

# Adapting the World Health Organization rapid Assistive Technology Assessment (rATA) to the Italian context: implementation of a TRAPD-based approach

Lorenzo Desideri<sup>1</sup>, Riccardo Magni<sup>2</sup>, Wei Zhang<sup>3</sup>, Massimo Guerreschi<sup>2</sup>, Claudio Bitelli<sup>2</sup>, Evert-Jan Hoogerwerf<sup>1</sup>, Paolo Andraghetti<sup>1</sup>, Ketty Vaccaro<sup>4</sup>, Vittoria Coletta<sup>4</sup>, Domenica Taruscio<sup>5</sup>, Marta De Santis<sup>5</sup>, Rosa Immacolata Romeo<sup>5</sup>, Margherita Genisio<sup>5</sup>, Carla Daniele<sup>6</sup>, Giuseppe D'Avenio<sup>6</sup>, Antonia Pirrera<sup>6</sup>, Sandra Morelli<sup>6</sup>, Daniele Giansanti<sup>6</sup>, Paola Meli<sup>6</sup> and Mauro Grigioni<sup>6</sup>

<sup>1</sup>AIAS Bologna onlus, Bologna, Italy

<sup>2</sup>GLIC Rete Italiana dei Centri Ausili Tecnologici, Bologna, Italy

<sup>3</sup>Department of Essential Medicine and Health Products, World Health Organization, Geneva, Switzerland

<sup>4</sup>Fondazione CENSIS, Rome, Italy

<sup>5</sup>Centro Nazionale Malattie Rare, Istituto Superiore di Sanità, Rome, Italy

<sup>6</sup>Centro Nazionale per le Tecnologie Innovative in Sanità Pubblica, Istituto Superiore di Sanità, Rome, Italy

## Abstract

**Background.** Measuring access to assistive technology (AT) has become a global priority. Recently, the World Health Organization (WHO) has developed the rapid assistive technology assessment (rATA), a population-based household survey that measures the use, need, unmet need, and barriers to accessing AT.

**Objective.** The aim of this paper is to report on the translation and adaptation process undertaken to implement the rATA survey in the Italian context.

**Method.** The Translate, Review, Adjudicate, Pretest, and Document (TRAPD) approach was used to translate and adapt the rATA from English to Italian. Eleven independent reviewers and 23 AT users were involved to validate the Italian translation of the rATA and pilot the survey, respectively.

**Results.** The feedback provided by the first users of the rATA indicate that the data collected are reliable and well reflect the state of AT provision in Italy.

**Conclusion.** This study confirmed the applicability of the rATA survey to the Italian context. The Italian version of the rATA can be used to support the government, the health system as well as the civil society to monitor the current state of AT access (and abandonment) in the country.

## Key words

- access to assistive technology
- population-based survey
- human rights
- rATA

## INTRODUCTION

Assistive technology (AT), from spectacles to social robots, enables people to live healthy, productive, independent, and dignified lives by facilitating their participation in education, the labor market and civic life [1]. Given the benefits brought about by AT for the individual and society, access to AT has been recognized as a fundamental human right by the Convention on the Rights of Persons with Disabilities (CRPD). Yet only 10% of the people in need of an AT have access to it [2].

To address the large and growing unmet need for AT and achieve universal coverage, in 2014 the World Health Organization (WHO) has established the Global Cooperation on Assistive Technology (GATE [3, 4]). The primary aim of the GATE initiative is to improve global access to appropriate and affordable AT for people with varying disabilities, diseases, and age-related conditions, through a series of actions involving five interlinked intervention areas: People, Policy, Products, Personnel, and Provision (for further details see [5-9]).

With regard to the activities related to the Policy area, GATE aims at understanding the need and unmet need for AT through a systematic measurement of AT access in various populations [4]. To date, no data have been systematically collected on a global scale about access to AT [10]. The reason for such lack of data may include the high variability of AT provision practices across systems and countries [11], which in turn may have prevented the development of tools that could be used to collect comparable information about AT access in different contexts.

To overcome this challenge and allow direct comparisons between AT systems across countries and populations, GATE has developed the rapid Assistive Technology Assessment (rATA) questionnaire [12]. According to the developers [13], the rATA is a stand-alone tool for efficiently and rapidly assessing the need, use, supply and impact of AT in a population through which AT stakeholders can: a) obtain data and evidence on access to AT; b) advocate and raise awareness of governments as well as of civil society about the importance of AT; c) advance research and development in AT; and d) support in the design, planning or prioritizing AT programmes, or interventions that should be made at global and country levels [13].

The rATA has been originally developed in English and later translated in Spanish, French, Chinese, Portuguese, Russian, and Arabic [14]. For this tool to be implemented globally, however, further translations are needed, considering cultural (e.g., language) as well as AT system specificities of the countries in which the rATA could be implemented.

The aim of the present paper is to report on the translation and adaptation process undertaken to implement the survey in the Italian context. According to a recent scoping review, little is known on the needs, access, and coverage of AT in the member states of the European region [15]. Italy has a population of about 60 million inhabitants, and it is the third-largest national economy in the European Union. The steady increase in the number and proportion of older persons in Italy combined with direct and indirect effects of the current pandemic situation on the health and social care systems, are expected to widen the challenges faced by people in need of an AT [16]. Strengthening access to AT for people with disabilities and those who are frail can be thus considered a national priority to prevent social inequalities and improve the quality of life of the Italian population.

To this end, a consortium of Italian governmental and non-governmental institutions has recently partnered with WHO to conduct a nation-wide survey using the rATA. This study can be considered relevant as it provides governmental authorities (e.g., Ministry of Health) as well as non-governmental organizations (e.g., AT users associations) with a specific tool to collect baseline data and continuously monitor AT access at national as well as regional level. It also provides researchers and AT professionals in Europe and other countries with a detailed account of the methodology followed to adapt the rATA in a specific context. With reference to this latter point, a further matter of in-

terest for the reader of the journal *Annali dell'Istituto Superiore di Sanità* is the implementation in the current study of a rigorous approach to translation and adaptation of the rATA questionnaire. This approach, named Translate, Review, Adjudicate, Pretest, and Document (TRAPD) is increasingly considered a viable strategy when the focus of translation is on cultural equivalence rather than on literal equivalence [17]. The TRAPD approach has several advantages over other existing methods (e.g., forward translation, back-translation), such as ease of adaptation to the needs and resources available to researchers [18]. In addition, this approach can be replicated in future studies to further refine the current version of the Italian rATA based on feedback from stakeholders, including specific populations of respondents (e.g., people with chronic health conditions or disabilities, frail adults, AT users and their caregivers), professionals and other stakeholders related to the AT provision process (e.g., AT experts, health professionals, policymakers), and the research community at large.

## METHOD

The present study took place between February and March 2021. It is part of a larger project conducted by a consortium of partners coordinated by AIAS, a not-for-profit association with more than 50 years of experience in promoting full inclusion of people with disabilities in every life domain through AT. Other partners included: a) the Italian Institute of Health (Istituto Superiore di Sanità; ISS), the main center for research, control and technical-scientific advice on public health in Italy; b) CENSIS (Centro Studi Investimenti Sociali), a foundation with more than 50 years of experience in research, assistance and consultancy activities performed in the main areas of social, socio-economic and socio-political relevance, from education and employment to welfare, healthcare, economic and local development; and c) the Italian network of independent AT centres (GLIC, Gruppo di Lavoro Interregionale Centri ausili informatici e elettronici), a network of 25 specialized AT services in Italy without any commercial interest.

## Instrument

The rATA is an interviewer-administered, population-based survey tool, divided into seven sections designed to gather information on: 1) self-reported use of need and unmet need for assistive products; 2) sources of, payers for and barriers to accessing assistive products and related services; 3) satisfaction with assistive products and related services; 4) self-reported functional difficulties; and 5) basic demographic information, such as age and gender [12]. It takes into account 50 prioritized assistive products [19] plus any other relevant products used or needed by respondents. Details on the structure of the rATA are provided in the manual [13].

## Overview of the translation and adaptation approach

The aim and description of each stage of the TRAPD process followed in this study is briefly summarized

**Table 1**  
Overview of the translation and adaptation process

Step	Definition	Activities undertaken
1. Translate	Develop a first survey translation using an expert approach	Two expert translators proficient in English and experts in AT collaborated to produce a preliminary translated version
2. Review	Expert review of the translation to identify problems and additional translation options	A committee of 11 AT experts independently checked the translated version against the original version. Their opinions were collected using an online survey
3. Adjudication	Make decision on the final version	Feedback from the AT experts were integrated into a second version of the translated rATA. A consensus approach has been used to identify the best possible solution to any issue encountered with the translation of the scale. The integration of the feedback was performed by the two original translators (see step 1)
4. Pilot	Conduct a field test of the survey translation and use observational methods to identify potential problems with the translated version	A small sample of AT users (n=25) has been interviewed by 8 AT experts to identify difficulties in understanding and answering the questions, and to identify translation issues that impede comprehensibility. Feedback from users and interviewers has been collected to refine the interview
5. Documentation	Reporting of all the outcomes produced in each of the preceding step	A detailed account of the outcomes of phases 1-4 have been sent to WHO contact person

in Table 1, along with a summary of the activities undertaken. Following this approach, TRAPD provided opportunities at each step for evaluating and revising translated materials [20]. The revisions that derive from a given step are used as inputs for the following step, with a goal of continuous improvement until a final version of the tool is produced.

#### Step 1: Translate

In this step, the English version of the rATA questionnaire was first translated independently by two experts who have between 10-20 years of experience in AT provision and proficiency in both languages. The two versions produced were matched and differences discussed until agreement was achieved to create a single preliminary version of the Italian rATA. In case of doubts when translating the English version, the two translators occasionally consulted also: a) the WHO contact person coordinating the global rATA survey implementation; and b) the Spanish and the French versions of the rATA questionnaires to achieve a more reliable translation.

#### Step 2: Review

In this step, 11 independent reviewers compared the original (English) version of the rATA scale with the preliminary Italian version. The group included nine AT experts from the Italian Institute of Health, three professionals serving as AT service providers, and three AT users. After familiarizing with the original and the translated versions of the questionnaire, each reviewer was asked to provide feedback on the Italian translation by answering two questions: 1) [Fidelity] "How would you rate the fidelity of the translation with the original version?"; 2) [Wording] "To what extent do you think the wording of the Italian translation is adequate to the Italian context?". Both questions used a 10-point Likert scale (1 = not at all; 10 = totally). After answering the two questions, the reviewers were given the opportunity to provide written suggestions for further refining the

translation. Feedback was provided online through the Qualtrics platform.

#### Step 3. Adjudication

The feedback collected in the previous step were collected and summarized by the two original translators. Suggested changes were discussed between the first and second authors and implemented in a second version of the Italian rATA. The newer rATA version has been later presented to representatives of the wider consortium and all revisions proposed were discussed. A final version of the Italian rATA has been finally produced once consensus among all the members was achieved.

#### Step 4. Pilot

The pilot focused on the assessment of the interviewer's experience with the questionnaire to ensure its applicability to the Italian context. To this end, eight interviewers were involved in this step who were blind to the outcomes of the preceding translation steps (i.e., Step 1-3). The eight interviewers were all AT professionals working in two specialized AT centres located in the central-northern part of Italy with an experience in AT provision ranging from 5 to 20 years. Each interviewer was introduced to the rATA in a 30-minute training session (via either in-person meeting or video-call) and asked to familiarize with the scale before administering it to AT users selected randomly among a group of volunteers. Comparisons between interviewers (i.e., inter-rater agreement) were not planned due to time and resource constraints. All the feedback from interviewee about the rATA were collected by the interviewer. To this end, each interviewer was requested to rate the rATA against four indicators (i.e., applicability, clarity, ease of use, and reliability). Three further open questions were also asked: a) "What are the main critical aspects of the rATA?"; b) "Did the respondents show any negative or positive reaction when answering the rATA?"; c) "Do you have any suggestions to facilitate the administration of the rATA?".

### Step 5. Documentation

The results achieved in each step were annotated and a summary report have been sent to the WHO contact point before implementing the rATA survey.

## RESULTS

The outcomes of the TRAPD process are briefly reported in the two following sections. *Translation and adaptation* summarizes outcomes from Steps 1-3, while *Pilot* provides a summary of outcomes from the pilot test (Step 4).

### Translation and adaptation

Table 2 (available online as Supplementary Material) provides an overview of the main language-related changes in the Italian version compared to the original rATA. The 11 reviewers provided very high ratings for both Fidelity ( $M = 9.22$ ;  $SD = .92$ ) and Wording ( $M = 9$ ;  $SD = 1.25$ ). Overall, suggested changes to wording can be considered of minor entity and were mainly aimed at clarifying the meaning of some general terms used in the original version. For instance, in place of the original term *assistive product*, in the Italian translation it has been decided to adopt the most commonly used Italian term *ausilio* instead of its literal translation (i.e., *prodotto assistivo*).

Notably, however, the rATA has been adapted to the Italian context by adding a section named "Abandonment". It includes one filter question namely "Have you been given an assistive product (*ausilio*) in the past three years that you have never used? (possible answers: Yes; No)". If the answer is "yes", then the respondent is asked to specify the type of assistive product and the reason for its abandonment or non-use.

### Pilot

In total, the interviewers involved 23 AT users. The majority presented with motor disability ( $n=12$ ), followed by age-related difficulties ( $n=5$ ), multiple disabilities ( $n=3$ ), cognitive impairment ( $n=2$ ), and sensor impairment ( $n=1$ ). As shown in Table 3 (available online as Supplementary Material), the rATA was considered overall applicable, clear, and reliable in collecting information related to AT needs, use and provision. In contrast, its use was not considered straightforward as highlighted by the relatively low score in the Ease-of-use indicator.

With reference to answers to the open questions, few comments were left by interviewers (see Table 3 online). Importantly, no negative reactions from respondents were reported. Critical aspects include the fact that the survey may be not fully capable of capturing all the complexities associated to AT delivery in Italy (i.e., multiple funding sources for the same assistive product may be omitted by the respondent) and that the respondents may have difficulties naming the solution in use or estimating the distance covered to buy/obtain it (see Table 3 online). Suggestions to facilitate rATA administration concerned exclusively in providing specific training to interviewers to cope with its complexity and length.

## DISCUSSION

The present study was aimed at reporting on the Italian translation and adaptation process of the rATA, a

questionnaire that is currently being used by WHO to assess global access to AT. Our results indicate that the data collected through the rATA are reliable and well reflect the general state of AT provision in Italy.

With reference to the applicability of the questionnaire to the Italian context, two considerations may be put forward. First, our preliminary results indicate that the Italian version of the rATA is well comprehensible to a wide range of AT users. In contrast, however, it may not be perceived easy to administer by interviewers due to its complexity and length. This aspect should be considered when implementing the survey to a wider population of respondents as it can increase between and within-interviewer variance due to heightened workload, with negative consequences for the quality and accuracy of the data collected [21]. To minimize errors in data collection, we recommend adopting systematic quality assurance procedures such as standardized training and practicing sessions for interviewers (enumerators) before survey implementation as well as continuous monitoring of interviews and data collection when the survey is taking place.

Second, although the rATA has been primarily designed to measure access to AT [13], we argue that it may also represent a unique opportunity to collect comparable data across countries on rates of AT abandonment. Abandonment of AT products, or their "non-use" (see [22] for further insights on this term) can be indeed considered a global issue [11]. Evidence reports abandonment rates up to 78%, depending on the AT considered [23], with most studies converging on AT abandonment rate of about 30% one year after delivery [24]. Although determinants of AT abandonment may vary according to a variety of factors, including age, severity of disability and type and number of AT needed (e.g., [25, 26]), its negative consequences for the individual (and society) are well-known. Accordingly, in the translated rATA we added a new section to investigate the abandonment of AT provided in Italy. In our view, estimating both access to AT and its abandonment may be instrumental in improving the quality of any AT system by facilitating a) the understanding of the factors associated to AT non-use, and b) the development of evidence-based strategies to mitigate discontinuation of AT products after delivery.

Based on current results, two suggestions for improving rATA questionnaire can be further made. First, to collect information on individual functioning, the rATA uses an adapted version of the Washington Group Short Set of Questions on disability (WG-SS) [27]. The WG-SS is an internationally recognized disability question set comprising six questions on respondents' difficulties in conducting everyday activities, including seeing, hearing, mobility, communication, remembering, and self-care [27]. The strength of the WG-SS is that it has been conceived in light of the biopsychosocial model of disability, focusing on the presence and extent of functional difficulties rather than on body structure or health conditions. As such, it is extremely useful for cross-national comparisons on disability data and is becoming the gold standard for censuses aimed at gathering population-level estimate of the number and proportion of persons

with functional difficulties that may need an AT. More recently, the set of six questions has been expanded to provide a more accurate assessment of children between 2 and 17 years of age [28]. To obtain a clearer picture of the state of AT access in a specific country, it may be desirable that future versions of the rATA could be designed to account for differences in functional limitations of different age groups of AT users by employing age-appropriate WG-SS sets of questions.

Second, user involvement is an essential precondition in any aspect of AT research [29]. The original version of the rATA has been developed over a series of consultations with stakeholders to ensure it reflects the views of the users as well as all the actors along the AT provision process [13]. As such, it can be argued that, in its original form, this tool already adopts a user-centred perspective. The Italian translation of the rATA followed as much as possible this approach, by involving stakeholders in almost any step of the TRAPD process. In this view, the relatively small sample of AT users involved in the pilot described in this study should be considered a complementary effort to further center the tool around the perspectives of the local (Italian) users. Moreover, it can be anticipated that the Italian rATA-based census will shed light on the appropriateness of the Italian translation of the rATA in capturing the key aspects of the Italian AT delivery system.

This study further documents the experience of using

an adapted version of the TRAPD approach to survey translation. In keeping with available literature [17, 18, 20], current results suggest that the TRAPD approach can be effective in ensuring: a) the quality of the translation when few resources are available (e.g., time); and b) the transparency of the whole translation process [18]. Further research is however needed to compare the efficacy of the TRAPD approach over other translation methods.

## CONCLUSIONS

This study confirmed the applicability of the rATA survey to the Italian context. The Italian version of the rATA can be used to support the government, the health system as well as the civil society to monitor for the first time the current state of AT access (and abandonment) in the country. The results of the survey may further inform policies at regional and national levels to improve access to AT and, in turn, the life conditions of people with disability/frailty, people with chronic health conditions, and older adults.

## Conflict of interest statement

The Authors declare that there are no conflicts of interest.

Received on 9 February 2022.

Accepted on 8 March 2022.

## REFERENCES

1. Tebbutt E, Brodmann R, Borg J, MacLachlan M, Khasnabis C, Horvath R. Assistive products and the sustainable development goals (SDGs). *Glob Health*. 2016;12(1):1-6. doi: <https://doi.org/10.1186/s12992-016-0220-6>
2. World Health Organization. The WHO Global Disability Action Plan 2014-2021. Available from: [www.who.int/disabilities/actionplan/en/](http://www.who.int/disabilities/actionplan/en/).
3. Khasnabis C, Mirza Z, MacLachlan M. Opening the GATE to inclusion for people with disabilities. *The Lancet*. 2015;386(10010): 2229-30. doi: [https://doi.org/10.1016/S0140-6736\(15\)01093-4](https://doi.org/10.1016/S0140-6736(15)01093-4)
4. World Health Organization. Improving access to Assistive Technology. WHO. Available from: [www.who.int/activities/improving-access-to-assistive-technology](http://www.who.int/activities/improving-access-to-assistive-technology)
5. Desmond D, Layton N, Bentley J, Boot FH, Borg J, Dhungana BM, et al. Assistive technology and people: a position paper from the first global research, innovation and education on assistive technology (GREAT) summit. *Disabil Rehabil: Assist Technol*. 2018;13(5):437-44. doi: <https://doi.org/10.1080/17483107.2018.1471169>
6. de Witte L, Steel E, Gupta S, Ramos VD, Roentgen U. Assistive technology provision: towards an international framework for assuring availability and accessibility of affordable high-quality assistive technology. *Disabil Rehabil: Assist Technol*. 2018;13(5): 467-72. doi: <https://doi.org/10.1080/17483107.2018.1470264>
7. MacLachlan M, Banes D, Bell D, Borg J, Donnelly B, Fembek M et al. Assistive technology policy: a position paper from the first global research, innovation, and education on assistive technology (GREAT) summit. *Disabil Rehabil: Assist Technol*. 2018;13(5):454-66. doi: <https://doi.org/10.1080/17483107.2018.1468496>
8. Smith RO, Scherer MJ, Cooper R, Bell D, Hobbs DA, Pettersson C, et al. Assistive technology products: a position paper from the first global research, innovation, and education on assistive technology (GREAT) summit. *Disabil Rehabil: Assist Technol*. 2018;13(5):473-85. doi: <https://doi.org/10.1080/17483107.2018.1473895>
9. Smith EM, Gowran RJ, Mannan H, Donnelly B, Alvarez L, Bell D et al. Enabling appropriate personnel skill-mix for progressive realization of equitable access to assistive technology. *Disabil Rehabil: Assist Technol*. 2018;13(5):445-53. doi: <https://doi.org/10.1080/17483107.2018.1470683>
10. World Health Organization. Global priority research agenda for improving access to high-quality affordable assistive technology. WHO; 2017. Available from: <https://apps.who.int/iris/handle/10665/254660>.
11. Federici S, Scherer M. *Assistive Technology Assessment Handbook*. (2. Ed). Boca Raton: CRC Press; 2018.
12. Zhang W, Eide AH, Pryor W, Khasnabis C, Borg J. Measuring Self-Reported Access to Assistive Technology Using the WHO Rapid Assistive Technology Assessment (rATA) Questionnaire: Protocol for a Multi-Country Study. *Int J Environ Res Public Health*. 2021;18(24):13336. doi: <http://dx.doi.org/10.3390/ijerph182413336>
13. World Health Organization. The rapid Assistive Technology Assessment (rATA) – Tool for National Representative Survey Enumeration: A Manual. World Health Organization; 2020.
14. World Health Organization. Rapid Assistive Technology Assessment tool (rATA). WHO; 2021. Available from: [www.who.int/publications/i/item/WHO-MHP-HP5-](http://www.who.int/publications/i/item/WHO-MHP-HP5-)

- ATM-2021.1
15. World Health Organization. Prevalence of coverage of assistive technology in the European Region: a scoping review. WHO – Regional Office for Europe; 2021. Available from: <https://apps.who.int/iris/handle/10665/344520>
  16. Palermo S. Covid-19 pandemic: maximizing future vaccination treatments considering aging and frailty. *Frontiers in Medicine*. 2020;7. doi: <https://doi.org/10.3389/fmed.2020.558835>
  17. Harkness J, Pennell BE, Villar A, Gebler N, Aguilar-Gaxiola S, Bilgen I. Translation procedures and translation assessment in the World Mental Health Survey Initiative. In: Kessler RC, Üstün TB, editors. *The WHO World Mental Health Surveys: Global perspectives on the epidemiology of mental disorders*. Cambridge: Cambridge University Press; 2008. p. 91–113.
  18. Vujcich D, Roberts M, Gu Z, Kao SC et al. Translating best practice into real practice: Methods, results and lessons from a project to translate an English sexual health survey into four Asian languages. *PloS one*. 2021;16(12):e0261074. doi: <https://doi.org/10.1371/journal.pone.0261074>
  19. World Health Organization, USAID & International Disability Alliance. Priority assistive products list: improving access to assistive technology for everyone, everywhere. WHO; 2016. Available from: <https://apps.who.int/iris/handle/10665/207694>.
  20. Harkness JA, Van de Vijver FJR, Mohler P. *Cross-cultural survey methods*. New York: Wiley; 2003
  21. Japiec, L. Quality issues in interview surveys - Some contributions. *Bull Methodol Sociol*. 2006;90(1):26-42.
  22. Wessels R, Dijcks B, Soede M, Gelderblom GJ, De Witte L. Non-use of provided assistive technology devices, a literature overview. *Technol Disabil*. 2003;15(4):231-8. Available from: <https://doi.org/10.3233/TAD-2003-15404>.
  23. Petrie H, Carmien S, Lewis A. Assistive technology abandonment: research realities and potentials. In: Miesenberger, K, Kouroupetroglou, G (Eds). *International conference on computers helping people with special needs*. Proceedings. Linz, July 11-13, 2018. p. 532-40. doi: [https://doi.org/10.1007/978-3-319-94274-2\\_77](https://doi.org/10.1007/978-3-319-94274-2_77)
  24. Federici S, Meloni F, Borsci S. The abandonment of assistive technology in Italy: a survey of users of the national health service. *Eur J Phys Rehabil Med*. 2016;52(4):516-26.
  25. Sugawara AT, Ramos VD, Alfieri FM, Battistella LR. Abandonment of assistive products: assessing abandonment levels and factors that impact on it. *Disabil Rehabil Assist Technol*. 2018;13(7):716-23. doi: <https://doi.org/10.1080/17483107.2018.1425748>
  26. Phillips B, Zhao H. Predictors of assistive technology abandonment. *Assist Technol*. 1993;5(1):36-45.
  27. Washington Group on Disability Statistics. *The Washington Group Short Set on Functioning (WG-SS)*; 2020. Available from: [www.washingtongroup-disability.com/fileadmin/uploads/wg/Documents/Questions/Washington\\_Group\\_Questionnaire\\_\\_1\\_-\\_WG\\_Short\\_Set\\_on\\_Functioning.pdf](http://www.washingtongroup-disability.com/fileadmin/uploads/wg/Documents/Questions/Washington_Group_Questionnaire__1_-_WG_Short_Set_on_Functioning.pdf).
  28. UNICEF. *Child functioning*; 2021. Available from: <https://data.unicef.org/topic/child-disability/module-on-child-functioning/>.
  29. Hoogerwerf EJ, Desideri L, Malavasi M, Rimondini M, Kübler A. Towards a framework for user involvement in research and development of emerging assistive technologies. In: Encarnacao P et al. (Eds). *Assistive Technology: From Research to Practice*. Proceedings. Vilamura, September 19-22, 2013. p. 531.