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## Assistive Technology: a Health Care Reform for People with Disabilities

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Assistive technology has become one of the most powerful tools in assisting people with disabilities fight for social equality both in Puerto Rico as well as in other cities worldwide. In spite of this, the availability of assistive technology equipment does not constitute reason enough for people with disabilities to have all the technology resources for making them independent and productive in a society as competitive as ours. An assistive technology evaluation process is recommended in order to achieve an optimum level of self-sufficiency in people with disabilities. The evaluation process should take into consideration both the individual's needs and strength and the advantages and disadvantages of the equipment. The main purpose of this research was to determine the satisfaction level of 69 consumers evaluated at

the Assistive Technology Integrated Services Center. These evaluations were conducted during 2001-2005. Statistical tests including distribution of frequencies, chi-square, bivariate and variance analysis were produced in order to determine if a scientific association existed between the consumers' level of satisfaction with the services and the assisted conditions. The data analysis results showed a significant difference between the satisfaction level with consumer's age, type of disability, and recommended equipment acquisition. Besides, statistical associations were established between general satisfaction concept dimensions, type of disability, and consumers' particular characteristics.

*Key words: Assistive Technology, Satisfaction Level, Evaluation Process, People with Disabilities*

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For the time being, assistive technology has proven to be one of the less practical and working fields in the technology industry. Assistive technology is a young concept. Two decades ago, an assistive technology team was an exclusive reality of avant-garde and dreamer's minds of a small but passionate group of individuals with the enthusiasm needed to transcend the barriers people with disabilities have to face every day (1).

The term assistive technology means all kind of devices or services used to increase, maintain or improve functional capabilities in people with disabilities. Simply put, assistive technology consists of equipments and services. An assistive technology device is any equipment, system or product, whether acquired commercially, modified, or customized based on the characteristics and particular needs of each people with disabilities. On the

other hand, an assistive technology service consists of any service that assists a person with disabilities and his/her family in the selection, acquisition, use, or maintenance of the equipment (2).

Studies carried out by researchers at the University of Puerto Rico have proven that the impact of assistive technology depends on the chemistry between users and equipments (3). Hence, the importance of the process whereby the user acquires the assistive technology equipments. A good chemistry between users and equipments is a crucial element in order to appreciate the impact of assistive technology at its peak. Thus, it has been proven that to achieve a real impact in people with disabilities, it is necessary to carry out an evaluation between the user and assistive technology equipments. The more appropriate the evaluation conditions and specialists expertise regarding the technologies available to supply the user's needs, the bigger impact of the assistive technology.

A retrospective cohort study was carried out in order to assess the satisfaction level of the people evaluated at the Assistive Technology Integrated Services Center. The purpose of this research was to study the assistive technology patterns of use between people with special needs and to explore the consumers' opinion about the services.

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## Method

### Participants

Consumers evaluated at the SI-AT Center between 2001-2005. The sample of this study was by availability and was composed of 69 individuals.

### Instrument

Self-administrated questionnaire of 30 reactivities in six sections. This instrument was drawn to evaluate the satisfaction level of those consumers who received services at the Assistive Technology Integrated Services Center (SI-AT Center). The questionnaire had the following sections: socio-demographic information, physical facilities, service given, and general satisfaction with the assistive technology evaluation, acquisition process, and recommended equipment effectiveness. This questionnaire was submitted to all the consumers evaluated at the SI-AT Center.

### Procedure

Through telephone conversations, the willingness to answer the questionnaire of those consumers evaluated at the Assistive Technology Integrated Services Center was determined. Only 130 consumers were willing to participate in the study. The instrument was mailed to each participant along with a consent form and a self-addressed envelope. After six weeks, 53.0% of the questionnaires were returned. Then, the data compilation process was stopped and the data input and analysis was begun.

### Data analysis

The following descriptive statistical analyses were used: frequency distribution, measures of central tendency, and multivariate and bivariate analysis. In order to determine the statistical association level between variable, chi-square, and variance analysis, general lineal models were used.

## Results

Most of the consumers assisted by the SI-AT Center (58.8%) were individuals between  $5 \pm 20$  years with a mean age of 11.3 years. A total of 94.0% of the consumers were female and more than a third (79.6%) showed communication problems.

Most of the population attended (58.0%) was from the metropolitan area, including San Juan, Carolina, Bayamón, and Guaynabo. A total of 98.4% of the evaluated consumers received an assistive technology equipment recommendation from specialists of the Center.

An evaluation of the satisfaction level of the people surveyed, based on consumers' answers to the instrument reactive, showed the following rate of effectiveness for each area: physical facilities (0.82), services given (0.90), satisfaction with the process (0.54), and equipment effectiveness (0.33). The rate of effectiveness that incorporates all the aspects mentioned above was estimated to be 0.70, which reflects an adequate service offered by the SI-AT Center. Although it can give the impression of an average quality service, this rate takes into consideration the presence of external factors, unconnected to the Center, which could affect the consumer's perception about the quality of the services.

**Table 1.** Rate of Effectiveness of the Evaluation Services offered at the SI-AT Center

Areas to evaluate	Score obtained	Maximum score	Effectiveness rate
Physical facilities	450	552	.82
Service given	1,487	1,656	.90
General satisfaction	594	1,104	.54
Equipment effectiveness	182	552	.33
Total	2,713	3,864	.70

According to Painter's (4) study of the effectiveness in the computer integration process in the educational process of children with learning disabilities, a treatment result does not depend only on the interaction of two or three elements, but in the external factors that could affect the behavior of some of the variables. A deeper analysis of the panorama reveals a combined rate of 0.88, which is evidence of a great service, when considering the first two sub-scales: physical facilities and service given. These two first sub-scales are the only ones that represent totally and exclusively the Center's efforts. On the other hand, a combined rate of 0.47, which evidences a low quality service, can be noticed when considering the last two sub-scales: evaluation process satisfaction and equipment effectiveness.

According to Watson & Johnston (5), assistive technology is a wide field. In that regard, the dramatic discrepancy between the quality indicators described above can be explained as the product of a broad investigative environment. For example, on a detailed sub-scale analysis, and although all the participants evaluated the equipment's effectiveness, only 29.6% had received the recommended equipment at the moment of the survey completion. Consequently, the average waiting time for acquisition of assistive technology equipment was calculated to be 2.1 years.

**Table 2.** Variance Analysis Tests Results of the Effectiveness of Services and Consumer Personal Characteristics

Aspect	Amount	Grad. Independence	Average square	Significance level F	P
Consumer age - Service effectiveness	.600 6.458 7.059	1 66 67	.600 .098	6.1	.016
Speech disorder - Service effectiveness	.600 6.458 7.059	1 66 67	.600 .098	6.1	.016
Learning disorder- Service effectiveness	.746 4.725 5.471	1 66 67	.746 .072	10.4	.002
Consumer satisfaction - Service effectiveness	1.593 9.525 11.118	1 66 67	1.593 .144	11.0	.001
AT equipment acquisition - Service effectiveness	.383 2.483 2.866	1 65 66	.383 .038	10.0	.002
Time of use of AT equipment - Equipment adaptability	348.821 582.483 931.304	3 19 22	116.274 30.651	3.7	.028
Time of use of AT equipment - Equipment integration	2.290 2.750 5.040	3 21 24	.763 .131	5.8	.005

## Discussion

According to Franklin's (6) article on assistive technology and sustained employment, all people with special needs have qualities and special features that produce different results although the treatment is the same. The results of this research provide scientific evidence to infer there is a significant inverse statistic association between the rate of effectiveness in the services offered at the SI-AT Center and the consumers' age ( $p < .05$ ). The younger the consumer, the higher the effectiveness of the services offered at the SI-AT Center. Similarly, a significant statistic association was shown between the effectiveness of the services offered and the consumers with speech disorders and learning disabilities. In that sense, the consumers with the disorders described above evaluated the service in a more effective way as compared to those who reported other types of disability.

According to Walling (7), the prevailing external conditions in the environment could influence on the consumer's appreciation and valuation of the services. The analysis also showed a significant inverse statistic association between the consumer's satisfaction level and the evaluation of the services offered ( $p < .05$ ). The

warmer the treatment from the SI-AT Center staff, the higher the consumer's satisfaction level with the services. On the other hand, the analysis showed a significant statistic association between the effectiveness of the service and the assistive technology equipment acquisition ( $p < .05$ ). In other words, the consumers who received the recommended equipment showed a higher satisfaction level compared to those who didn't receive their equipment at the time of the research.

Study results point out a significant statistic association between the length of time consumers spend using the equipments and the appropriateness of the equipment adaptation to the consumer's needs ( $p < .05$ ). The longer the length of time consumers spends using the recommended equipment, the easier the adaptability to their needs. The analysis showed a significant statistic association between length of time consumers spend using the recommended equipments and their use or integration level within the school activities ( $p < .05$ ). The longer the length of time consumers spends with the equipment, the higher the level of use and integration within the school activities.

According to Vanderheiden (8), a statistic association between two or more variables infers an established

behavior pattern if it is controlled by the variables of confusion. An assistive technology service should not have to wait to end in order to determine its quality. It is the specialist responsibility to evaluate and manipulate the environment during the process to achieve an effective impact in the use of assistive technology.

## Resumen

En la actualidad, la asistencia tecnológica se ha convertido en una de las herramientas más poderosas que tienen las personas con impedimentos para luchar por su equidad social tanto en Puerto Rico como en otras partes del mundo. A pesar de esto, la oferta de equipos de asistencia tecnológica no constituye razón suficiente como para que las personas con necesidades especiales posean todos los recursos tecnológicos necesarios para ser independientes y productivos en una sociedad tan competitiva como la actual. Para lograr un nivel óptimo de autosuficiencia en la persona con impedimento, se recomienda un proceso de evaluación en asistencia tecnológica, donde se tomen en consideración tanto las necesidades y fortalezas del consumidor como las ventajas y las desventajas del equipo a ser evaluado. El propósito principal de esta investigación fue determinar el nivel de satisfacción de un total de 69 consumidores, quienes fueron evaluados en el Centro de Servicios Integrados en Asistencia Tecnológica durante el período de tiempo que comprende desde el año 2001 hasta el 2005. Con el propósito de determinar si existía una asociación significativa desde el punto de vista estadístico entre el nivel de satisfacción de los consumidores y las condiciones atendidas, se realizaron distintas pruebas de análisis estadístico, que incluyeron las siguientes: distribuciones de frecuencia, análisis bivariado, análisis de chi-cuadrada y análisis de la varianza. Los resultados del estudio concluyeron que existe una diferencia significativa entre el nivel de satisfacción con los servicios y la edad del consumidor, el tipo de impedimento y el tiempo de obtención de los equipos recomendados. Además, se establecen asociaciones estadísticas entre las dimensiones del concepto de satisfacción general,

tipo de impedimento y características particulares de los consumidores evaluados.

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