Breastfeeding: validation of assistive audio technology for the visually impaired individual

Amamentação: validação de tecnologia assistiva em áudio para pessoa com deficiência visual

Paula Marciana Pinheiro de Oliveira[1]
Lorita Marlena Freitag Pagliuca[2]
Kariane Gomes Cezario[3]
Paulo César de Almeida[4]
Gilmara de Lucena Beserra[1]

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Corresponding author
Paula Marciana Pinheiro de Oliveira
Abolição Avenue, 3, 62790-000, Redenção, CE, Brazil.
paulapinheiro@unilab.edu.br

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Abstract

Objective: To validate assistive technology for breastfeeding with a visually impaired individual in the audio Cordel literature (popular and inexpensively printed booklets or pamphlets containing folk novels, poems and songs in Northeastern Brazil) using an online access modality.

Methods: Methodological research, conducted from August 2012 to March 2013, with 124 blind individuals, who appreciated technology (Cordel literature) on breastfeeding. Tests for quantitative variables were performed.

Results: Most subjects were aged 30-49 years (61.3%), female (51.6%), and high school education (48.4%), non-married (55.6%), and were visually impaired at birth (51.6%). With regard to the assistive technology, the mean showed the topics that were viewed favorably and well evaluated were objective (93.6±10.7), organized (87.0±14.5), audio (86.7±15.6) and motivating (88.9±15.3).

Conclusion: After evaluation, the technology achieved the proposed objectives, with good overall organization, structure, presentation strategy and coherence, in addition to enabling proper understanding, having a good audio style, and being motivating and interesting.

Resumo

Objetivo: Validar tecnologia assistiva sobre amamentação para cegos pessoas com deficiência visual na modalidade literatura de cordel em áudio através do acesso online.

Métodos: Pesquisa de desenvolvimento metodológico. Realizada de agosto de 2012 a março de 2013, com 124 pessoas cegas, as quais apreciaram tecnologia (literatura de cordel) sobre amamentação. Realizaram-se testes para variáveis quantitativas.

Resultados: A maioria dos sujeitos tinha idade de 30-49 anos (61,3%), sexo feminino (51,6%), cursaram o ensino médio (48,4%), não casados (55,6%), e com deficiência visual de nascença (51,6%). Em relação à avaliação da tecnologia assistiva, pelas médias encontradas, os tópicos foram favoráveis e bem avaliados, objetivo (93,6±10,7), organização (87,0±14,5), estilo de áudio (86,7±15,6) e motivação (88,9±15,3).

Conclusão: Após avaliações, a tecnologia atingiu os objetivos propostos, com boa organização geral, estrutura, estratégia de apresentação e coerência, além de apropriada compreensão, bom estilo de áudio, motivadora e interessante.

[1]Universidade da Integração Internacional da Lusofonia Afro-Brasileira, Redenção, CE, Brazil.
[2]Universidade Federal do Ceará, Fortaleza, CE, Brazil.
[3]Centro Universitário Estácio do Ceará, Fortaleza, CE, Brazil.
[4]Universidade Estadual do Ceará, Fortaleza, CE, Brazil.

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Introduction

Assistive Technology (AT) is understood as a resource that supports the development of functional ability and enables the achievement of a desired function, when the individual is limited by deficiency or aging. In this sense, AT provides greater autonomy, improvement in quality of life, and social inclusion.[1]

Assistive technology for visually impaired individuals, in previous research, was developed on the subject of breastfeeding, and assessed by specialists.[2] Aiming toward health promotion, Cordel literature is a technology that consists of text with rhymes. It was audio recorded with musical accompaniment, making listening to it a form of entertainment. Cordel literature has been certified among health educators as a method capable of stimulating effective participation and discussion among individuals in society, in the search for health promotion, as its focus is associated with the emancipation of the individual from collectively acquired knowledge.[3] The rhyme, inserted in the verses, makes the lines interesting and attractive. In this perspective, nurses could use these strategies to consolidate effective interventions.

In written histories, the booklets show the lives of people in evidence, contextualizing disputes, novels and diverse subjects. They address health issues: diabetes, Acquired Immunodeficiency Syndrome (AIDS), dengue, women, and breastfeeding, among others. These subjects are interesting when approached in booklets, especially breastfeeding, the theme of the current research. This subject is experienced by many women and represents a moment of rapprochement between mother and child. In addition, the benefits provided by breast milk have already been demonstrated, and are related to the possibility of reducing infant mortality rates due to the presence of protective factors, and the lower risk of infants developing diseases, such as respiratory and gastrointestinal ones.[4]

The visually impaired person needs her demands to be met, using innovations, technological advances and relevant themes. Although lacking vision, blind women use touch, smell and hearing more acutely.[5] Women with visual impairment need the same care given to sighted women regarding breastfeeding care and counseling. They also perceive themselves as insecure and seek support and information from close friends, neighbors and family members. However, it is difficult for information to be distributed by these individuals, because they are lay persons in this area.[6]

In this context, it is essential to provide health education using ATs for disabled women in relation to breastfeeding. The use of methods that are entertaining supports and facilitates understanding.

The World Health Organization (WHO), corroborated by the Brazilian Ministry of Health, recommends breastfeeding for two years or more, and exclusively in the first six months.[7]

The obstacles associated with breastfeeding are diverse, but in general the reasons for abandonment involve innumerable myths and misinformation, even among women with a higher socioeconomic level, which potentiates the importance of guidelines and effective interventions from health professionals in supporting the nursing mother.[8]

Thus, the aim was to validate assistive technology on breastfeeding for individuals with visual impairment in the form of audio Cordel literature, using the online access.

Methods

This was a methodological study in which the psychometrics model was adopted,[9] consisting of theoretical, empirical and analytical areas. The theoretical procedure presents six steps, of which the first five were performed in previous research.[2] At the same time, content and Cordel literature specialists contributed decisively to the validation step. The agreement between experts was present in almost all items and, all suggestions were accepted, even those in the minority, subjecting the technology to reevaluation until the revisions were finished. Content experts

changed and added terms to facilitate understanding and complement important information on the subject, and the Cordel experts used terms and expressions to insert the content into the existing rules for the development of Cordel Literature.[10]

The pilot test, as part of the last step, was implemented in the present research. In addition, the empirical area, which represents planning of the technology application, the data collection and the analytical phases were submitted to statistical analysis. The validation steps were finalized and completed by the target audience of the study, which were individuals with visual impairment. Data collection by means of online access was conducted from August of 2012 to March of 2013, using the physical and technological infrastructure of the Laboratory of Communication in Health of a Federal University. The laboratory presents resources to work on the theme of people with disabilities and to perform research and communication in health, and it is a space for teaching communication.

The validated technology was Cordel literature on breastfeeding, entitled *Breastfeeding in action*, with 32 sextilhas, that is, verses with six stanzas. These were presented in categories, discussed according to the theoretical references related to the subject: 1. Composition of breast milk; 2. Advantages of breastfeeding for the mother and family; 3. Advantages of breastfeeding for the child; 4. Myths and taboos about breastfeeding; 5. Professional, family and breastfeeding; 6. Communication in health.

The inclusion criteria included visually impaired women who were at least 18 years of age, and had basic ability in using the computer screen reader program, which allows the visually impaired person access to this equipment and the internet. By having visual impairment, this audience only uses computer with a program that reads what is found on the screen. After calculating the sample size, and considering the formula of the size N of infinite population ($n=t^2xPxQ/E^2$): ($n=1{,}96^2_{5\%}$ x 0,25 x 99,75/$0{,}77^2$), the sample size identified was n=124. For data collection, the web page was provided with its own tool that counted accesses and stored AT assessments. Incompleted forms were deleted from the sample.

An instrument that gathered information about the profile of the subjects was used, and then the technology was evaluated in four topics that included: objective (purposes that are desired with the use of the technology), organization (presentation of technology, structure, presentation strategy, coherence and sufficiency), audio style (appropriateness of audio style, comprehension characteristic) and motivation (technology's ability to impact, motivate, and/or interest).

For the technology assessment, the instrument used a five-point Likert scale. One represented the worst score, and five represented the highest score. In order to compare the mean between the topics, this scale was transformed into an analogue scale, ranging from zero to 100 (score 1: 0-20, score 2: 21-40, score 3: 41-60, score 4: 61-80), with the expressions: [(Obtained value- Minimum)/(Maximum-Minimum)] x100. Frequencies of 61-80 and 81-100 were considered favorable, with good and excellent evaluations representing, respectively, scores four and five.

The mean and standard deviation of the quantitative variables were calculated. The associations between qualitative and or categorical variables were analyzed by Chi-Square and likelihood ratio tests. The comparison of the means of the topics was performed using the Student t-test for independent data, or the Snedecor F-test (ANOVA -Analysis of variance). Analyzes were considered significant when $p < 0.05$.

The study subjects signed the Terms of Free and Informed Consent form, agreeing to participate in the study. The data collection was performed after approval was received from the Research Ethics Committee, protocol No. 21/09.

Results

The results are organized in tables below. A total of 124 participants were obtained. Table 1 shows the profile of the people who answered the survey.

Table 1. Distribution of the subjects according to variables

Participant characteristics (variable)	n(%)
Age group (mean ± standard deviation): 37.4 ± 11.5 years	
18 - 29	29(23.4)
30 - 49	76(61.3)
50 - 72	19(15.3)
Sex	
Female	64(51.6)
Male	60(48.4)
Level of education	
Elementary	53(42.7)
High school	60(48.4)
College	11(8.9)
Marital status	
Married/Stable union	55(44.4)
Single	69(55.6)
Family income (mean ± standard deviation): 1.8 ± 1.0 MW*	
Up to 1.0	50(40.3)
1.1 - 2.0	31(25.0)
2.1 - 6.6	43(34.7)
Work	
Yes	93(75.0)
No	31(25.0)
Occupation	
Retired	27(21.8)
Student	23(18.5)
Telephone operator	15(12.1)
Beneficiary	14(11.3)
Auxiliary (physiotherapy, hairdresser, dark camera and administration)	11(8.9)
Massage Therapist	10(8.1)
Others	24(19.3)
Kind of blindness	
At birth	64(51.6)
Acquired	60(48.4)

*MW-minimum wage (2012 - R$622, 00; 2013 - R$678, 00, Brazil)

Table 2. Assessment of the topics corresponding to the topic objectives, organization, audio style and motivation

Topic	Mean; Median
Objective Mean ± standard deviation (SD)	93.6 ± 10.7*
Describes the composition of breast milk	4.85; 5.0
Clarifies doubts about myths and taboos	4.70; 5.0
Highlights the importance of the father, family and professional	4.73; 5.0
Highlights the advantages of breastfeeding for the child	4.69; 5.0
Highlights the advantages of breastfeeding for the mother	4.76; 5.0
Includes topics related to encouraging breastfeeding	4.73; 5.0
Organization Mean ± standard deviation (SD))	87.0 ± 14.5*
Technology is attractive	4.41; 5.0
Provides clear information and understandable terms	4.51; 5.0
Audio level is good	4.26; 5.0
Topics in logical sequence	4.38; 5.0
Material is appropriate	4.55; 5.0
Theme describes important key aspects	4.63; 5.0
Audio style Mean ± standard deviation (SD)	86.7 ± 15.6*
Audio is in proper style	4.54; 5.0
Sung Cordel literature is interesting. The tone is friendly	4.57; 5.0
Technology corresponds to the knowledge level	4.30; 5.0
Motivation Mean ± standard deviation (SD)	88.9 ± 15.3*
Addresses issues necessary for those who want to breastfeed	4.64; 5.0
Addresses useful subjects for parent who wants to encourage the infant's breastfeeding	4.54; 5.0
Addresses issues necessary for the family to encourage breastfeeding	4.59; 5.0
Allows the transfer and generalization of learning in different contexts	4.50; 5.0
Encourages change in behavior and attitude	4.52; 5.0

*p of ANOVA <0.0001; By Games-Howell test, equal letters, equal means and different letters, different means

There was a prevalence of subjects aged 18 to 72 years, with a mean of 37.4±11.5 years; female (51.6%); high school education (48.4%), unmarried (55.6%) and family income of approximately one minimum wage (2012 - R$ 622.00, 2013 - R$ 678.00), with a mean of 1.8±1.0 minimum wages. The majority were working (75%), retired (21.8%) and visually impaired (51.6%), living in the states of Ceará, Piauí, Pernambuco and Paraná.

Table 2 shows the comparative analysis of the topics contained in the instrument for assessment of the assistive technology.

As identified, the items of all topics presented a mean of 4.26 to 4.85, with a median of 5.0. Those who rated the objective-topic higher were the ones who matched the composition of breast milk (4.85). In the organization-topic, the item describing key aspects (4.63) was better evaluated.

In the audio-style topic, the item of sung Cordel literature was considered interesting, and the friendly tone (4.57) obtained a better score. In the motivation- topic, the item that addressed subjects necessary for those who want to breastfeed (4.64), obtained the highest evaluation.

The variable, sex, obtained similar means in the four topics (p>0.291), that was, men and women similarly evaluated the AT. Although there was no statistical significance, the female sex assigned a better mean of evaluation in the four topics. The age group that assigned the best evaluation to all topics was 30-49 years (p <0.05).

Regarding the educational level, all means were statistically different (p<0.0001), with the best evaluation from subjects with a high school education. The marital status with the highest average in all four topics was that of married/stable union (p<0.016), whereas the family income with the highest mean was the group at 1.1-2.0 the minimum wage (p<0.0001).

The blind working individuals assigned higher mean values for all topics (p<0.0001). Individual who were born blind were more likely to better evaluate the technology (p<0.001).

Discussion

Regarding the characteristics of the study subjects, findings such as a high percentage of participants with primary school (42.7%) and high school (48.4%) education were significant, as well as a lower family income (2012 - R$622.00, 2013 - R$ 678.00), among which some (21.8%) were retired but the majority were working (59.7%). As a result, most of them have low educational levels and, consequently, receive low remuneration. The number of married people, although less than half, is representative (44.4%) and shows that this group of individuals also has a social and affective life.

In the marital status topic, the technology scored higher among people who were married / in a stable union; probably because parents living together are more likely to breastfeed. The father contributes decisively to this act, by encouraging it.

People born with visual birth defects validated the technology better. This finding may be related to the ability of the blind individual to handle the computer, as the person born with this condition learns early on how to use AT resources, which is different from the individual who acquires blindness later.

As demonstrated in the objective topic, health education is important, and consequently clarifications on breastfeeding are needed. Describing the composition of breast milk, clarifying doubts about myths and taboos, explaining the advantages of breast milk for the mother and child, and emphasizing the incentive to breastfeed constitute necessary content to encourage breastfeeding.

Breast milk is the ideal food for the baby. due to a composition rich in nutritional and immunological properties, protecting the newborn from infections, diarrhea and respiratory diseases,[11] and it is necessary to encourage this act.

Studies have shown that adequate prenatal care is one of the requirements for long-term breastfeeding, in addition to clarifying myths.[12] Many women report the practice of early weaning due to lack of information and, therefore, it is noted that activities focusing on awareness and demystification of taboos should be encouraged.[13]

Breast milk has several advantages to the infant's health,[8] but it is also worth noting that one of the advantages of breastfeeding for the mother is the reduction of breast cancer. The longer the breastfeeding period, the more protection she will have.[14] Even with so many scientifically proven advantages for the binomial, the prevalence of exclusive breastfeeding continues to be very low globally, [15] hence the need to develop strategies that are considered effective.

In addition to the evaluation of the objective topic, the organization, audio style and motivation topics also presented favorable means, configuring respectively the meaning of their own titles. Specifically the organization topic showed that the technology was considered attractive, with clear and easy-to-understand information and terms, viable audio level, logical sequence, appropriate and important information.

A study whose objective was to validate technology for individuals with disabilities demonstrated that it should be developed in an attractive way. Several ATs have been developed that contemplate different health scenarios, among them: a study of/for women with visual impairment on the female condom, and a study on the development and evaluation of an accessible online course on breast health for blind women, which were fundamental for health promotion on their respective themes.[16,17]

Assistive technology must have content clarity, providing information with easy understanding.[18] Among the forms of organization, the adequate audio level is important, and the scientific literature recommends a satisfactory time for understanding the material, avoiding doubts and making it effective[17] when the topics and the material must be presented in a logical sequence, with important aspects on the subject.

With regard to the style of audio, it is perceived that this well accepted by this public. Among the different types of ATs for the blind, Cordel literature adapted in audio format was of great relevance as an educational strategy to facilitate the adherence to and maintenance of breastfeeding. The chanting rhyme became attractive, with a friendly sound that was adapted to the level of public knowledge.

To finalize AT assessment, the last topic, motivation, is determined by the ability of technology to stimulate motivation and interest. Thus, it is essential to address issues that are necessary for those who want to breastfeed. In the study, there was a similarity among the sex assessments, although women showed a slightly better mean for the actual AT content. The women actively participate in this sublime act, albeit with the important assistance of the partners. Thus, as noted, the AT on breastfeeding accessible online can be made available to men and women without distinction.

Involving the father in the practice of breastfeeding can increase exclusive breastfeeding rates and prolong their duration.[19] The support of the father figure, as well as of the whole family, in encouraging the practice of breastfeeding is important. Among all family members and people close to the woman, the presence of the father continues to be the most relevant support for breastfeeding from the maternal perspective.[20]

After assessment of the technology, it was perceived that it reached the objectives and goals intended, with good general organization, structure, presentation strategy, and impact on the target audience, the blind mothers. Comprehensive, individualized care needs to be provided to people with disabilities by ensuring access to ATs which can provide a better quality of life to these disabled mothers.

Thus, it is necessary to transfer learning on the subject in different contexts, where the professional nurse's role would be necessary in orienting the women, their partners and family on the importance of effective support in breastfeeding.

Conclusion

The developed technology is a valid strategy for health promotion, as the proposed and expected goals were achieved, with good overall organization, structure, presentation strategy and coherence, as well as enabling appropriate understanding and having a style of audio that can impact, motivate and/or interest. Men and women attributed similar scores to the four topics. The adult population of 30-49 years of age, subjects in stable unions, and people who were born blind evaluated all topics of technology better. The technology presents breast milk composition, 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 important key aspects.

Proper audio style encourages behavior and attitude changes. In addition, technology allows the transfer and generalization of content in different contexts. This study shows the role of nurses in health promotion, with emphasis on the needs of specific groups. This professional participates in an interprofessional team, works in the context of each individual, knows her real needs and demands, and consequently develops effective strategies to improve the quality of life. The study allows the inference that the validated technology, as a strategy, supports the role of the nurse as a health promoter of the visually impaired person.

Collaborations

Oliveira PMP contributed to the article writing, study design, analysis and data interpretation. Pagliuca LMF contributed to the study design, relevant critical review of the intellectual content, and final approval of the version to be published. Cezario KG contributed to the study design, analysis and data interpretation. Almeira PC contributed to the analysis, data interpretation and relevant critical review of the intellectual content l. Beserra GL contributed to the article writing. All authors contributed to the technical procedures.

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