An ideal model of an assistive technology assessment and delivery process

Stefano Federici¹, Marcia J. Scherer², and Simone Borsci³

¹Department of Philosophy, Social & Human Sciences and Education, University of Perugia, Perugia, IT
²The Institute for Matching Person and Technology, Webster, NY, USA
³Department of Information Systems and Computing, Brunel University, London, UK

Abstract

The purpose of the present work is to present some aspects of the Assistive Technology Assessment (ATA) process model [1] compatible with the Position Paper 2012 by AAATE/EASTIN [2]. Three aspects of the ATA process will be discussed in light of three topics of the Position Paper 2012: (i) The dimensions and the measures of the User eXperience (UX) evaluation modelled in the ATA process as a way to verify the efficient and the evidence-based practices of an AT service delivery centre; (ii) The relevance of the presence of the psychologist in the multidisciplinary team of an AT service delivery centre as necessary for a complete person-centred assistive solution empowering users to make their own choices; (iii) The new profession of the psychotechnologist, who explores user’s needs by seeking a proper assistive solution, leading the multidisciplinary team to observe critical issues and problems. Through the foundation of the Position Paper 2012, the 1995 HEART study, the Matching Person and Technology model, the ICF framework, and the pillars of the ATA process, this paper sets forth a concept
and approach that emphasise the personal factors of the individual consumer and UX as key to positively impacting a successful outcome and AT solution.

**Keywords**

Assistive Technology Assessment process, Service delivery systems, ICF, Psychotechnologist, Psychologist, MPT model.
1. Background and purpose

The model of the Assistive Technology Assessment (ATA) process was developed by Federici and Scherer [1] with the contribution of 55 scholars from five continents. It models the functioning process of centres for assistive technology (AT) evaluation and provision independently from the model of local or national service delivery systems. The aim is to suggest practical guidelines for a quality control of effective processes of matching individual users with the most appropriate technology. The ATA process borrows a user-driven working methodology from the Matching Person and Technology (MPT) model of Scherer [3, 4]. Furthermore, the ATA ideal model embraces the ICF biopsychosocial model [5], aiming at the best combination of AT to promote the customer’s personal well-being.

The ATA process can be read both from the perspective of the user or from the perspective of the Center (Figure 1).

[INSERT FIGURE 1 ABOUT HERE]

Since the ATA process is a user-driven process any activity of the AT service delivery must find a correspondence to a user action and vice-versa. The users’ actions of the ATA process can be grouped into three phases.

Phase 1 → The user seeks a solution for one or more activity limitations or participation restrictions and seeks assistance from a center.

Phase 2 → The user checks the solution and tries and checks one or more technological aids provided by the professionals in a suitable evaluation setting (Center, house, hospital, school, rehabilitation center, etc.)

Phase 3 → The user adopts the solution after obtaining the technological aid(s) from the public health system (or public/private insurance), receives training for the daily use of the AT and receives follow-up.
The actions of the Center can be grouped into four phases.

Phase 1
(a) The center for assistive product welcomes a user’s request by activating an initial meeting at a time and location that is satisfactory to the user/client population. (b) The initial interviewer is focused on gathering the user’s background information and psycho-socio-environmental data. (c) When the user provides data to the center, data are collected and the case is opened and transmitted to the multidisciplinary team.

Phase 2
(e) The multidisciplinary team evaluates the data and user’s request and arranges a suitable setting for the matching assessment.

Phase 3
(f) The multidisciplinary team, along with the user, assesses the assistive solution proposed, tries the solution and gathers outcome data. (g) The multidisciplinary team evaluates the outcome of the matching assessment, then (h) proposes the assistive solution to the user. When the assistive solution proposed requires an environmental evaluation, the team initiates the Environmental Assessment Process.

Phase 4
(j) When the technological aid is delivered to the user, follow-up and on-going user support is activated and the assistive solution is evaluated in the daily life context of the user.

The ATA process model is built on five pillars from disability studies and rehabilitation research:

i. The *ICF: International Classification of Functioning, Disability and Health* biopsychosocial model [5]. Activities and social participation are strictly related to the body’s functions and structures, so that the individual’s functioning is the outcome of a triadic reciprocal relationship among health condition, environmental factors, and personal factors. According to this view of human functioning, the ATA process models service delivery provision in such a way that all dimensions affecting the user’s functioning (health condition and contextual factors) must be evaluated when the analysis of the user’s request and the selection of the AT is carried out by a centre. These dimensions are also criteria to verify the success of a good assignment and AT solution.

ii. The MPT model [3, 4]. It contends that the characteristics of the person, milieu/environment, and technology should be considered as interacting when selecting the most appropriate AT
solution for a particular person's use. Moreover, the MPT model overcame the traditional one-way process from provider to consumer by involving the user in AT selection for the first time. The ATA process borrows a user-driven and collaborative working methodology from the MPT model, fostering a continuous dialogue between user and professional or team of professionals to make manifest different aspects of the person's needs and appropriate supports. It models a user-driven process guaranteeing that any activity in an AT service delivery centre must find a correspondence to a user action and vice-versa;

iii. The definition of an assistive solution stated by the Association for the Advancement of Assistive Technology in Europe (AAATE) from 2003 [6]. The solution for a user provided by an AT service delivery centre must “involve something more than just a device, it often requires a mix of mainstream and assistive technologies whose assembly is different from one individual and another, and from one context to another. We may label it assistive solution” [6]. The assistive solution is the goal of the entire ATA process which, hypothetically, might not require any technological aid (e.g., just changes to fit the environment or a blend of use of a device and personal assistance) [7]. It is also crucial when pursuing the goal of the assistive solution that the user's request is taken seriously, often requiring an exploration to capture and understand the user's real needs. For this reason, the ATA process sees the role of the psychologist as essential—a pillar of the model—to help guarantee a user-centred evaluation and to empower users to make their own choices.

iv. The role of the psychotechnologist. The psychotechnologist [8-10] is an expert in both psychology and AT, in particular in Human-Computer Interaction (HCI) and human factors. He or she analyses the relations emerging from the person-technology interaction by taking into account all the psychological and cognitive components, and the possibilities of adapting and designing systems and services in an adaptable and accessible manner. Because of the characteristics of his or her professional background and training, the psychotechnologist is an ideal support for the multidisciplinary team in the assessment phase and in the decision-making process, by leading the team to observe critical issues and problems among the user’s needs and assistive solutions proposed. The role of the psychotechnologist should not be confused with
that one of the psychologist, whose profile and expertise are only partly shared with the psychotechnologist [11]. The psychotechnologist is more focused on the technological side of matching the person with technology and less oriented to the clinical and psychological dimensions of human-technology interactions relationships, and communication [10].

v. The role of the psychologist. The psychologist in an AT service delivery process provides an appropriate psychological evaluation or a precise clinical intervention with the users and/or their significant human context over the course of the whole AT assignment process. We believe that to invest in personal factors represents an important turning point for a successful match between person and technology. Assigning greater importance to personal factors would help dramatically to reduce the abandonment rate of technologies by users [4, 11-20].

The ATA process can be used by professionals to check the functioning and to (re-)conceptualize the phases of an AT delivery system according to the biopsychosocial model of disability stated by the ICF [5]. Figure 2 displays the ICF model as it fits the ATA process.

[INSERT FIGURE 2 ABOUT HERE]

The ATA process model can be a useful driver for re-arranging the relationships among professionals and end-users, and for defining when a multi-perspective assessment of the match between the user and the AT is a mandatory phase in a delivery process [1]. It has been thought to indicate an ideal process of AT assessment and delivery process for any kind of AT (limb prosthetics, mobility devices, simple daily living equipment, communication devices, etc.). Nevertheless, given that it stresses the role of the psychologist—as guarantee of a user-centred evaluation and empowering users to make their own choices—and the role of the psychotechnologist—as an expert in HCI and human factors among the relations emerging from the person-technology interaction—the ATA process model seems to be particularly helpful for the evaluation and delivery processes of ICT-based AT and cognitive-oriented devices.
Finally, as previous empirical studies have confirmed, the ATA can be used as a valid tool for helping practitioners to compare their AT service delivery systems [21] or to re-think the AT delivery process in terms of a process for the delivery of an assistive solution. The ATA process model was used as an ideal model to analyse and compare the AT service delivery system of the Umbria (Italy) Region’s Territorial Health Service Providers in order to build up a best practice guide capable of unifying and standardising the different kinds of assignation processes [22].

**Purpose**

The purpose of the present study is to verify the compliance of some aspects of the ATA process model with the guidelines proposed by AAATE and EASTIN (European Assistive Technology Information Network) [2] in order to identify conceptual and methodological similarity and dissimilarity. Specifically, by using as a driver the recent Position Paper [2] by AAATE and EASTIN, we reread three strengths of the ATA process: (i) The dimensions and the measures of the User eXperience (UX) evaluation modelled in the ATA process as a way to verify the efficient and evidence-based practices of an AT service delivery centre; (ii) The relevance of the presence of the psychologist in the multidisciplinary team of an AT service delivery centre as necessary for a complete person-centred assistive solution empowering users to make their own choices; (iii) The new profession of the psychotechnologist guide to coordinate the AT service delivery process for the user.

2. **Modelling the User eXperience in an AT service delivery centre**

The first topic tackled by the Position Paper 2012 is about the need for evidence-based practices in service delivery systems. The reasons for the importance of this topic in the report are mainly related to macroeconomic factors: “the today's [European] political climate of budget containment and accountability” [6], which results in a containment of public spending within the health services. The evidence-based practices in the AT and rehabilitation field requires that making decisions about treatments and technological solutions are to be grounded in the best available evidence with practitioner expertise and scientific research and with the characteristics, state, needs, values, and
preferences of users. This has to be pursued in a manner that is compatible with the user’s milieu/environmental and the national and local health systems. “Evidences is comprised of research findings derived from the systematic collection of data through observation and experiment and the formulation of questions and testing of hypotheses” [23].

Since the ATA process models an AT service delivery process in a centre for AT evaluation and provision explicitly specifying its theoretical and methodological bases (see above the five pillars and [1]) and scientific evidences and good practices [1, 22], its entire model outlines an ideal process which provides reference guidelines for evidence-based practices steering both public and private centres to compare, evaluate, and improve their own matching model. Nonetheless, in this section we focus on how the ATA process provides to practitioners a model to design evidence-based practice parameters on the management of a user-driven and person-centred matching process in an AT service delivery centre.

When defining a set of steps that lead users to achieve an assistive solution, practitioners are designing a process that can be perceived by users, and their caregivers, as good or bad, satisfactory or unsatisfactory, stressful and frustrating or supportive. The users' perception of an AT service delivery process is a key factor for achieving a good match between the user and the AT solution, because on the basis of their judgements about the process, users will react to the requests of the professionals in a different way (e.g. acceptance or not of professional recommendations). In light of this, it is extremely important for the professionals of AT centres to assess their service delivery processes in terms of UX by measuring how the process is perceived by the user “to ensure access to appropriate, timely, affordable, and high-quality rehabilitation interventions” [19] and to provide AT solutions that are “suited to the environment” and “suitable for the user” by also granting an “adequate follow-up to ensure safe and efficient use” [19].

In the HCI field, UX is a broad concept that refers to how a system (e.g., AT service delivery centre) is “perceived, learned and used. It includes ease of use and, most important of all, the needs that the product fulfils” [24], and it is hierarchically related to the possibility of the users to get into the system and obtain the information (accessibility) and to use effectively and efficiently the system in a
satisfactory way (usability) [25, 26]. Whereas the analysis of the accessibility and usability at the AT service delivery centre (the system) is useful for defining a basic level of UX during the user interaction with an AT, the overall UX of the interaction can be measured only in the user's daily life milieu/environment after a long period (at least 3 months) of use (follow up level of UX). Practitioners, by estimating the difference between basic and follow up levels of UX, can reliably assess whether the interaction between the users and the AT is positively increased over time or whether it decreased, affecting the users' performances and/or their well-being. As Figure 3 shows, in the ATA process model, the basic and the follow up assessments of the UX are a core part of an AT system delivery process. They help practitioners evaluate the relationship between user and system by measuring the accessibility and the usability of the interaction with the AT, and the effectiveness of the assistive solution provided by measuring the user's satisfaction after the AT provision.

Nevertheless, as Figure 3 exemplifies, we propose to use the UX assessment also for analysing all the steps that comprise a process of system delivery as a framework for an evidence-based procedure. In light of this, we offer a process for technology matching in which accessibility and usability are measured as follows:

i. Accessibility of the process is measured by analysing the user's ease of accessing the AT service delivery centre, how the centre receives and sustains the requests of the user, and the user's satisfaction with his or her initial relationship with the centre (contact). Therefore, accessibility is determined by the ease of access to the centre and the satisfaction of the contact, measured by: (a) the costs perceived by the users, in terms of use and access to the service for achieving the goal; (b) the possibility to reach the service (availability); (c) the ease of contact (comfort); (d) the expectation of the users (anticipation of benefit); and (e) the users' perceived (or known) service/centre performance.

ii. Usability of the process can be measured by considering effectiveness, efficiency, and satisfaction perceived by the user among the different steps of the process, from the beginning contact to the support after the AT assignation and acquisition. The efficiency, intended as "resources expended in relation to the accuracy and completeness with which users achieve
goals" [27], is measured through costs in terms of time and workload perceived by the user to obtain the AT. The measure of efficiency, defined as “accuracy and completeness with which users achieve specified goals” [27], is strictly connected with the UX assessment of the AT. When the professional assesses the basic level of UX in the laboratory, they can only measure the effectiveness in terms of efficacy of AT use “in an ideal condition”. Only when professionals gather data about the UX in daily life (follow up) through surveys and questionnaires, can they measure the real effectiveness of the process by determining the difference between basic and follow up levels of UX. In this way, the users’ satisfaction and their overall perspective about the quality of the AT obtained and the actions of the AT service delivery centre process is obtained, providing reliable evidence-based data.

In tune with the Position Paper 2012, we believe that the framework and the methods of the HCI can strongly support professionals of the AT centres by providing them with a set of reliable and well-tested evidence-based practices in order to design, assess, and re-define, their system delivery processes under the umbrella of a user-centred perspective.

4. The psychologist: The steward of a complete person-centred assistive solution

The whole Position Paper 2012 owns a strong person/user-centred vision. From the basic definition of AT and assistive solution—through the equation of the “four A”, the meaning of accessibility and the reasons that push public service delivery systems to provide AT with the intermediation of AT service delivery centres—until the lists of recommendations, the independence and well-being of the persons are the primary goal of the document. It is in the eighteen recommendations about “user influence” (fifteen in the sub-section “Recommendations for improvement at national or local level” and three in “Suggestions for actions at EU level that could support improvement”) that the user/person centrality is better expressed.
What emerges is a clear picture of a successful AT service delivery programme that is aimed at assuring that “[t]he individual AT programme should be built in relation to what life goals the user wants to achieve” through an evaluation and assignment process “designed in a way that empowers users to make their own choices” and “tailored to different needs” [2]. The assistive solutions cannot be obtained without the “involvement of disabled persons”. For this reason “[i]n the various steps of the service delivery process, users should be empowered and receive all information needed to make informed choices [...] as a specialist him/herself of his/her needs”.

The ATA process model has taken into serious account the importance of direct user involvement in the functioning of an AT service delivery centre, because it has embraced both a user-driven theoretical model from the MPT model (see the second pillar above) and the ICF biopsychosocial model of disability that overcomes a vision of disability as a consequences of disease focusing on the individual’s functioning (see the first pillar above). In light of this, the ATA process models the flow chart of the functioning of AT service delivery both from the perspective of the user and from the perspective of the centre (Figure 1; [1]). Furthermore, our model has strongly reaffirmed the role of the psychologist within a multidisciplinary team of professionals in an AT service delivery centre. Out of all the professionals comprising the multidisciplinary team, the psychologist is the one who, in terms of curriculum and training, is the greatest expert in personal factors as they are conceptualized by the ICF.

In an AT service delivery process, the psychologist provides an appropriate psychological evaluation and a precise clinical intervention with the user and/or their significant human context over the course of the whole AT assignment process. To guarantee a process designed in a way that empowers users to make their own choices, tailored to different needs, by involving disabled persons in the various steps of the service delivery process as a specialist him/herself of his/her needs [2], it is not sufficient to know about what personal factors are, but it requires specific competences about the dynamics of the subjective dimensions and individual functioning and their assessment. It also requires training in the ways in which to help individuals express themselves and uncover their true goals. Theoretical knowledge of personal factors does not reveal the psychological and existential side of the individual’s
functioning. Therefore, the ATA process model stresses the psychologist’s role in the multidisciplinary team by considering it essential to an effective AT selection and matching process.

The psychologist in an AT service delivery process provides an appropriate psychological evaluation or a precise clinical intervention with the users and/or their significant human context over the course of the whole AT assignment process. In the third point of the Position Paper 2012’s second recommendation, we find how the psychologist’s tasks in an AT service delivery centre empowers users to make their own choices: "a) educating professionals to have an attitude of equity towards users; b) providing information and consultation to enable users to make responsible choices; c) allowing users to try out products for a reasonable time before making the final choice; d) providing the possibility, to both users and professionals, to change decisions that have been made" [2]. In spite of these four recommendations being originally intended for all professionals involved in "[a] good service delivery process […] designed in a way that empowers users to make their own choices" [2], they must be considered to specifically affect the role of the psychologist, because he or she not only has an attitude about user’s personal factors but he or she is also skilled and specialised in subjective dimensions and individual functioning.

The intended meaning of the Position Paper 2012 is that all professionals involved in a service delivery process should be educated to have an empowerment attitude; however, only the psychologist can be considered an expert in personal factors. Knowing about personal factors is not equivalent to knowing subjective dimensions and individual functioning. Theoretical knowledge of personal factors and training in empowerment attitude do not convey the psychological and existential dimensions of the individual’s functioning [28]. For these reasons, we claim that the psychologist might provide his or her expertise to guarantee a user-centred evaluation and empowering users to make their own choices.

In the ATA process model five actions in the psychologist’s role and the professional skills of psychologists have been defined [11, 21]:

1. **Identify** the user’s personal factors, priorities, preferences, etc.;
2. **Advocating** the user's request in the user-driven process through which the selection of one or more technological aids for an assistive solution is reached;

3. Acting as **mediator** between users seeking solutions and the multidisciplinary team of an AT service delivery centre;

4. Team **facilitating** among members of the multidisciplinary team; and finally

5. **Reframing** the relationship between the client and his or her family within the framework of the new challenges and activity limitations or participation restrictions they face.

The role of the psychologist within the ATA process is displayed in Figure 4.

![INSERT FIGURE 4 ABOUT HERE]

We believe that to invest in personal factors represents an important turning point for a successful match between person and technology. Assigning greater importance to personal factors would help dramatically to reduce the abandonment rate of technologies by users [4, 11-20].

5. **The psychotechnologist’s role in the multidisciplinary team**

The structure, level of intensity, and services available for rehabilitation vary widely from one area to another, whether comparing facilities, cities, states, or countries. Despite this, there is considerable consistency worldwide in the list of professionals comprising a multidisciplinary rehabilitation team. As one illustration, a review of traumatic brain injury rehabilitation [29] listed the following professionals: Patient and patients’ family or caregiver; Rehabilitation physician or physiatrist; Rehabilitation nurse; Rehabilitation technicians; Primary neurosurgeon; Allied health professionals: physiotherapist, occupational therapist, speech and language pathologist, clinical psychologist, neuropsychologist, social worker and counsellor; Paramedical health professionals: dietician, orthotist, and rehabilitation engineer; Other medical specialists: ophthalmologist, otorhinolaryngologist, orthopaedic surgeon,
gastroenterologist and neurologist for electrophysiological studies; Vocational rehabilitation services and counsellors; Volunteers from support or spiritual groups. The Joint Committee on Interprofessional Relations Between the American Speech-Language-Hearing Association and Division 40 (Clinical Neuropsychology) of the American Psychological Association [30] also provided a list of professionals comprising the brain injury interdisciplinary team:

“Besides the patient and caregivers, interdisciplinary teams may include, but are not limited to, the following professionals: speech-language pathologist, clinical neuropsychologist, audiologist, rehabilitation psychologist, behavioral specialist, dietitian, educator, occupational therapist, physical therapist, primary care physician, psychiatrist, physiatrist, rehabilitation nurse, social worker, case manager, therapeutic recreation specialist, vocational rehabilitation counselor, and paraprofessionals. When cognitive, communication, emotional, and psychosocial domains are affected, the team should include at least a clinical neuropsychologist and speech-language pathologist. Team membership will vary with the age of the persons served, the type of impairment, the stage of recovery, and the special training of team members.”

Thus, there is considerable consistency in these two views of the rehabilitation team, the first from Singapore and the second from the United States.

In an AT service delivery centre it is not necessary for all the professionals listed above to be present on a multidisciplinary team assembled for a given individual. In fact, the multidisciplinary team can rely on the expertise of outside professionals whenever necessary. Furthermore, the composition of the multidisciplinary team will depend on the services offered by the centre. Regardless of the composition of the multidisciplinary team, however, it needs to be led by professionals with a multidisciplinary background and training, with the precise charge of coordinating the interdisciplinary team and the entire ATA process.

A professional with the appropriate training and background for supporting both the assessment of the match between AT and users and the process of AT delivery decision-making was already identified in
the rehabilitation psychologist [31]. Scherer [32] describes the role of rehabilitation psychologists as follows in the 4th Edition of the *The Concise Corsini Encyclopedia of Psychology*:

“Rehabilitation Psychologists' work includes assessment and intervention regarding the range of physical, personal, psychosocial, cognitive, and behavioral factors that may be affected, such as neurocognitive status, sensory difficulties, mood/emotions, desired level of independence and interdependence, mobility/freedom of movement, self-esteem and self-determination, behavioral control and coping skills, subjective view of capabilities and quality of life. In addition, Rehabilitation Psychologists consider the influences of culture, ethnicity, language, gender, age, developmental level, sexual orientation, social network, residence and geographic location, socioeconomic status, and relative visibility and/or assumption of disability on attitudes and available services. When planning interventions and recommending services, Rehabilitation Psychologists involve the rehabilitation team and consider the network of an individual’s environments (e.g. familial, social, cultural, physical, service availability, and political) and the means of addressing barriers in these areas, such as personal adaptation, the use of assistive technology and personal assistance services and modifications of physical and social environments [33, 34]. It is frequently a blend of such products and services that is most beneficial to individuals in achieving desired goals and well-being. The preferences, needs, and resources of persons served are taken into account in treatment planning, and any obstacles preventing the highest level of personal and social functioning are identified and reduced or removed when feasible.”

The term “psychotechnology” was coined in 1991 by Canadian sociologist Derrick De Kerckhove to refer to “any technology that emulates, extends or amplifies sensory-motor, psychological or cognitive functions of the mind” [35]. In 2002, Federici added the term modifies to the definition: “any technology that emulates, extends, amplifies and modifies sensory-motor, psychological or cognitive functions of the mind” which conveys a biopsychosocial model of interaction [8, 10]. A practitioner of psychotechnology is a psychotechnologist.
Miesenberger, Corradi and Mele [10] describe the role of the psychotechnologist as working with the multidisciplinary team in a user-driven assessment process to achieve a person-technology match that fosters, in keeping with the ICF biopsychosocial model, the person becoming social and active with the mainstream population. Thus, the psychotechnologist is one who fulfills the definition of rehabilitation psychologist above, but who additionally has expertise in multiple areas of AT, Information and Communication Technology, e-Accessibility, universal design, and so on.

The psychotechnologist may, indeed, be the most appropriate support among the multidisciplinary team for the individual with needs under the ICF components of Global and Specific Mental Functions, as well as the person with significant incentives and disincentives under Personal Factors.

The Position Paper 2012 points out “coordination” as one of six quality indicators valid to monitor the quality in an AT service delivery system. This coordination must take place on three levels: micro level, i.e., “within the primary process of service delivery”; meso level, i.e., “during the various steps of the service delivery system process”; macro level, i.e., “within other policies and processes [...] involving assistive technology” [2]. Furthermore, in the Recommendations about coordination, the Position Paper 2012 stresses that “[a] knowledgeable guiding person should be available to coordinate the service delivery process [i.e. micro and meso level] for the user”.

The ATA process model has identified the guiding role in the psychotechnologist [8-10]. The relevance of the psychotechnologist within the ATA process is crucial for an effective service delivery system process at such point to consider the introduction of this professional as a pillar of the model (see above the fifth pillar).

AT is increasingly complex and sophisticated and this requires inter- and multi-disciplinary approaches to assessment that involves a wide range of disciplines and in some cases the emergence of new interdisciplinary approaches [36]. The psychotechnologist is not a clinical/dynamic psychologist, but he or she has a background in psychology, especially in rehabilitation. The psychologist is also distinguished as a cognitive ergonomist because the latter evaluates the interaction according to a dualistic reciprocity between two poles: the user system and the artifact system [37]. Conversely, the
psychotechnologist evaluates the interaction between person and technology by following a user-AT-milieu holistic model, as in the MPT model [3, 15], that is to say, he or she is an expert in assistive solutions (Figure 5). By means of the use of different tools—e.g., the Survey of Technology Use (SOTU) and the Assistive Technology Device Predisposition Assessment [ATD-PA; 3], the Quebec User Evaluation of Satisfaction with Assistive Technology [QUEST; 38], the Software Usability Measurement Inventory [SUMI; 39], etc.—the psychotechnologist explores the user’s needs by seeking a proper assistive solution, leading the multidisciplinary team to observe critical issues and problems [40]. (For a complete presentation of how the psychotechnologist works in an AT service delivery centre, refer to [10, 21]).

6. Conclusions

Since the time of the 1995 HEART study and the dissemination of Scherer’s original research [41, 42], we have seen tremendous growth in the number, quality, and versatility of AT devices. Unfortunately, over this time period we have not seen concomitant advances in the quality of AT delivery systems. It remains true that too many people who can benefit from AT solutions are uninformed as to who to turn to, what to ask for, and what to do with their AT devices once they are obtained. There is no standard of AT service provision, and different disciplines, while following their guidelines for practice, often do not collaborate. This can lead to service gaps where, typically, the end user loses the most. This paper began with the foundation of the Position Paper 2012, the 1995 HEART study, the MPT model, the ICF framework, and the pillars of the ATA process to set forth a concept and approach that emphasise the personal factors of the individual consumer and UX as key to positively impacting a successful outcome and AT solution. This core target determines what the aspects of service delivery and assistive solution must be.
Throughout Italy, specific AT Service Delivery Centres exist as a dynamic and multifaceted approach towards achieving many of the aspirations of the Position Paper 2012. These Centres have already been described [1] as a means of implementing the ATA model. While certainly not a perfect or complete model, they do represent one basis for a multinational discussion on the individual points of the Position Paper 2012. By addressing the various existing systems of AT service delivery operating today within the European Union, and analysing what is working well and the key elements of successful practices, AAATE can take a leading role in organizing data that can be utilised broadly.

The growth in the numbers of aging persons and those with disabilities and chronic illnesses, and the economic uncertainties in many parts of the world, mean we cannot wait any longer to address the longstanding need to improve the ways in which we match person and technology.
References


[30] Joint Committee on Interprofessional Relations Between the American Speech-Language-Hearing Association and Division 40 (Clinical Neuropsychology) of the American Psychological
Association. Structure and Function of an Interdisciplinary Team for Persons With Acquired Brain Injury


**Figure 1.** Flow chart of the ATA process ideal model [1]. On the left of the User Action flow chart and on the right of the procedures of the AT Service Delivery, the numbers refer to the phases and the small-cap letters the steps for each phase.

**Figure 2.** The ATA process according to the ICF’s biopsychosocial model. In the upper left side, the biopsychosocial model and, in right side, the ATA process flow chart are shown. The solid line connects the components of Body Functions and Structure with the phases 1 and 2 of the ATA process: The individual functioning and disability of the user are taken into account by the multidisciplinary team that evaluates health conditions of the user. The dashed line connects Activities component with the phase 3 of the ATA process: The matching process aims to support activity limitations and enhance individual functioning. The dotted line connects the Participation component of the ICF with the Environmental assessment process and the phase 4 of the ATA process: Overcoming a disablement may involve something more than just a device, it often requires a mix of mainstream and assistive technologies whose matching is different from one individual and another, and from one context to another [6]; therefore, the multidisciplinary team has to take in a serious account the participation restrictions.

**Figure 3.** Dimensions and measures of the UX evaluation of an AT system delivery process. In the ATA process model, the UX framework and the dimensions of accessibility and usability are adopted in order to assess both the interaction between user and AT and user and the process in an AT system delivery centre. The ATA process model provides reference guidelines for evidence-based practices steering both public and private centres to compare, evaluate, and improve their own matching model.

**Figure 4.** The psychologist’s role in the ATA process model. The ATA process can be read both from the perspective of the user or from the perspective of the AT Service Delivery centre. In the ATA process model five actions in the psychologist’s role and the professional skills of psychologists have been defined [11, 21]. The five actions (identify, advocate, mediate, facilitate, and reframe) of the psychologist in the ATA process are shown in relation to the User’s Actions and the AT Service Delivery procedures.
**Figure 5.** The socio-environmental system according to the biopsychosocial perspective [5, 43]. The psychotechnologist meets the user’s needs by seeking a proper assistive solution (in cooperation with the multidisciplinary team). With the use of different tools (MPT measures (including the ATD-PA), QUEST, SUMI, IPDA, etc.), the psychotechnologist coordinates the team of professionals in an AT service delivery centre by observing critical issues and problems.
Figure 1. Flow chart of the ATA process ideal model [1]. On the left of the User Action flow chart and on the right of the procedures of the AT Service Delivery, the numbers refer to the phases and the small-cap letters the steps for each phase.
Figure 2. The ATA process according to the ICF’s biopsychosocial model. In the upper left side, the biopsychosocial model and, in right side, the ATA process flow chart are shown. The solid line connects the components of Body Functions and Structure with the phases 1 and 2 of the ATA process: The individual functioning and disability of the user are taken into account by the multidisciplinary team that evaluates health conditions of the user. The dashed line connects Activities component with the phase 3 of the ATA process: The matching process aims to support activity limitations and enhance individual functioning. The dotted line connects the Participation component of the ICF with the Environmental assessment process and the phase 4 of the ATA process: Overcoming a disablement may involve something more than just a device, it often requires a mix of mainstream and assistive technologies whose matching is different from one individual and another, and from one context to another [6]; therefore, the multidisciplinary team has to take in a serious account the participation restrictions.
Figure 3. Dimensions and measures of the UX evaluation of an AT system delivery process. In the ATA process model, the UX framework and the dimensions of accessibility and usability are adopted in order to assess both the interaction between user and AT and user and the process in an AT system delivery centre. The ATA process model provides reference guidelines for evidence-based practices steering both public and private centres to compare, evaluate, and improve their own matching model.
Figure 4. The psychologist’s role in the ATA process model. The ATA process can be read both from the perspective of the user or from the perspective of the AT Service Delivery centre. In the ATA process model five actions in the psychologist’s role and the professional skills of psychologists have been defined [11, 21]. The five actions (identify, advocate, mediate, facilitate, and reframe) of the psychologist in the ATA process are shown in relation to the User’s Actions and the AT Service Delivery procedures.
Figure 5. The socio-environmental system according to the biopsychosocial perspective [5, 43]. The psychotechnologist meets the user’s needs by seeking a proper assistive solution (in cooperation with the multidisciplinary team). With the use of different tools (MPT measures (including the ATD-PA), QUEST, SUMI, IPDA, etc.), the psychotechnologist coordinates the team of professionals in an AT service delivery centre by observing critical issues and problems.