Original Article

Transcultural adaptation of the structuring framework for the conceptual modeling of assistive technology devices outcomes for portuguese (Brazil)[1]

Adaptação transcultural do quadro de estruturação para a modelagem conceitual de resultados de dispositivos de tecnologia assistiva para o português (Brasil)

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Abstract

The "Evidence-Based Practice in Assistive Technology" model has as its guiding object to aggregate the clients' "objectives and the professionals" experience to the best available evidence of the systematic research for the choice of Assistive Technology Devices (ATD). This is done through the 'Structuring Framework for Conceptual Modeling of AT Device Outcomes (SFCMATDO) that guides the professional during the process of selection and implementation of DTA. The goal was adapting a conceptual model of Assistive Technology cross-culturally, through a structured framework for the Brazilian Portuguese language. Transcultural adaptation of the Framework for Conceptual Modeling of AT Devices Outcomes (SFCMATDO), guided by Evidence-Based Practice in Assistive Technology (EBPAT) was carried out from the national and international literature in the area. The use of measuring instruments allows standardized data to be obtained, comparing the results among different populations, as well as being an economical and efficient way of acquiring reliable and valid results.

Keywords: Assistive Technology, Occupational Therapy, Transcultural Adaptation, Clinical Practice Based on Evidence.

Resumo

O modelo "Prática Baseada em Evidência na Tecnologia Assistiva" tem como norte agregar os objetivos dos clientes e a experiência dos profissionais às melhores evidências disponíveis da pesquisa sistemática para escolher Dispositivos em Tecnologia Assistiva (DTA). Isso é feito por meio do "Quadro de Estruturação para a Modelagem Conceitual de Resultados de Dispositivos de TA" (QEMCRDTA), que guia o profissional durante o processo de seleção e implementação do DTA. Objetivou-se adaptar transculturalmente um modelo conceitual de Tecnologia Assistiva, por meio de um quadro estruturado para a língua portuguesa brasileira. Foi realizado o processo de adaptação transcultural do QEMCRDTA, norteado pela Prática Baseada em Evidência na Tecnologia Assistiva (PRABETA), com base na literatura nacional e internacional na área. O uso de instrumentos de medida possibilita a obtenção de dados padronizados, permitindo comparar os resultados entre populações distintas, e é uma forma econômica e eficaz de adquirir medidas de resultado confiáveis e válidas.

Palavras-chave: Tecnologia Assistiva, Terapia Ocupacional, Adaptação Transcultural, Prática Clínica Baseada em Evidência.

1 Introduction

Assistive Technology is an area of interdisciplinary knowledge, encompassing products, resources, methodologies, strategies, practices, and services to promote the functionality, activities, and participation of people with deficiency, disabilities or reduced mobility, to stimulate their autonomy, their independence, good quality of life and social inclusion (Brasil, 2007).

AT devices, resources and services can be purchased commercially, modified, personalized and/or made by therapists, aiming to increase, maintain or improve the functional capacities of individuals with disabilities or with temporary functional limitations (Marins & Emmel, 2011).

This Assistive Technology makes users increase their potential, enabling more functional independence or autonomy and increasing their social participation (Cook & Polgar, 2015; Barroso, 2018), understood as a set of behaviors expected by society, modeled by culture and that can guide the process of choosing occupations and raise the level of independence, quality of life and social inclusion. This is done by expanding their communication, mobility, controlling their environment, learning and working skills (Braccialli, 2007; American Occupational Therapy Association, 2015; Cruz et al., 2016; Alves & Matsukura, 2016).

The technological and social changes experienced in the last decades have enabled the development of products and systems that before were focused only on technical and functional aspects and ergonomic and design perspectives, with their design, restricted to the contribution of some areas, such as Anthropometry, Biomechanics, and Physiology. Currently, it is important to be concerned with cognitive aspects and strive to also reach the emotional and relational aspects between the user and the product (Neistadt & Crepeau, 2002; Alves, 2013). In the Assistive Technology area, the

prescription process requires responsible professionals with knowledge of the equipment and an understanding of the users' demands to be met (Pelosi & Nunes, 2009; Marins & Emmel, 2011; Galvão et al., 2013).

With the models and measurement instruments, it is possible to obtain data, compare results between different populations, acquire reliable and valid result measures economically and effectively, and transform subjective measures into objective data, which can be quantified and analyzed. This enables one to verify the impacts on the health intervention processes and to compare the data obtained more efficiently and with less financial resources (Beaton et al., 2000; Neistadt & Crepeau, 2002; Gjersing et al., 2010; Witte et al., 2018).

In exploratory research, the researcher should use a methodology and/or an instrument previously developed to avoid the construction of a new model or instrument, due to the complexity of the creation process, associated with the existence of validated instruments and models that many times assess the same phenomenon. Therefore, we recommend an adaptation of pre-existing models for the desired culture be conducted (Beaton et al., 2000; Wild et al., 2005; Mokkink et al., 2010; Gjersing et al., 2010).

Beaton et al. (2000) and Wild et al. (2005) suggested that the methodology for conducting cross-cultural adaptation should be used systematically. Thus, the instrument developed must be equated and the guidelines used in the process of cross-cultural conduction should be used to guarantee the reliability and consistency of grammatical and cultural issues to the professionals who will use the model.

Compared with other countries in North America and Europe, Brazil has a reduced number of AT instruments that assist researchers and rehabilitation professionals in the process of prescribing, indicating and selecting AT items and their monitoring (Barroso et al., 2018). The evaluation process and methodologies for AT products are another limiting aspects. The real objectives of an assessment and rehabilitation process can only be achieved if the assessment and selection instruments are used properly (Carvalho et al., 2014; Coster & Mancini, 2015).

As in other areas of Health, Education and Services, the use of assessment tools and/or methodologies in a new country, culture and/or language in the Assistive Technology needs to adapt them and follow the guidelines to conduct cultural adaptation and associate it with tests of psychometric properties (Guillemin et al., 1993; Neistadt & Crepeau, 2002; Wild et al., 2005; Sampaio & Mancini, 2007a; Gjersing et al., 2010; Coster & Mancini, 2015; Pinto et al., 2016).

Considering the need to expand and strengthen research on Assistive Technology in the rehabilitation area in Brazil, this research proposes to study a conceptual model that guides professionals to use AT devices and made it available to the Brazilian culture, previously developed from the structure of the International Classification of Functioning, Disability and Health (CIF) (Sampaio & Mancini, 2007b; Di Nubila & Buchalla, 2008; Alves, 2013; Carvalho et al., 2014; Campos, 2017). The conceptual model chosen was the "evidence-based practice in Assistive Technology" (EBPAT) - a process of analysis and sequential search to discover the best Assistive Technology Device (ATD), which is most appropriate to meet the client's needs. The central object guides the "structuring framework for the conceptual modeling of the Assistive Technology devices outcomes" (SFCMATDO), created by

Fuhrer et al. (2003), aiming to investigate and validate the contribution and impact of using an AT Device.

Fuhrer et al. (2003) proposed that the implementation starts with the search for the resource, identifying the individual's need, the types of devices and the available AT services, as a way to analyze their effectiveness. First, the introduction of the resource will be characterized by a short-term use, which will depend on the investigation of effectiveness, efficiency, satisfaction, well-being and moderating factors (cost, body and environmental factors), and it will determine the exchange or the maintenance of the device for long-term use, which will be determined by the moderating factors. The concrete time to analyze and evaluate the moderating factors will depend on the professional who will implement the device with the user. This methodological process is necessary not only because there are several questions to answer, but also because research on ATD is complex (Fuhrer et al., 2003; Peterson-Karlan & Parette, 2007; Alves, 2013; Dias & Dias, 2017).

The commitment to add the clients' objectives and integrate the professionals' experience with the best available evidence from systematic research to choose the product is a characteristic of this model. In the AT field implies an emphasis on results research that discusses the contributions of devices and services related to users' daily life and practice. Thus, this study aimed to conduct the process of cross-cultural adaptation of the "Structuring Framework for the Conceptual Modeling of the AT Devices outcomes" (SFCMATDO) for the Brazilian Portuguese language, guided by the "Evidence-Based Practice Assistive Technology" conceptual model.

2 Method

This is cross-cultural adaptation research of the "Evidence-Based Practice in Assistive Technology" model by Fuhrer et al. (2003). Its guiding objective is to add the objectives of the clients and the experience of the professionals to the best available evidence of the systematic research for the choice of Assistive Technology Devices (ATD) through the "Structuring Framework for Conceptual Modeling of AT Device Outcomes" (SFCMATDO), a guide for rehabilitation professionals, engineers, salespeople, and designers, to be used during the ATD selection process.

The process of cross-cultural adaptation was based on the methodology and recommendations proposed by Beaton et al. (2000) and Wild et al. (2005), organized in five stages: 1) Translation; 2) Synthesis of the translations; 3) Back translation; 4) Analysis by an Expert committee; 5) Pre-final version testing.

2.1 Procedures

Initially, we contacted Dr. Marcus Fuhrer via email, one of the authors of the "Evidence-based Practice in Assistive Technology" model, and the translation process was authorized. The project was submitted to the Human Research Ethics Committee of the University of São Paulo (USP), respecting the prerogatives of Resolution 466/12, of the National Health Council (CNS), and approved on March 24, 2017, with opinion 1,957,349/2017 and with the Presentation Certificate for Ethical Appreciation (*CAAE*): 62807916.8.3001.5188.

1. **Translation:** the translation of the Model from North American English into Brazilian Portuguese was carried out independently, in two moments, by four different people (see Table 1).

Two English specialists, professionals in the Rehabilitation area, and two bilingual occupational therapists participated in the first stage of the process, whose mother tongue was Brazilian Portuguese, but who mastered the English language in the area of Assistive Technology. The activity lasted one month and was done individually. The occupational therapist translators 1 and 2 translated the model (English into Portuguese) independently, without any exchange of information between them. After this stage, we obtained the version of Translator 1 (T1) and Translator 2 (T2). There was a conference between the translations and a discussion held by two professionals with experience in English and specialists in the Rehabilitation area. During this stage, they found the differences and they made suggestions for the most appropriate terms shown in Tables 2 and 3.

The result of this phase came from the first version of the translation. Tables 2 and 3 show the different terms used in Translators 1 and 2, and the changes made, which originated the first version of the Model. The result of this phase was derived from the first version of the translation. Tables 2 and 3 show the terms that differed between Translators 1 and 2, as well as the changes made, which led to the first version of the Model.

2. **Synthesis of the translations**: a team with researchers involved in the project with experience in the area of Assistive Technology, Rehabilitation and in cross-cultural adaptations met to compare the original version with the two versions translated in stage 1 - Translation. After this stage, the translations became uniform, a process named as version-consensus;

3. **Back translation**: based on the consensus version, the Portuguese version was translated into the native language of the instrument - American English, by two other bilingual translators independently, whose native language was North American English;

4. **Experts Committee**: a Experts Committee was created to assess the equivalences, with professionals having the following studies: only Graduation (n = 2), Specialization (n = 2), Master (n = 4), Doctorate (n = 2) and Post-Doctorate (n = 2). These professionals worked for more than five years in postural adequacy in CR (n = 8), with less than five years of practice (n = 2) and no experience in AT (n = 2) since they work with English teaching and translation. Four of them live in São Paulo/SP; two in Rio Grande do Norte/RN; two in João Pessoa-PB; two in the interior of Minas Gerais; one in Rio de Janeiro/RJ; and one abroad (USA). This diversity certified the quality of the analysis, especially in the possible regional linguistic differences. The inclusion criteria to be in the Experts Committee for the research were: (a) to be an occupational therapist and/or an English teacher, with higher education in the area of Linguistics; (b) to know the area of Assistive Technology and/or Ergonomics; (c) to know Linguistics and master the English and Portuguese languages. The contact was made via e-mail and telephone, with specialists who did not live in São Paulo, and personally, with the others. After the first contact, an invitation was sent with a brief contextualization of the research, in which everyone agreed to participate. The researcher carried out the characterization of the participants of the Experts Committee through a consultation of the Lattes Curriculum on the CNPq platform. After this process, the translation presented a vocabulary coherent with the original English version, which enabled a faithful version to the original;

5. **Pre-final version testing**: although there are numerous ways to measure the stage of the Pre-test in the literature, we decided to follow the protocol of Beaton et al. (2000), applying the Chart in a sample composed of 30 or more individuals of the target population, in this case, wheelchair users. Sixty-four people spontaneously participated in the process of cross-cultural adaptation of the SFCMATDO - 10 judges, 50 representatives of the target population, two service coordinators and two general coordinators. The sample was non-probabilistic, for convenience and consisted of 50 people using wheelchairs who were in line at the Dispensing Service of 2008, located at the Institute of Orthopedics and Traumatology (IOT) of Hospital das Clínicas, Medicine School at the University of São Paulo (USP). The last collection was on December 14, 2017. The inclusion criteria were: people who were on the waiting list for the concession service; in the case of children, to use a wheelchair; who had used a WC manual for at least six months; who have completed elementary education (for example the caregiver); who not have cognitive and/or communication problems and accept to participate in the research voluntarily.

3 Results and Discussion

There was a consensus that the translation of an instrument already developed in another language has advantages over the construction of a new one since it is faster and results in an equivalent measure that can be used to compare different contexts (Guillemin et al., 1993; Beaton et al., 2000; Gjersing et al., 2010; Wild et al., 2005; Sampaio & Mancini, 2007a; Epstein et al., 2015; Coster & Mancini, 2015).

We used this guiding idea for the processes that involve the cross-cultural adaptation of models and related ones.

We strictly followed the guidelines proposed by the authors of the conceptual model (Fuhrer et al., 2003) to carry out this process as well as the guidelines of researchers in the area of cross-cultural adaptation (Guillemin et al., 1993; Beaton et al., 2000; Gjersing et al., 2010; Wild et al., 2005; Sampaio & Mancini, 2007a; Epstein et al., 2015; Coster & Mancini, 2015).

The process of conducting a cross-cultural adaptation required a series of strict guidelines and methodological strategies for the translation and cross-cultural adaptation of the Model, ensuring a valid version to be used in a language different from the original. The methodology is not simple and involves costs. Therefore, it is necessary to consider whether the instrument and/or model is relevant for research and clinical practice and whether its characteristics are suitable for the purpose, the population and the context in which it is intended to be used (Coster & Mancini, 2015).

3.1 The translation

The North American English to Brazilian Portuguese translations of the "Structuring Framework for Conceptual Modeling of Assistive Technology Device Outcomes" by Fuhrer et al. (2003) were very close. Despite this, the versions showed different interpretation, a common fact, as it is an individualized intellectual work, making the synthesis work rich, as shown in Table 1.

Table 1. Translation of SFCMATDO from English to Portuguese from Brazil.

Item	Original term	T1 translation	Translation T2
1.	*Procurement of a Device-type*	Aquisição de tipos de dispositivo	Aquisição de um tipo de dispositivo
2.	*Introductory use*	Uso introdutório	Uso introdutório
3.	***Shorter-term outcomes:*** *Effectiveness; Efficiency; Device Satisfaction; Psychological Functioning; Subjective Well-being*	**Resultados em curto prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Funcionamento psicológico • Bem-estar subjetivo	**Desfecho em curto prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Função psicológica • Bem-estar subjetivo
4.	*Discontinued use*	Uso descontínuo	Uso interrompido
5.	*Longer-term use*	Uso em longo prazo	Uso em longo prazo
6.	***Longer-term outcomes:*** *Effectiveness; Efficiency; Device Satisfaction; Psychological Functioning; Subjective Well-being*	**Resultados em longo prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Funcionamento psicológico • Bem-estar subjetivo	**Desfecho em longo prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Função psicológica • Bem-estar subjetivo
7.	*Discontinued use*	Uso descontínuo	Uso interrompido
8.	*Continued use*	Uso contínuo	Uso a longo prazo
9.	***Moderating co-factors:*** *ICF Body Function and Structures; ICF Activities and Participation; ICF Environmental Factors; ICF Personal Factors; Concurrent interventions; Comorbidities; Continuing ATD Services; Costs*	**Cofatores de moderação:** • CIF Estrutura e Função do Corpo • CIF Atividade e Participação • CIF Fatores Ambientais • CIF Fatores Pessoais • Intervenções concorrentes • Comorbidades • Serviços de TA contínuos • Custos	**Fatores moderadores:** • Estruturas e funções do corpo da CIF • Atividades e participação da CIF • Fatores ambientais da CIF • Fatores pessoais da CIF • Intervenções simultâneas • Comorbidades • Manutenção dos serviços de DTA • Custos

T1 and T2: translators 1 and 2. ATD: acronym for - assistive technology devices. DTA: assistive technology devices. TA: assistive technology. CIF: International Classification of Functioning, Disability and Health. ICF: acronym in Portuguese for - *Classificação Internacional da Funcionalidade, Incapacidade e Saúde*.

There was disagreement in seven of the nine items of the 63 words analyzed in the table. In some words, the translations differed due to the use of synonyms, addition or deletion of terms in comparison with the original, as shown in Table 1. The coordinators met and generated the synthesis version to solve the discrepancies. The decision for consensus on the versions sought semantic proximity to the original version, as shown in Table 2.

Table 2. Consensus between the versions.

Item	Original term	T1 translation	Translation T2	Synthesis	Justification for changes
1.	*Procurement of a device-type*	Aquisição de tipos de dispositivo	Aquisição de um tipo de dispositivo	Aquisição de um tipo de dispositivo	Decided by the coordinators – Experts Committee
2.	*Introductory use*	Uso introdutório	Uso introdutório	Uso introdutório	Similarity between translations
3.	***Shorter-term outcomes:*** *Effectiveness; Efficiency; Device Satisfaction; Psychological Functioning; Subjective Well-being*	**Resultados em curto prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Funcionamento psicológico • Bem-estar subjetivo	**Desfecho em curto prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Função psicológica • Bem-estar subjetivo	**Resultados em curto prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Funcionamento psicológico Bem-estar subjetivo	Decided by the coordinators – Experts
4.	*Discontinued use*	Uso descontínuo	Uso interrompido	Uso interrompido	Decided by the coordinators – Experts
5.	*Longer-term use*	Uso a longo prazo	Uso a longo prazo	Uso a longo prazo	Similarity between translations
6.	***Longer-term outcomes:*** *Effectiveness; Efficiency; Device Satisfaction; Psychological Functioning; Subjective Well-being*	**Resultados em longo prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Funcionamento psicológico • Bem-estar subjetivo	**Desfecho em longo prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Função psicológica • Bem-estar subjetivo	**Resultados em longo prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Funcionamento psicológico • Bem-estar subjetivo	Decided by the coordinators – Experts
7.	*Discontinued use*	Uso descontínuo	Uso interrompido	Uso interrompido	Decided by the coordinators – Experts
8.	*Continued use*	Uso contínuo	Uso em longo prazo	Uso em longo prazo	Decided by the coordinators – Experts
9.	***Moderating co-factors:*** *ICF Body Function and Structures; ICF Activities and Participation; ICF Environmental Factors; ICF Personal Factors; Concurrent Interventions; Comorbidities; Continuing ATD Services; Costs*	**Cofatores de moderação:** • CIF Estrutura e Função do corpo • CIF Atividade e Participação • CIF Fatores ambientais • CIF Fatores pessoais • Intervenções concorrentes • Comorbidades • Serviços de TA contínuos • Custo	**Fatores moderadores:** • Estruturas e funções do corpo da CIF • Atividades e participação da CIF • Fatores ambientais da CIF • Fatores pessoais da CIF • Intervenções simultâneas • Comorbidades • Manutenção dos serviços de DTA • Custos	**Fatores moderadores:** • Estruturas e funções do corpo da CIF • Atividades e participação da CIF • Fatores ambientais da CIF • Fatores pessoais da CIF • Intervenções concorrentes • Comorbidades • Manutenção dos serviços de DTA • Custos	Decided by the coordinators – Experts

T1 and T2: translators 1 and 2. ATD: acronym for - assistive technology devices. DTA: assistive technology devices. TA: assistive technology. CIF: International Classification of Functioning, Disability and Health. ICF: acronym in Portuguese for - *Classificação Internacional da Funcionalidade, Incapacidade e Saúde*.

The cross-cultural adaptation must generate a reliable and valid instrument, similar to the original, to be used as a reference in research and the clinical area in different cultures, aiming to compare the results obtained in different countries (Beaton et al., 2000; Wild et al ., 2005).

Cultural, psychosocial, financial, physiological and biomechanical factors can be culturally different, but they must be well understood to help the rehabilitation professional to make decisions during the therapeutic process (Beaton et al., 2000; Wild et al., 2005; Mokkink et al., 2010; Ruaro et al., 2012; Senna et al., 2013).

3.2 Synthesis of the translations

Although we found a few disagreements between the translators in the table, we decided to hold the synthesis meeting. Initially, two professional translators specialized in the rehabilitation area (Translator 1 and Translator 2) translated the SFCMATDO independently from English into Brazilian Portuguese, without any contact or exchange of information between them. After this stage, we obtained the T1 and T2 versions.

The synthesis meeting aimed to review the modeling framework and possible corrections based on the information from the translators and, later, those that emerged with the analysis of the data collected in the pre-test. The professionals with experience in the English language and Experts in the area of Rehabilitation/Ergonomics/Assistive Technology checked and discussed the translations, in which a version was produced. In addition to the translations of professionals who master the English language, it was carried out through the reflection of two professionals involved in the research. The result of this process constitutes version 1 of the translation shown in Table 3.

3.3 Back translation

Back translation is the process of reverse translation performed by a health professional, Brazilian, resident in the United States and fluent in English, who participated as a translator of the Brazilian Portuguese to American English version.

According to the guidelines of Beaton et al. (2000) & Wild et al. (2005), this is a method that guarantees more consistency between translations, reflecting the same content as the original version and then adjusted according to the decision of the Experts Committee if they wish. The two versions of the translation and the two versions of the back-translation work were similar to each other. All items and alternative answers were similar between the two back-translations and analyzed by the Experts Committee (Reichenheim & Moraes, 2007).

3.4 Theoretical analysis of the items

According to the process of cross-cultural adaptation described by Pasquali (2009), after the translation, the synthesis and equivalence stages between the versions of the SFCMATDO model, there was a descriptive analysis through tables and quantitative assessments, using the frequency and percentage distributions. In the analysis of the Experts Committee, Pasquali's (2009) agreement index was adopted, in which:

$$Agreemequent\ calculation = \frac{Agreement}{Agreements\ +\ Disagreements} \times 100 \qquad (1)$$

The main researcher of this study carried out the first stage and consisted of counting the items, by calculating the agreement between the judges. After verifying the stages described, the Semantic Equivalence process was carried out, which consists of comparing terms or words from the original document and the cross-cultural adaptation version, performed from the counting of the corresponding and non-corresponding items by calculating the agreement between the judges. According to Pasquali (2009), this is done to maintain the meaning correspondence of the original document.

After investigating the answers of the translators and the Expert Committee, there was the first synthesis meeting, which generated Table 3. There were disagreements in some words that did not reach a minimum of 80% of agreements between the judges and there was disagreement with the other researchers on the equivalence.

The items that did not reach at least 80% in the agreement calculation were sent back to the judges to proceed with a new analysis. After the corrections, semantic analysis and idiomatic equivalence reached 82% of acceptance for each item. The analysis of cultural (75%) and conceptual equivalence (68%) showed a low rate of the proportion of items and did not meet the criterion of CI> 80. Some changes were necessary, as shown in Table 3 (Pasquali, 2009).

Table 3. Agreement Index of the Expert Committee Judges.

4 judges	Agreement		Agreement		Agreement		Concord Agreement ância	
	Semantic Equivalence	%	Idiomatic Equivalence	%	Cultural Eq.	%	Conceptual Eq.	%
Item 1	4	100%	4	100%	4	100%	4	100%
Item 2	4	100%	4	100%	4	100%	2	50%
Item 3	4	100%	4	100%	4	100%	2	50%
Item 4	4	100%	4	100%	2	50%	2	50%
Item 5	2	50%	2	50%	2	50%	4	100%
Item 6	3	75%	3	75%	3	75%	3	75%
Item 7	2	50%	2	50%	2	50%	2	50%
Scale agreement:	82%		82%		75%		68%	

Some items continued to show disagreements between the judges, such as the English stage of *Continued use*. The judges were unable to agree with the term "Continuous use" or "Long-term use", which led to a lack of consensus. In the end, all the items reached 100% approval and expected agreement. Table 4 shows this result.

Table 4. Items that have changed.

English version	Portuguese translation	Agreement	Changes	Agreement
Procurement of a Device-type	Aquisição de tipos de dispositivo	**100%**	Aquisição de um tipo de dispositivo	-
***Shorter-term outcomes:** Effectiveness; Efficiency; Device Satisfaction; Psychological Functioning; Subjective Well-being*	**Desfecho em curto prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Função psicológica • Bem-estar subjetivo	**75%**	**Resultados em curto prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Funcionamento psicológico Bem-estar subjetivo	**100%**
Discontinued use	Uso descontínuo	**75%**	Uso interrompido	**100%**
***Longer-term outcomes:** Effectiveness; Efficiency; Device Satisfaction; Psychological Functioning; Subjective Well-being*	**Desfecho em longo prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Função psicológica • Bem-estar subjetivo	**100%**	**Resultados em longo prazo:** • Eficácia • Eficiência • Satisfação com o dispositivo • Funcionamento psicológico • Bem-estar subjetivo	-
Continued use	Uso contínuo	**75%**	Uso a longo prazo	**100%**
***Moderating Co-factors:** ICF Body Function and Structures; ICF Activities and Participation; ICF Environmental Factors; ICF Personal Factors; Concurrent Interventions; Comorbidities; Continuing ATD Services; Costs*	**Cofatores de moderação:** • CIF Estrutura e função do corpo • CIF Atividade e participação • CIF Fatores ambientais • CIF Fatores pessoais • Intervenções concorrentes • Comorbidades • Serviços de TA contínuos • Custo	**75%**	**Fatores moderadores:** • Estruturas e funções do corpo da CIF • Atividades e participação da CIF • Fatores ambientais da CIF • Fatores pessoais da CIF • Intervenções concorrentes • Comorbidade • Manutenção dos serviços de DTA • Custos	**100%**

ATD: acronym for - assistive technology devices. DTA: assistive technology devices. TA: assistive technology. CIF: International Classification of Functioning, Disability and Health. ICF: acronym in Portuguese for - *Classificação Internacional da Funcionalidade, Incapacidade e Saúde*.

After the researchers who guided this study (Beaton et al., 2000; Wild et al., 2005; Reichenheim & Moraes, 2007) followed all the stages, the Semantic Equivalence process was performed again, comparing the terms, phrases, and words between the original instrument and the adapted version, trying to maintain the meaning correspondence of the original model (Reichenheim & Moraes, 2007).

3.5 Experts Committee

According to Beaton et al. (2000), Wild et al. (2005) & Pasquali (2009), the process of cross-cultural adaptation was carried out following these steps: Semantic Equivalence, Idiomatic Equivalence, Cultural Equivalence, and Conceptual Equivalence, presented in the item "Theoretical analysis of the items".

For this step of the research, the Experts Committee adjusted the words, the technical terms, and the semantic coherence and considered the linguistic equivalences between Brazilian Portuguese and North American English. In the last round, the participants of the committee received a kit containing an information letter and the four evaluations: semantic, idiomatic, cultural and conceptual in a table, with the items in which there was disagreement between the translators (T1) and (T2).

The analyses were performed by comparing the English version with version 1 in Portuguese, as shown in Table 3. Committee members were instructed not to exchange information with other participants during the item analysis process. The work started with a discussion about the model's name, and the consensus was based on building a name as similar as possible to the North American name.

One of the questions that guided the discussion was that there were two names to be translated: the first name refers to the "Evidence-Based Practice Model in Assistive Technology", which had already undergone a process of translation into Brazilian Portuguese, carried out in the work of Alves (2013), in which the models and the method of implementing Assistive Technology resources in the literature were identified. The second name that went through the procedures was the "Structuring Framework for Conceptual Modeling for Assistive Technology Devices Outcomes". The decision not to make an acronym with parts of the name was because possible abbreviations for the name are used, such as Conceptual Modeling Framework; Assistive Technology Devices Conceptual Modeling Framework and Assistive Technology Modeling Framework.

After this first step, the agreement of the seven items that did not obtain a value greater than 80% similarity between the translators was analyzed. For this, the synthesis judge coordinated the re-elaboration of some words, checking which terms were better described grammatically to make the model clearer and more fluid for Brazilian culture. The process was also based on the choice of synonyms so that the statement would be more similar to the expressions used in our daily lives (example: in items four and seven, the phrase: Discontinued use was translated as interrupted use, changed if the term "discontinuous" for "interrupted"). This happened because the word "discontinuous" was not used as much as "interrupted". The inversion of orders, as in item 9 (example: the word ICF was for the end of the sentence), as shown in Table 4, also facilitating the reading of the table. At the end of the meeting, the final version of the SFCMATDO was established, shown in Figure 1.
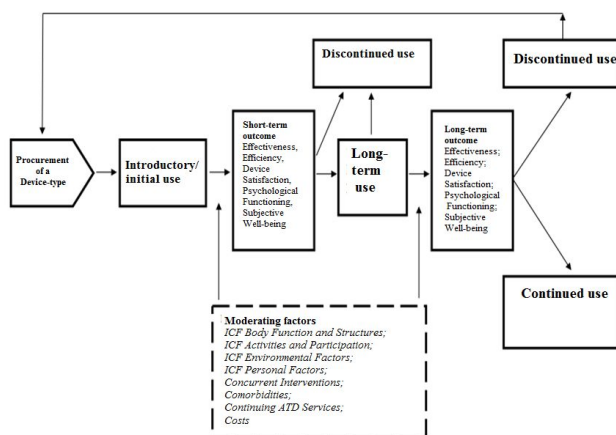
Figure 1. Final Version of "Structuring table for Conceptual Modeling of Results from AT Devices" (QEMCRDTA) SFCMATDO.

4 Final Considerations

This study described the conductive methodology of the cross-cultural adaptation of the "Structuring Framework for the Conceptual Modeling for Assistive Technology Devices Outcomes" (SFCMATDO), through the conceptual model of Evidence-Based Practice in Assistive Technology that is the central guiding object of the Framework.

The cross-cultural adaptation is a complex process composed of several stages strictly followed according to the guiding literature used in this research. After the procedures for cross-cultural adaptation, the SFCMATDO maintained equivalence with the original version, according to national and international literature, being suitable for the Brazilian population.

The study showed that the SFCMATDO has the potential to facilitate the development of specific causal models for selecting AT devices and can contribute to the development of a research agenda for a deeper and more accurate observation of the results of ATD, highlighting measures that need to be developed and identifying testable hypotheses related, for example, to the way and duration of use of the devices and the application of specific AT instruments adapted to Brazilian culture.

Finally, the presentation of the statistical data that aim to understand the process of reliability and validity is still necessary. We believe that this article can contribute to improving the process of investigation, selection and cross-cultural adaptation of models and/or instruments that guide the use of Assistive Technology Devices and encourage good choices, with the perspective of reducing abandonment and increasing the satisfaction of the users with their device.

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Author's Contributions

Both authors were responsible for the design and development of the text, and approved its final version.

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