin educational region and the other one is at the southern districts at Hebron educational region and both belong to Al-Quds Open University.

The objectives of these training centers can be briefed in rehabilitating and training blind and visually impaired students in order to enroll them into a normal academic life, therefore raising their academic performance.

The idea of establishing such rehabilitation centers came from the real need of this marginalized sector to have an equal role compared with their sighted peers in both academic and employment opportunities

Al-Quds Open University centers are targeting both Al-Quds Open University and local community visually impaired students. During 2005 and 2006 the both centers of Hebron and Jenin have graduated 25 blind persons from both Al-Quds Open University and the local community.

The results and achievements of the two training centers within the short time period and the modest resources can be accounted for Al-Quds Open University as the first initiative in whole West Bank universities.

Screen Reader, Braille Display, Braille Converter (WinBraille) and Braille Embosser are the assistive tools that disabled students use to access the world of technology.

Students now have the capabilities to read, write, keep and retrieve records, send and receive e-mails and surf the web.

3-2 Training Tools and Equipments

The training centers in both Hebron and Jenin are furnished and equipped with the latest training tools and equipments depending on well-examined assistive technology.

3-2-1 Screen Reader (JAWS 6.1)

It is a computer-human interaction software where student can listen to each action done on the computer and therefore he/she can respond to this action. JAW 6.1 is Arabic and English enabled software.

3-2-2 Braille Screen

It is a hardware kit connected to the computer. It enables students to read and control the computer through using the raised dots of Braille's system.

3-2-3 Braille Embosser

It is an alternative kind of printers which can print out Braille's codes instead of our conventional text.

3-2-4 Win Braille

It is software which can convert any ordinary and classical text into Braille's codes automatically without any need for a previous knowledge of Braille's codes.

3-3 Training Tracks

Al-Quds Open University is targeting the computer literacy for the students who are blind and visually impaired. Al-Quds Open University is focusing on the ability of using the computer by the students in their daily life needs and therefore the essential knowledge of any employment opportunity. The main training tracks are:

- A- Introduction to computer
- B- Typing and Keyboarding
- C- Ms-Windows XP
- D- Ms-WinWord 2003
- E- Internet and email

The exercises during the training sessions depend on the real life scenarios such as "Writing a resume, letter, a paragraph from a newspaper, etc."

3-4 Evaluation Method

Really, it is difficult to evaluate the performance of blind and visually impaired students in the field of using computer and its techniques by utilizing the classical methods of evaluating sighted students. Therefore Al-Quds Open University has followed the scale evaluation method which depends on evaluating each instructed information alone, by giving it a scale from 1 to 4, where these scales mean:

1 means that "Student is unable to perform the task at all"

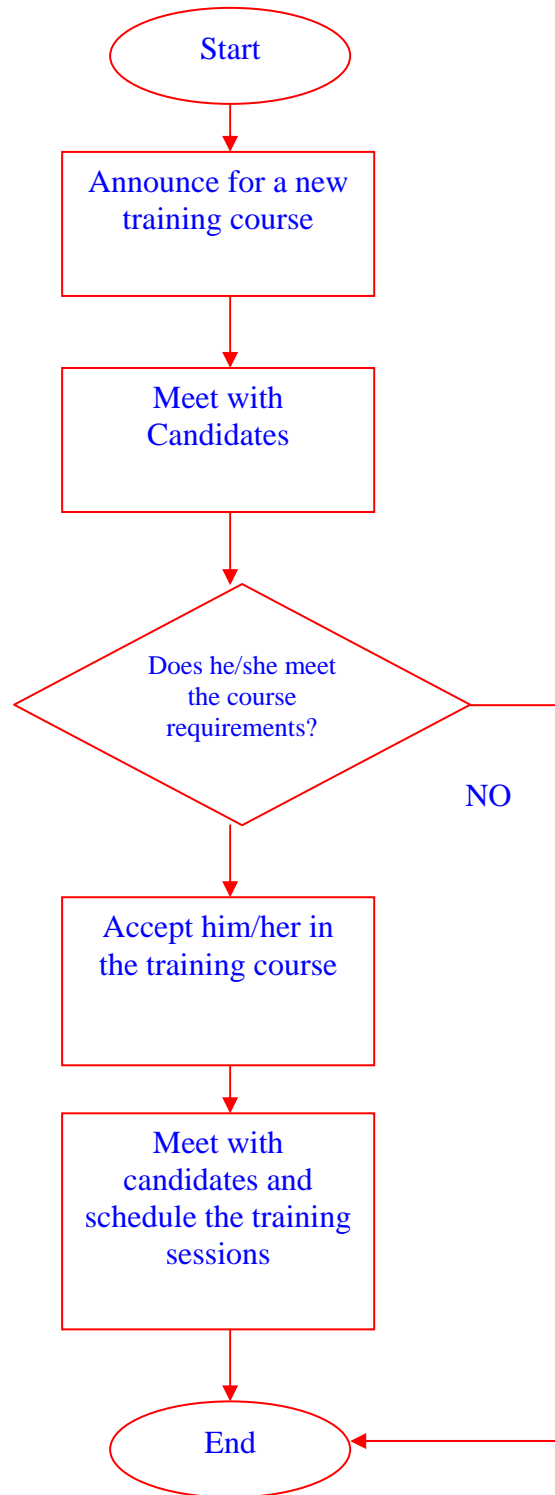
2 means that "Student recognize the basics of the task but he/she need some help"

3 means that "Student is able to perform the task with little help"

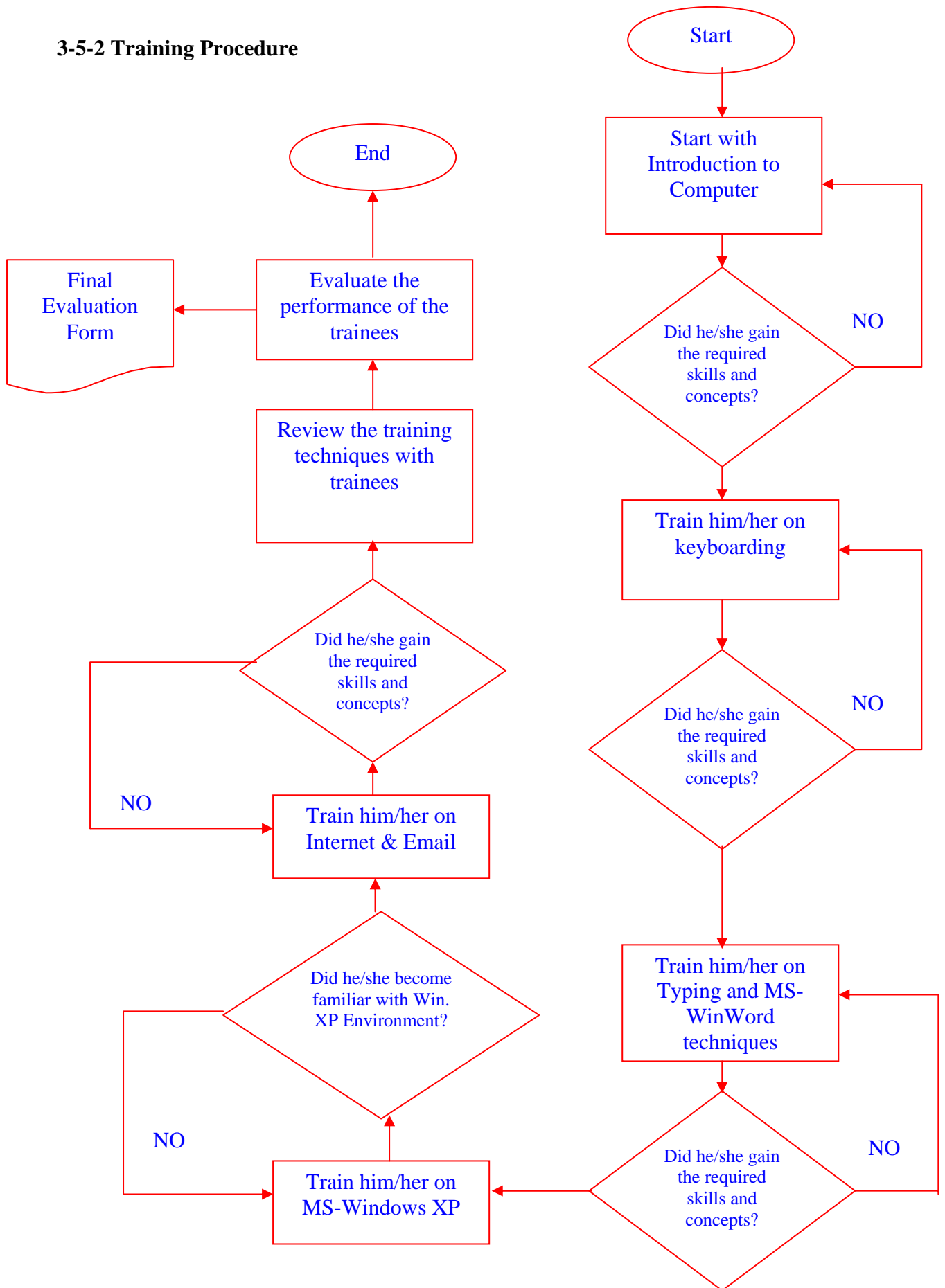
4 means that "Student is able to perform the task independently without any help"

3-5 Training Process Procedures

3-5-1 Pre-Training Procedure



3-5-2 Training Procedure



3-6 Obstacles

The major obstacles that appeared during the training period were as follows:

- 1- Many blind students have no previous knowledge in using Braille's system which leads to extra efforts and doesn't allow them to get benefits from all available Brailled-based equipments (such as Braille embosser).
- 2- The cost of such assistive programs and tools are considered expensive for the students. This may lead them not to use the techniques which they have learned after finishing the training course.

3-7 Prospective Development and Improvement

The next phase of developing the training centers in both Hebron and Jenin educational regions is going in its process by creating a new assessment of blind and visually impaired students needs which will lead to creating a new proposal for developing the centers and therefore the quality of equipments and tools which will reflect positively on the performance of both trainers and trainees. In addition, attempting to establish a new training center in Ramallah city due to its location as the center link between all West Bank cities. Thus it will serve all visually impaired individuals form both Ramallah city and its suburbs.

Al-Quds Open University is currently preparing web-based curriculums which will enable visually impaired students to study on-line by using screen reader software.

The large image of Al-Quds Open University development process is to expand the experiment services to all Al-Quds Open University educational regions in both West Bank and Gaza in order to increase the number of beneficiaries and the quality of performance.

3-8 Conclusions and Results

The experiment of Al-Quds Open University helped in promoting the students' independence and economic well-being and enhancing their quality of life through using the latest technology combined with time-tested adaptive methods. Moreover, raising their academic performance through offering them equal academic opportunities compared with their sighted peers.

This experiment has launched a new learning approach for those students who are visually impaired, and covered many aspects of educating blind and visually impaired students at university level. On the other hand, the study attempted to cover the practical experiment of Al-Quds Open University in rehabilitating and educating students with visual impairments. The achieved results were marvelous and the efforts that were paid in this field were worthy. Thus this study has concluded the following:

- 1- Academic Staff in all Palestinian universities should have the minimum knowledge of how to teach and deal with blind and visually impaired students.
- 2- The educational infrastructure of Palestinian universities for the students with visual impairments needs to be further developed and enhanced.
- 3- Al-Quds Open University has the initiative in launching such learning approach and the other Palestinian universities should follow the same suit.

3-9 Recommendations

After Al-Quds Open University practical experiment in the field of rehabilitating and educating blind and visually impaired students at university level, the researcher recommend the following:

- 1- The awareness of blind needs should be raised in the Palestinian society and its organizations.
- 2- There should be more financial and social support for rehabilitating and training visually impaired students.
- 3- Employers should afford more employment opportunities for trained blind students after their graduation.
- 4- There should be well prepared and planned infrastructure in public places for blind people.
- 5- Knowledge resources should be available for blind people especially in public libraries.
- 6- The university academic staff should have the minimum knowledge of how to deal with and teach blind students.

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<http://www.rit.edu/~easi/>
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<http://www.cast.org/>
- Family Center on Technology and Disability
<http://www.fctd.info>