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Effective Factors in Successful Use of Assistive Technology at Palestinian Universities: Islamic University of Gaza as Case Study

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Abstract
The blind and visually impaired have the right to merge in the society and show up their capabilities and their great potentials. The Islamic University of Gaza (IUG) and its Assistive Technology Center (ATC) proved this sector of students with the opportunity to release their energy and compete with their visual comrades by utilizing assistive technology (AT). This study investigated the factors that led to the success in using AT at IUG. The study showed that ATC and AT led to more self confidence, more independence, and better academic achievement. ATC staff and management played a big factor in this success.

Keywords: Assistive technology, IUG, Blind, ATC.

Introduction
Background
Computing technology is going through enormous development over the last three decades. It emerged in all aspect of life and became essential for our daily routines. This put emphasis on learning and knowing how to use this technology efficiently and to its at most potential. This led to look at all people on equal footing and the most knowledgeable survive whether they have disability or not. Blind or visually impaired can now compete on equal footing with the sighted on the basis of "knowledge" and "technological competence".

Blind and visually impaired could suffer from lack of self-confidence and low academic achievement. This leads to losing the chances of landing a job. This is a result of the limitation of movement and the dependence on others. Thus, there is a need to utilize modern technology to assist visually impaired and blind students to reach the information they want without the assistance of others; thus, improving their chances of better academic achievement.

The Internet has presented new ways to learn especially for blind or visually impaired with limited mobility. With the help of assistive technology, the world of the blind and visually impaired has expanded. With certain adjustments, the Internet can be an available tool to people with visual impairments [1].

Studies have shown that Assistive Technologies helped people with disabilities to enjoy a more satisfactory life [2]. Computers as AT are frequently cited as the means to overcome the lack of access to information and other environmental barriers for persons with visual impairments [3]. For people with visual impairments, computer accessibility opens new horizons in the educational area [4].

Assistive technology (AT)
Assistive Technology can be defined as any piece of equipment or device that is invented, modified, or customized to increase, maintain, or improve functional capabilities of individuals with disabilities and enable them to have greater independence, productivity and confidence at their home, at work, at school or in the community [5]. Assistive Technology (AT) in Education is defined as products and services which assist in the learning process such as computers, communication aids and digital learning aids [6]. Using text-to-speech technology enriches learning by having the computer highlight text and read it aloud as the student follows along [7].

Web accessibility is the process of making Internet sites and Web applications compatible with assistive technologies used by people with disabilities. Accessibility violations occur when Web sites violate accessibility requirements.

Motivations and aims
This paper is considered to be the first study to investigate the effect of using assistive technology on academic achievement of blind and visually impaired students at Palestinian universities. The

blind and visually impaired students at the Islamic University of Gaza are used as a case study. It determines the needed assistive technology equipment and resources at a university in order for its blind and visually impaired students to access information. It gives indicators on dealing with and training blind and visually impaired students on the optimal use assistive technology; thus, helping other Palestinian universities on measuring their compliance and success.

The main objectives of this paper is to determine the main factors that helped blind and visually impaired students at IUG to use assistive technology successfully. Another objective is to measure student satisfaction with the output of using assistive technology in academia. The last objective is concerned with measuring the effect of using assistive technology on their self confidence, academic achievement, and independence.

The paper is organized as follows: section 2 covers ATC and assistive technology; section 3 covers the study problem and approach; section 4 gives the study results; section 5 gives conclusions and recommendations.

ATC and Assistive Technology Studies

The Islamic University of Gaza (IUG) has over 20,000 students and over 1000 teaching instructors. It offers over 50 programs leading to BS and MS programs. It has a blind and visually impaired student population of over 50.

The ATC was established in November 2000 as the first university-based assistive computing center in Palestine with the task of enabling people who are blind or partially sighted to achieve their full potential. A primary goal of ATC is to use assistive technology to access educational materials and related information [8].

Studies concerning the effective use of AT in the Arab region are rare. Awabel (2006) studied the difficulties facing blind students in Saudi Arabia when using assistive technology [9].

Abu Auwn (2007) studied student satisfaction with AT software such as using Ibsar[1] program and Virgo[2] program at IUG ATC. Students were trained on using the two programs at ATC. The study found that students preferred Ibsar program, which depends on voice for its simplicity and speed performance, over Virgo, which depends on touching the Braille lines [10].

Study Problem and Approach

This research concentrates on identifying the factors that led to the successful use of AT for blind and visually impaired students in Palestinian universities. It also investigates the level of using AT and the effect of this use on academic achievement. It also investigates the scope of attention that university administration pay to the needs of blind and visually impaired students in order to achieve better student satisfaction.

The study will answer the following qquestions:

Do the university administration and ATC management play a role in the success of using of AT? What are the outcomes of using blind and visually impaired students AT? What is the level of their satisfaction? What is the effect of using AT on blind and visually impaired students in terms of self confidence, independence, and academic achievement?

This study assumes that there is a direct link between the availability of AT and student use of computers at IUG. It also assumes that students at IUG were successful in adopting AT in their studies.

The main tools of this research are: interviews with ATC employees, trainers and management; focus group of ATC students; a questionnaire conducted on blind and visually impaired students and alumni at IUG. The literature will be used as a secondary tool.

The questionnaire was designed to contain three parts. The first part is concerned with personal data. The second part consists of 12 questions and covers the factors that led to the successful use of AT at IUG. The third part consists of 15 questions and covers the effects of using AT. The questionnaire was reviewed and evaluated by a group of experts and modifications were made based on their recommendations.

This study targeted all blind and visually impaired students and alumni attended IUG since 2000 that total 86 students. 76 students responded to the questionnaire which equals to 88.4%.

Study Results

The study results are divided into three parts: the first part is concerned with the interview of ATC management and staff outcomes, the second part is based on the outcomes of the focus group, and the third part is related to the questionnaire outcomes.

The outcomes of ATC staff interview

The interview of ATC employees, trainers, and management was based on four questions on factors that led to the successful development of ATC and its services.

Q1: What are the problems that faced blind and visually impaired students before the establishment of ATC at IUG?

The problems started from difficulties in registration, studying, taking exams, moving in campus, accessing information from the library or from the digital and electronic media. Moreover, blind and visually impaired students had trouble building social relationships and camaraderie.

Q2: What problems did ATC employees and management faced in terms of blind and visually impaired students using AT and the effect on the working environment?

In the early stages, students resisted using the new technology and freshmen students showed the least interest, but, this resistance started to die as they progress in their studies. In their senior year, students cannot live without using AT as their search to access information increased. To promote ATC, the center held non-curriculum activities and social events in order to let students consider ATC as their home and to introduce its services.

Q3: How do you evaluate blind and visually impaired students' satisfaction using AT?

ATC monitored certain indicators in order to measure its students satisfaction with its AT services through:

- Student enrollment at IUG as it increased from 22 students in 2000 to 86 in 2007.
- Students started using computers for registration and followed up on their student files and records as their counter visual students did.
- Students are using the email services are a mean of communication more frequently.
- Students started using electronic and digital books more frequently that before.

Q4: What are the factors that helped in ATC success?

The following factors are considered the main influential ones:

- University administration championed the idea of opening a center dedicated to help blind and visually impaired students reach their full potential.
- A team of dedicated employees and trainers equipped with the necessary knowledge and know how.
- The full scholarships that are offered by IUG for blind and visually impaired students.
- The availability of adequate resources at ATC and the center working hours.

The outcomes of the focus group

In the focus group students from all academic levels and both sexes were represented. The focus group concentrated on answering four questions.

Q1: What were the main obstacles that faced students when using ATC?

The answer concentrated on four parts as follow:

- The center room area was small in comparison with the student population its serves especially if take into consideration that access to the center is not partial since the daily working hours are divided between female and male students.
- The training courses on using AT and developing the necessary skills lasted too long for various reasons.
- Early version of programs suffered from too many bugs; however, this problem was solved in later versions.
- The lack of personal computers equipped with AT at home limited the students use of AT to the ATC working hours which hindered the whole process.

Q2: How do you evaluate AT services that are offered at IUG ATC in terms of meeting your needs?

The answers were as follow:

- The best service was providing readable textbooks (Braille or magnified and voiced recorded textbooks).
- Braille library at ATC.
- ATC provided students with writers to assist them in taking exams.
- ATC provided students with Perkins typewriters and Braille papers. It also provided them with computer that allowed them to access lectures and notes and have printed copies.
- They think the center is meeting their expectation; thus, they are recommending their follow comrades to attend IUG due to the services of ATC.

Q3: What role did using AT play in academic achievement and social interaction for blind and visually impaired students?

Before 2000, blind and visually impaired students were reluctant to attend college and interact and compete with their visual students since they are used to attend their special schools. After IUG established ATC which provided them with the tools, they were encouraged to attend IUG and achieved good grades and sometimes exceeded their expectations.

Now, they feel special and are happy with their ability to use computers, sometimes better than their visual colleagues. Moreover, few started learning programming; others are thinking of establishing their own AT center. Some graduates even landed governmental jobs and four of them are working as trainers at ATC.

Q4: Are there any success stories?

Some students are taking their exams on computers using AT which also led to an improvement in their typing skills. One student

published an article in a local women magazine. Students are searching the web and using the internet to do their research papers.

The outcomes of the questionnaire
          The questionnaire was distributed on all IUG ATC students and alumni. 76 students responded to the questionnaire. Table 1 showed the sex of surveyed students while Table 2 showed the students' academic level. The answers of the questionnaire were tabulated and analyzed using SPSS.

Table 1: Sex of surveyed students

Sex	Frequency	%
Male	46	60.5
Female	30	▪ 39.5

Table 2: Students academic level

Level	Frequency	Percent %
Freshman	24	31.58
Sophomore	9	11.84
Junior	9	11.84
Senior	12	15.79

          The outcomes of the questionnaire are as follow:
Q1: Do university administration and ATC management play a role in the successful use of AT among its blind and visually impaired students?
          94.7% thought that ATC management and university administration concentrated on continuous development of ATC resources and services (average mean 3.39). 79% thought that ATC management encouraged students to use AT (average mean 2.97). 50% said that ATC increased their computer skills (average mean 2.5). 71.1% said that the culture at IUG influenced their successful use of AT (average mean 2.92).
          81.6% thought that ATC management and employees are the main factor in ATC success (Average mean 3.05). 92.1% said are proud that IUG provided them with the necessary means and the tools to use (Average mean 3.55). 81.3% said that using AT improved their self confidence and boosted their morale (Average mean 3.05).
          84.2% said that using AT made it easier to access information sources (Average mean 3.08). 94.7% said that the goals and benefits of using AT were obvious to them (Average mean 3.39). 63.1% said that using AT opened a new cultural horizon to them and made it easier to communicate.
          Overall, University administration and ATC management played a big role in the success of using AT by blind and visually impaired students.

Q2: What are the outcomes of using blind and visually impaired students AT? What is the level of their satisfaction?
          Students strongly agreed that AT made it easier to access information sources as 73.7% expressed their satisfaction in obtaining information using the Internet. While 23.7% agreed that using AT is considered a big milestone in their life and an outstanding achievement for them. 57.5% strongly agreed that AT made it easier to access information for the purpose of academic studies. 60.5% agreed that using AT solved for them the problem of accessing information sources and provided them with independence in this regards. 89.5% said that they are satisfied with AT services and tools. Finally, 94.7% said that using AT improved their computer skills significantly.
Q3: What is the effect of using AT on blind and visually impaired students in terms of self confidence, independence, and academic achievement?
          92.1% said that using AT improved their academic achievement. 93.7% said that AT usage led to more independence in their college life and overall. 94.7% said that using AT led to faster access to information; thus, the ability to share these information with their comrades; better social interaction. 76.3% said using AT reduced the amount of time to do homework and assignments.

Conclusion and Recommendations
          In 2000, IUG established the ATC to help its visually impaired students to compete with other students. This paper presented IUG ATC as a case study in order to measure factors that helped using AT successfully among blind and visually impaired students. The study results were based on three tools: interviews with ATC employees and management, focus group consisting of blind and visually impaired students, a questionnaire that distributed on 76 students and alumni.
          The results showed that before 2000, blind and visually impaired students at Palestinian universities faced many challenges and difficulties such as: taking exams, accessing information sources, moving in campus, social and psychological interaction, lack of self confidence, and less independence. The results showed that the establishment of ATC at IUG led to self satisfaction among its blind and visually impaired students. ATC speeded access to information sources, improved cooperation and coordination of university department for the benefit of blind and visually impaired students, and led to better student academic achievement. Results showed that the use of AT led

to more self confidence, more independence and better academic achievement.

The paper makes the following recommendations:

- ATC should update and improve AT tools, equipment, and program to match the increased demands on its services.
- ATC should increase the space allocated its students in order to facilitate the number of its female and male students at once.
- ATC should focus on providing advanced services and training.
- ATC should lunch laptop with AT for every student program.
- ATC should cooperation with the e-learning Center in order to develop suitable educational material and build accessible pages for its course.

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