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## BREASTFEEDING ASSISTIVE TECHNOLOGY FOR PEOPLE WITH VISUAL DEFICIENCIES: COMPARISON BETWEEN BRAZIL AND PORTUGAL

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### ABSTRACT

**Objective:** to describe the result of the apparent validation and content of the assistive technology "Breastfeeding in action", with visually impaired people from two realities, Portugal and Brazil.

**Method:** an apparent validation study based on the psychometric model composed of the theoretical, empirical and analytical poles. Participants were 19 people in Brazil and 21 people in Portugal with visual impairments. The construct is the Assistive Technology in a cordel format, "Breastfeeding in Action", developed in Brazil and adapted for application in Portugal. For data collection, a computer with a voice synthesizer and computer screen reading system for the blind was used. For the evaluation items a Likert-type scale was used.

**Results:** among the participants of South America, young adults with elementary education and among the Europeans, older adults with elementary education prevailed. Regarding the technology itself, in all topics and items there were excellent evaluations with some topics analyzed differently in the two countries. The participants liked the Assistive Technology, however, it took time for the validation using the synthesizer and, even then, it was often complex. The refusals to participate may have been related to the absence of digital inclusion.

**Conclusion:** it was concluded that the technology was evaluated. It was well accepted and it was found that, for people with visual impairment, new inclusion strategies are still necessary, both in health and in other areas.

**DESCRIPTORS:** Breastfeeding. Technology. People with visual impairment. Nursing. Health Promotion.

## TECNOLOGIA ASSISTIVA SOBRE AMAMENTAÇÃO PARA PESSOAS COM DEFICIÊNCIA VISUAL: COMPARAÇÃO BRASIL E PORTUGAL

### RESUMO

**Objetivo:** descrever o resultado da validação aparente e de conteúdo da tecnologia assistiva "Amamentação em ação", junto a pessoas com deficiência visual de duas realidades, de Portugal e Brasil.

**Método:** estudo de validação aparente fundamentado no modelo da psicometria composto dos polos teórico, empírico e analítico. Participaram, no Brasil, 19 pessoas com deficiência visual e em Portugal 21. O construto é a Tecnologia Assistiva em formato cordel, "Amamentação em Ação", elaborada no Brasil e adaptada para aplicação também em Portugal. Para coleta, foi utilizado computador com sintetizador de voz e sistema de leitura de tela do computador para cegos. Para os itens de avaliação utilizou-se escala tipo Likert.

**Resultados:** entre os participantes da América do Sul prevaleceram adultos jovens com escolaridade correspondente ao ensino fundamental e entre os europeus, idosos com ensino fundamental. Concernente à tecnologia propriamente dita, em todos os tópicos e itens houve excelentes avaliações com alguns tópicos analisados diferentemente nos dois países. Os participantes gostaram da Tecnologia Assistiva, mas para validar utilizando o sintetizador, precisou-se de tempo, e mesmo assim, muitas vezes, foi complexo. Alguns se recusaram a responder isto pode estar relacionado ainda à ausência da inclusão digital.

**Conclusão:** concluiu-se que a tecnologia foi avaliada. A mesma foi bem-aceita e conclui-se que para pessoas com deficiência visual ainda são necessárias novas estratégias de inclusão, tanto na saúde como em outras áreas.

**DESCRIPTORIOS:** Aleitamento materno. Tecnologia. Pessoas com deficiência visual. Enfermagem. Promoção da saúde.

# TECNOLOGÍA DE ASISTENCIA SOBRE AMAMANTAMIENTO PARA PERSONAS CON DEFICIENCIA VISUAL: COMPARACIÓN ENTRE BRASIL Y PORTUGAL

## RESUMEN

**Objetivo:** describir el resultado de la validación aparente y del contenido de la tecnología de asistencia “Amamantamiento en acción”, junto a personas con deficiencia visual de las realidades en Portugal y Brasil.

**Método:** estudio de validación aparente fundamentado en el modelo de la sicometría y compuesto de polos teóricos, empíricos y analíticos. En Brasil, participaron 19 personas con deficiencia visual y en Portugal 21 personas. El constructo es la Tecnología de Asistencia en el formato cordel, “Amamantamiento en Acción”, elaborada en Brasil y también adaptada para su aplicación en Portugal. Para la obtención de datos se usó un computador con sintetizador de voz y sistema de lectura de pantalla del computador para ciegos. Para los ítems de evaluación se utilizó la escala de tipo Likert.

**Resultados:** entre los participantes de América del Sur prevalecieron los adultos jóvenes con escolaridad correspondiente a la enseñanza primaria y entre los europeos, los ancianos con enseñanza primaria. En relación a la tecnología propiamente dicha, en todos los tópicos e ítems hubo excelentes evaluaciones con algunos tópicos analizados de forma diferente en ambos países. Los participantes gustaron de la Tecnología de Asistencia, pero para validar utilizando el sintetizador se precisó de tiempo, y aun así, muchas veces resultó ser complejo. Algunos se negaron a responder por estar relacionado con la ausencia de la inclusión digital.

**Conclusión:** se concluyó que la tecnología fue evaluada. La misma fue bien aceptada y se concluye que para las personas con deficiencia visual todavía son necesarias nuevas estrategias de inclusión tanto en la salud como en otras áreas.

**DESCRIPTORES:** Amamantamiento materno. Tecnología. Personas con deficiencia visual. Enfermería. Promoción de la salud.

## INTRODUCTION

Health promotion is a strategy to change the technical and care models in the search for elements and possibilities, knowledge and actions, that help improve the quality of health and life of the population.<sup>1</sup> Its broad concept allows the life of the individual to be affected in a positive and comprehensive way, including individuals without exception. In this context, priority should be given to the focus on people with disabilities and the specific needs of this population.

The World Health Organization (WHO) estimates that 285 million people worldwide suffer from visual impairments, 39 million of whom are blind and 246 million with poor eyesight.<sup>2</sup>

In Brazil, according to data from the IBGE (Brazilian Institute of Geography and Statistics), of the 23.9% (45.6 million people) that declared some deficiency, those with visual impairments total of 3.5% of the population, being (16.0%) men and women (21.4%).<sup>3</sup> In Portugal, these represent 9.16% of the population, totaling 163,515 individuals with this deficiency.<sup>4</sup>

Health promotion should be provided to all, including people with visual impairments. For these people communication basically occurs through the remaining senses, touch and hearing, therefore, the materials prepared for them must have specific characteristics.<sup>5</sup> Furthermore, materials adapted for people with visual impairments are scarce, since health education is still focused on people without disabilities, using manuals, pamphlets and visible technologies.

Thus, it is essential to use assistive technology, understood as resources, instruments and services that can be used by disabled people and older adults to increase their autonomy and independence.<sup>6</sup> Blind people use the computer with the aid of a reader that transforms the written text into audio. When developing assistive technology for blind people the text should be written clearly and objectively, when a figure is presented, it should be accompanied by an audio description and, whenever possible, reproduced in relief so that it can be explored through touch.

In a previous study, a text called “Breastfeeding in action” was written, addressing the composition of breast milk; myths and taboos about breastfeeding; professional, family and breastfeeding; advantages of breastfeeding for the child; advantages of breastfeeding for the mother and the family; and communication in health. This text has been transformed into verses according to the norms of cordel literature, as rhyming verses that are attractive, awaken and hold the attention of the listener, this being the main way blind people relate to the medium. In this scenario, the cordel literature was used with the assistive technology, made available in electronic means to be accessed through the computer, constituting education and health promotion material. This assistive technology was evaluated by blind people in a Brazilian study.<sup>7</sup>

Assistive technology construction must be submitted to a validation process in order to affirm that it constitutes an efficient and effective means for the learning, autonomy and independence of individuals. This validation process should be

conducted in different cultural contexts. From this perspective, one of the researchers, during a doctoral sandwich program, replicated the process with a sample of blind people from Portugal, a country that, despite having the same language, presents linguistic particularities.

Thus, the present study aimed to describe the result of the apparent validation and content of the assistive technology "Breastfeeding in action", with visually impaired people from two realities, a country of Europe and one of South America.

## METHOD

This was a study of the development and evaluation of assistive health technology, the theme of which portrays breastfeeding. Studies of this type have the purpose of constructing resources and equipment that help increase the autonomy and independence of people with disabilities, improving their quality of life and promoting their health.

In this study, the construct is the assistive technology, in a cordel format, "Breastfeeding in Action", which was developed in Ceará - Brazil, supported by a review of the literature and evaluation by specialists in the area, then submitted for evaluation by blind people. In Porto - Portugal the content was adapted by specialists in the area of breastfeeding so that cultural expressions were respected, then the assistive technology was evaluated by blind people.

In Brazil, data collection took place from March to May 2011 and from March to June 2012 in Portugal. The evaluation of the construct was carried out with access to the site [www.labcomsaude.ufc.br](http://www.labcomsaude.ufc.br), where the "Invitation" and "Consent Form", the assistive technology "Breastfeeding in Action" and the "Evaluation Instrument" are available.

In Brazil, support to recruit the study subjects was provided by the Association of Blind People (*Associação de Cegos*) of the State of Ceará. In Porto, Portugal, the specialist judges and the application of the technology with the target population was carried out at the *Escola Superior de Enfermagem do Porto* (ESEP) and at the *Associação de Cegos e Amblíopes de Portugal* (ACAPO).

Initially, the intention was to collect data with the study population, which was composed of People with Visual Impairments associated with ACAPO. However, due to the unfeasibility of schedules of some possible participants and researchers, the data collection was performed using the snowball technique.

The application of the assistive technology was made with the use of a computer, using a voice synthesizer and computer screen reading system for the blind. This equipment, in Brazil, belonged to the association where the research was carried out. In Portugal, in turn, at many moments, the equipment used was that of the researcher, because it was scarce in the association. All subjects used the voice synthesizer, which is important software that assists in reading. For people who could not access and manipulate the technology alone, face-to-face meetings were arranged with the researcher or a mediator who could supervise and assist the subjects in accessing the site. For the entire collection, the internet was an important tool. This, when feasible, allowed the technology to be applied effectively and helped with the evaluation of some items related to the evaluation.

The inquiry evaluation instrument covered the sociodemographic profile; evaluation of the topics present, denominated: Objectives, Organization, Motivation, Design and Navigability of the website; Structure and presentation of the technology. For the evaluation items a Likert-type scale from 1 to 5 points was used.

To compare the means of the topics, Objectives, Organization, Motivation, Design and Navigability of the website; Structure and presentation of the technology, the scales were transformed from 0 to 100, using the expression  $[(\text{Topical value} - \text{Min}) / (\text{Max} - \text{Min})] \times 100$ . Normality of the variables was verified using the Kolmogorov-Smirnov test. Comparison of the characteristics of the subjects between the two countries was performed through the Fisher-Freeman-Halton exact test and Fisher's exact test. Means between the topics were compared using the ANOVA test and, when statistically significant, multiple comparisons were performed using Tukey's test. Means of the topics between the two countries were compared using Student's t-test (for scales from 0 to 100) and the Mann-Whitney test (for scales from 1 to 5). Results were considered statistically significant when  $p < 0.05$ .

The legal ethical aspects were respected, following resolution 466/2012. To carry out the study in Porto-Portugal, this was considered a declaration of authorization, since there is no Research Ethics Committee.

## RESULTS

Participants of the study were 19 people with visual impairments in Brazil and 21 in Portugal. Table 1 below shows the profile of the participants.

**Table 1 - Characterization of the subjects of Brazil and Portugal, 2012. (n=19/n =21)**

Variable	Brazil		Portugal		P
	n	%	n	%	
Age Group (years)					0.032*
20 - 30	9	47.3	6	28.6	
31 - 40	7	36.8	3	14.4	
41 - 50	3	15.9	4	19.0	
51 - 60	-	-	4	19.0	
> 60	-	-	4	19.0	
Sex					0.525 <sup>†</sup>
Female	9	47.4	13	61.9	
Male	10	52.6	8	30.1	
Marital status					0.078 <sup>(1)</sup>
Single	13	68.4	8	30.1	
Married/stable union	6	31.6	8	30.1	
Widowed	-	-	4	19.0	
Other	-	-	1	4.8	
Years of study					0.045 <sup>(1)</sup>
4	1	5.3	6	30.0	
9	15	78.8	8	40.0	
12	-	-	1	5.0	
>12	3	15.9	5	25.0	

<sup>†</sup>p from Fisher-Freeman-Halton; <sup>(1)</sup>p from Fisher's exact

The variables that presented statistically significant differences were age group ( $p=0.032$ ) and years of study ( $p=0.045$ ). In Brazil, young subjects prevailed with years of study that corresponded to the completion of elementary education. In Portugal, there was a homogeneous distribution among the age groups and subjects with elementary education also prevailed. It is important to note that when totaling the number of participants in this variable there are twenty participants, with

this referring to the absence of a response from one person.

Sex and marital status did not present statistical differences between the two countries. In Brazil, the percentage of single people was 2.2 times higher than that of married people. In Portugal 19% of the subjects were widowers.

Table 2 shows the evaluation of each item of the Objective, Organization and Motivation topics by the research subjects.

**Table 2 - Evaluation of the means of evaluation of the Objectives, Organization and Motivation topics. Brazil and Portugal, 2012.**

Topics	Brazil	Portugal	p*
	Mean; Med.	Mean; Med.	
<b>Objectives (mean ± standard deviation)</b>	97.3±4.9	90.2±12.2	0.019 <sup>†</sup>
Aspects of breast milk composition	4.95; 5.0	4.86; 5.0	0.630
Clarifies doubts about myths and taboos	4.89; 5.0	4.48; 5.0	0.074
Emphasizes the importance of the family and professional	4.89; 5.0	4.38; 4.0	0.015

Topics	Brazil	Portugal	p*
	Mean; Med.	Mean; Med.	
Highlights advantages for the child	5.0; 5.0	4.95; 5.0	0.810
Highlights advantages for the mother	5.0; 5.0	4.81; 5.0	0.307
Addresses communication in health	4.79; 5.0	4.33; 4.0	0.065
Portrays incentive to breastfeeding	5.0; 5.0	4.62; 5.0	0.074
Addresses change of behavior and attitude	4.74; 5.0	4.62; 5.0	0.436
Meets objectives of the institutions working with breastfeeding	4.79; 5.0	4.43; 5.0	0.124
<b>Organization (mean ± SD)</b>	91.0±11.2	83.7±23.3	0.225
The technology is attractive	4.47; 5.0	4.14; 5.0	0.486
Clear information and understandable terms	4.74; 5.0	4.38; 5.0	0.307
Size of the technology is good	4.11; 5.0	4.29; 5.0	0.768
Topics have logical sequence	4.79; 5.0	4.38; 5.0	0.124
Material is appropriate	4.74; 5.0	4.29; 5.0	0.215
Portrays important key aspects	5.0; 5.0	4.62; 5.0	0.124
<b>Motivation (mean ± SD)</b>	96.0±8.0	84.1±24.2	0.043
Corresponds to the level of knowledge	4.0; 5.0	4.29; 5.0	0.830
Suitable for those that want to breastfeed	4.95; 5.0	4.33; 5.0	0.111
Suitable for the father to encourage breastfeeding	4.79; 5.0	4.29; 5.0	0.333
Suitable for the family to encourage breastfeeding	4.79; 5.0	4.48; 5.0	0.307

\*p of Mann-Whitney; †Student's t-test - Scale from 0 to 100; Med = Median; SD = standard deviation; a Scale of topics from 0 to 100; b Scale of items from 0 to 5

In both countries, all the topics were evaluated as good, with emphasis on the objective determined by the proposals, goals or purpose that are desired with the use of the cordel technology. Comparatively, the Objective ( $p=0.019$ ) and Motivation ( $p=0.043$ ) topics were statistically different. The mean was higher in Brazil for both topics.

The topics and items had excellent evaluations with scores greater than four. In the Objective topic, in the item Emphasizes the importance of the family and professional, there was no statistical difference ( $p=0.015$ ). The Brazilian subjects gave three

items maximum scores, these being, Advantages of breastfeeding for the mother, Advantages for the child and Incentive for breastfeeding. Another item with maximum score present in the topic organization was Portrays important key aspects.

In Portugal, all the means were also excellent. Aspects of breast milk composition and Advantages of breastfeeding for both child and mother can be highlighted.

Table 3 describes the findings related to the Design, Navigability and Structure and presentation topics, according to the two countries.

**Table 3 - Evaluation of the means of the Design, Navigability and Structure and presentation of the web site topics. Brazil and Portugal, 2012.**

Topics	Brazil	Portugal	p*
	Mean; Med.	Mean; Med.	
Design (mean ± standard deviation)	97.3 ± 7.8	75.0; 27.9	0.002†
Home page clear and can be manipulated	4.89; 5.0	4.0; 4.0	0.002
Navigability (mean ± SD)	96.9 ± 5.6	87.7 ± 24.6	0.191
Easy to move between pages, sections and links	4.95; 5.0	4.41; 5.0	0.066

Topics	Brazil	Portugal	p*
	Mean; Med.	Mean; Med.	
The access links to the technology are defined	4.79; 5.0	4.53; 5.0	0.639
The access links operate efficiently	4.89; 5.0	4.59; 5.0	0.490
Structure and presentation (mean $\pm$ SD)	94.4 $\pm$ 9.2	81.8 $\pm$ 23.7	0.043
Clear and logical organization for localization of the technology	4.89; 5.0	4.29; 5.0	0.052
Provides information for access to the technology	4.63; 5.0	4.35; 5.0	0.315
Information organized and easily understood	4.79; 5.0	4.38; 5.0	0.205
Information presented in the links is appropriate	4.95; 5.0	4.35; 5.0	0.030
Presentation contributes to learning	4.53; 5.0	4.10; 5.0	0.215
Invitation letter stimulates access to the technology	4.63; 5.0	4.12; 4.0	0.121
Appropriate presentation of the Consent Form	4.95; 5.0	4.43; 5.0	0.124
Appropriate presentation of the evaluation instrument	4.84; 5.0	4.62; 5.0	0.611

\*p Mann-Whitney; †Student's t-test - Scale from 0 to 100; SD = standard deviation; Med = Median

The comparison between Brazil and Portugal showed that the mean of Brazil that was higher than that of Portugal was for the Design ( $p=0.002$ ) topic. This topic is determined by the drawing presented on the page, demonstrating clarity in its manipulation. Structure and presentation showed statistically significant differences when comparing the means of the two countries ( $p=0.043$ ), determined by the way the technology was presented. This involves general organization, structure, presentation strategy, consistency and sufficiency. The item that presented a statistical difference was related to the content of the information presented in the links being appropriate, with this item better evaluated in Brazil.

Better evaluations in Brazil corresponded to the Design and Navigability topics. In Portugal the best evaluation was Navigability, determined by the ease of the user browsing the pages and corresponding contents. The items better evaluated, in turn, were from the Navigability and Structure and presentation topics, respectively: Access links operate efficiently and Appropriate presentation of evaluation instrument.

## DISCUSSION

In Brazil there were more young participants, data that are different to the national picture found in this country, which shows that the number of people with visual impairment is higher in individuals over 65 years.<sup>3</sup> This can be attributed to the fact that the sample did not follow probabilistic selection criteria. In Portugal, the greater number of participants reflected the predominant reality.

There is evidence that disability, in general, often affects older subjects.<sup>9</sup>

In Portugal the older adult population increased from 7.0% in 2001 to 9.7% in 2013. The trend is more pronounced among women with 8.6% in 2001 and 11.5% in 2013. The population of this age group represents almost half of the older adult population, 49.0% in 2013, rising to 51.8% in 2013 in women. The proportion of older adults (aged 80 years or more) increased to 27.9% in 2013, with 23.8% men and 30.8% women, a difference that highlights the phenomenon of male mortality, against 18.1% and 24.1%, respectively, for men and women in 2001.<sup>10</sup> This study also portrays the reality found concerning the greater number of women than men, also in the statistics presented.

Records in Portugal highlight that the majority of the older adult population (55%) presents reduced mobility or cannot walk, cannot carry out activities related to personal hygiene (bathing/dressing) and live alone or accompanied by other older adults.<sup>9</sup>

In relation to the years of study, in both Brazil and in Portugal, the highest proportion of subjects had around nine years of study, that is, complete elementary education. However, it was observed that the individuals with greater deficiency presented only a few years of study.

Throughout a history of prejudice and discrimination, many exclusionary movements have been generated at various levels of society. This has happened since antiquity, in which women, foreigners, the handicapped and other people considered out of the ordinary by society were excluded, how-

ever, the phenomenon at the time was considered natural. Later, the effects of this exclusion appeared, generating prolonged unemployment where many became socially excluded. At that time, exclusion became a central issue in the various media of society, with it also being reflected in education, making access difficult and limited for people with disabilities. Inclusion in school implies considerations that go beyond simple educational innovation and requires knowledge of the particularities of this clientele.<sup>11</sup>

In the evaluation of the topics and items, there was a positive analysis of the assistive technology by people with visual impairment, in both Brazil and Portugal, demonstrating that, although there were individuals who did not know the technology in the cordel format, after reading it, its various aspects were considered adequate.

The Objective, Motivation, Design and Structure and presentation topics presented statistical differences. This shows that the assistive technology presents essential and enlightening subjects for those who want to breastfeed, as well as for those who want to help with the breastfeeding. The clear description and form of presentation invite access and curiosity and the structure and logical presentation provide the information necessary to access the technology and instruments. Although all the evaluations were excellent, in Brazil the scores were higher, with these evaluations possibly being related to the use of the cordel format, which is more common in Brazil, mainly in the Northeast region, where the study was carried out.

Specifically in Brazil, the best evaluations were for the Objective and Design topics. In Portugal, in turn, the subjects also considered the Objective topic adequate, with the highest mean, and, unlike Brazil, Navigability had one of the higher scores. This may be related to better internet access.

It can be perceived that the Objective topic obtained one of the highest means in both countries, as did its items. This topic depicts the propositions to be pursued with the use of technology. In Brazil, three items presented the maximum evaluation, which were: Advantages for the child (5.0), Advantages for the mother (5.0) and Encourages breastfeeding (5.0), while in Portugal, three items received excellent evaluations, these being: Aspects of breast milk composition (4.86), Breastfeeding advantages for the child (4.95) and Advantages for the mother (4.81).

As widely disseminated, the act of breastfeeding provides several biological benefits for the child and is a powerful activity for the interaction and

loving relationship between the mother and baby, especially for fostering communication and the formation of affective bonds. It is in this activity that the child is hugged, held next to the body of the mother and caressed. In addition, the mother constantly speaks with the child. Although blind people lack vision, they use other senses with greater precision and need assistance in the same way as people that can see. In this sense, just as the nurse uses creativity and develops educational technologies for other people, the use of assistive technologies for blind people is also fundamental.<sup>12</sup>

It is important to mention that in this same topic, there was a strong agreement between the two groups regarding the importance of the family and the health professional to stimulate and maintain breastfeeding. The presence of people in the daily life of the infant, especially the mother, grandmother, mother-in-law and partner, help in the practice of breastfeeding, with greater influence related to longer periods of living together.<sup>13</sup>

The nurse should support and encourage the mother throughout the puerperal pregnancy cycle regarding the practice of breastfeeding. In addition the nurse should provide information related to the physiological, biological, psychological, emotional and financial benefits of breastfeeding for the mother-child pair.<sup>14</sup> These actions may or may not contribute to the initiation and maintenance of breastfeeding, depending on the activities of nurses, such as the welcome, clarification of doubts and provision of guidance. It is believed that self-instructional educational technologies reinforce the approach of the health professionals.

There is recognition of the importance of the support of the partner (family) to obtain better breastfeeding indicators, among them longer duration of breastfeeding.<sup>16</sup> Another determinant for the abandonment of exclusive breastfeeding is not receiving help from the partner in the care of the child.<sup>17</sup>

The topics with the best evaluation, in Brazil, was Design and in Portugal, Navigability. In the Design topic, the item Home page clear and can be manipulated presented a significant statistical difference, although with excellent evaluations, with one of the highest scores presented in Brazil. Concerning the Design topic, this portrays the design presented on the page and, with it, the ease of manipulation. From the evaluation of the participants, it was reinforced that the page can be used by people with disabilities without difficulty, although, in Brazil, the difficulty was less. This may also be

related the possibility of accessing the Internet in Portugal, which at some moments, was not effective.

The literature shows that findings regarding designs appropriate for the people with visual impairments are constant. New ways of producing and disseminating contents and products, diagnostics and treatments, relationships and accessible information for people with visual impairments, using all the senses of human perception, have been discussed.<sup>18</sup> With the help of new technologies, design has been appropriating structure and appearance in order to improve communication. In the case of publications aimed at visually impaired people, it is necessary to explore the other senses so that they overcome the need for vision.<sup>19</sup>

The dissemination of resources designed for the visually impaired is noticeable, which includes: Braille menus in restaurants and snack bars, traffic lights with sound signals and different tiles on the sidewalks. However, there is still precariousness in the specific services and lack of incentive to improve the quality of life of this clientele, situations that make it difficult for society to be inclusive and prioritize the universal design.<sup>20</sup>

Regarding Navigability, another better score in Portugal, this variable is influenced directly by the use of the internet. This means that the population that accessed the assistive technology when it had internet access, had a good connection. Navigability is a necessary tool for digital inclusion, understood as access to information technologies, including strategies that favor this process. Inclusion is also linked to the development of assistive technologies that increase accessibility and consequent autonomy and independence for people with disabilities. Digital illiteracy, due to affecting the ability to learn, navigability and dissemination of information, has consequences in all spheres of human life.<sup>21</sup>

The need to expand and develop programs that offer opportunities for digital literacy practices is highlighted. This indicates the need for policies of planning and improvement of the informational structures of public schools; investments in both equipment for the effective inclusion of information and communication technologies (ICTs) in education, and in human training adequate to meet the demand for digital (multi) literacy promotion; for broad academic and political discussion about the role of ICTs in social and technological development, as well as the conquest of full digital citizenship.<sup>22</sup>

It should be mentioned that, for the evaluation of the Design, Navigability and Structure and presentation topics, the blind people had to have

viable access to the internet to listen to the technology in an ideal way for each one. For the visually impaired, the voice synthesizer and internet speed are paramount to allow for digital inclusion and accessibility. In this sense, the item Information presented in the links is appropriate, present in the Structure and presentation topic, showed a statistical difference, since the use of the internet in Brazil, at the study site, was more feasible and therefore it was possible to use the available technology and have the access to the breastfeeding content.

In this sense, it is important to discuss the elaboration, evaluation and use of health technologies, in the relations between professionals and users of the health system. In nursing, as in other health areas, technologies should be used to assist clients and to promote autonomy and independence through health education.<sup>23</sup> When constructing assistive technologies, it is essential to subject them to the evaluation of clients, considering their particularities and characteristics, presenting goals to be achieved and motivating the reader to read and/or listen to the technology. Clear and objective language should be used in all the access and evaluation steps, avoiding technical terms and complex and negative sentences, which make the reading confusing.

To construct technology includes carrying out validation, this being an important phase in the development and adaptation of constructs. It must include measures to evaluate validity and reliability, which are fundamental procedures for researchers and health professionals increasingly involved in exploiting and employing reliable and appropriate measures and instruments for a given population.<sup>24</sup>

For validation, it is necessary that the evaluators have expertise in the area of interest of the construct, so that they will adequately evaluate the representativeness and relevance of the material submitted to the analysis. It should be noted that the observations and suggestions of the judges contribute to improve the content of the questions and the grouping of actions.<sup>25</sup> However, what really strengthens the validation is the test with the target audience.

## CONCLUSION

The technology portrays the composition of breast milk, with significant clarifications and notes for those who want to breastfeed. It is attractive, with clear information and understandable terms; has a logical sequence and addresses key aspects. In addition, it allows the transfer and generalization of the content in different contexts.



As noted in this study, recruiting blind subjects is difficult and laborious. However, the participants positively evaluated the technology, that is, they liked the assistive technology, however, to evaluate using the synthesizer and complete the instrument, took time, and even then, often became complex. Many, due to their daily activities, refused to participate. This may have been related to the absence of digital inclusion. In this context, the presence of a mediator or the researcher was important to carry out these recruitment steps.

It should be mentioned that the number of participants was important to begin the validation stage, with this initial evaluation of the technology. In this sense, this is an important step and needs to be continued in order to extend and complete the validation. In this study, the evaluation was performed, with the technology considered positive and effective by the population.

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