




Prototype of a mobile application for cultural self-assessment in nursing care for people with disabilities*

Protótipo de aplicativo móvel para autoavaliação cultural de Enfermagem no cuidado às pessoas com deficiência

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ABSTRACT

Objective: to describe the construction of a prototype mobile application for self-assessment of the cultural competence of nursing professionals and students in providing care to people with disabilities. **Methods:** a methodological study of the prototype application type, based on the Instrument for Self-Assessment of Transcultural Competence for the Care of People with Disabilities, which has five levels of responsiveness and 23 items grouped into the five types of disabilities, in compliance with the Transcultural Nursing Theory. The layout content of the technology was created according to the five methodologies of the “One-Minute Preceptor” application. **Results:** the prototype has 42 screens, consisting of initial screens with information about the Self-Assessment Tool and the registration interface with login and password. The following screens are made up of the cultural self-assessment of each disability. **Conclusion:** the construction of the prototype, based on the Instrument for Self-Assessment of Transcultural Competence for Caring for People with Disabilities, directs nursing professionals/academics towards self-assessment and the acquisition of cultural competence for nursing care. **Contributions to practice:** the prototype has the quality of its content ascertained through validation with specialists, which makes it possible to learn and improve culturally competent nursing care for people with disabilities. **Descriptors:** Self-Testing; Mobile Applications; Cultural Competency; Disabled Persons; Information Technology.

RESUMO

Objetivo: descrever a construção de um protótipo de aplicativo móvel para a autoavaliação da competência cultural dos profissionais e acadêmicos de Enfermagem no fornecimento do cuidado à pessoa com deficiência. **Métodos:** estudo metodológico do tipo protótipo de aplicativo, a partir do Instrumento de Autoavaliação da Competência Transcultural para o Cuidado da Pessoa com Deficiência, que possui cinco níveis de responsividade e 23 itens agrupados nos cinco tipos de deficiências, em observância a Teoria Transcultural de Enfermagem. O conteúdo de *layout* da tecnologia foi criado conforme as cinco metodologias do aplicativo “One-Minute Preceptor”. **Resultados:** o protótipo possui 42 telas, compostas por telas iniciais com informações sobre o Instrumento de Autoavaliação e *Interface* de cadastro com *login* e senha. As telas seguintes são compostas pela autoavaliação cultural de cada deficiência. **Conclusão:** a construção do protótipo, fundamentado no Instrumento de Autoavaliação da Competência Transcultural para Cuidar da Pessoa com Deficiência, direciona os profissionais/acadêmicos de Enfermagem à autoavaliação e à aquisição de competência cultural para o cuidado de Enfermagem. **Contribuições para a prática:** o protótipo possui qualidade de conteúdo constatada a partir da validação com especialistas, o que possibilita o aprendizado e melhoria no cuidado de Enfermagem com competência cultural à pessoa com deficiência.

Descritores: Autoteste; Aplicativos Móveis; Competência Cultural; Pessoas com Deficiência; Tecnologia da Informação.

Introduction

It is estimated that there are more than one billion People with Disabilities (PwD) in the world, which is equivalent to approximately 15% of the world's population, and that one in five people has some kind of disability⁽¹⁾. In Brazil, in 2022, approximately 18.6 million people (8.9%) over the age of two were identified as having some kind of disability. Of these, 10.7 million are female and 7.9 million are male, representing 10% and 7.7% of the country's female and male population, respectively. It was also observed that there is a high predominance of people who declared themselves to be black (9.5%), brown (8.9%), and white (8.7%). Disabilities are divided into permanent or temporary, mild, moderate, and severe. The most common severe disability in Brazil is physical disability, which affects approximately 8.3% of the population, followed by intellectual disability (3.7%) and visual impairment (3.1%)⁽²⁾.

The main causes of disability are classified as hereditary, congenital, or acquired. Acquired disabilities have hereditary and/or genetic causes, which can be manifested early or late. Congenital disabilities arise from a variety of causes and manifest themselves before, during, or after birth, for example, prematurity and maternal illnesses. Acquired disabilities are those that arise during the course of a human being's life, whether due to external factors, accidents, or lifestyle, such as systemic arterial hypertension⁽³⁾.

The United Nations Convention on the Rights of Persons with Disabilities stresses that PwDs have the right to live in conditions of equity, with freedom of choice and space like typical people, regardless of their social class, religion, color, ethnicity, or political choice, and that it is the duty of each country to take effective attitudes and measures to facilitate inclusion and participation in the community in full enjoyment of their rights as human beings⁽⁴⁾.

Brazil has developed policies to improve care and guarantee the right of access to health services for people with disabilities through the Brazilian Inclusion Law and the Statute of People with Disabili-

ties, which establish that individuals with disabilities are those who live with any intellectual, physical, or sensory limitation that may prevent them from fully participating in community activities or exercise⁽⁵⁾.

People with disabilities have difficulties in accessing services, whether due to care or physical barriers in the different types of health services, a circumstance that presupposes offering the humane, inclusive, and holistic care that is guaranteed by the guidelines established for this population group⁽⁶⁾.

Among health workers, nurses are often the professionals who establish the first contact with PwD and, due to lack of training or lack of knowledge, they have difficulties in conducting nursing consultations with this population. There are limitations in understanding health needs during care, as well as the quest to promote the individual's independence in the face of their limitations⁽⁷⁾. Given the complexity of providing culturally congruent care to PwD, there is a need to acquire cultural competence, which should be based on Transcultural Nursing Theories through detailed clinical investigation of biopsychosocial and spiritual needs, cultural context, and cultural values⁽⁸⁾.

The American Association of Colleges of Nursing defines cultural competence as a set of practices that should be included in the care of users with disabilities, which are: attitudes, knowledge, and skills that aim to provide health care with quality and effectiveness, meeting the peculiarities and needs inherent to each population⁽⁹⁾.

Based on the self-assessment of cultural competence, nurses and nursing students can develop clinical skills and competencies in their own conduct when caring for people with disabilities, focusing on the cultural context, beliefs and values, and the needs of the population they serve, in order to improve the care provided and the development of culturally competent care⁽¹⁰⁾.

It is worthwhile for nurses to self-assess their cultural competence in order to make them sensitive to nursing care for PwD. To this end, some instruments can be applied to optimize this self-assessment process, an example of which is the Instrument for

Self-Assessment of Transcultural Competence for the Care of Persons with Disabilities (ISATCCPwD)⁽¹¹⁾, which, when transformed into a mobile application, becomes more accessible to nursing students and professionals.

Technological innovations are currently gaining prominence in the health sector, especially when they are associated with the prevention and recovery of users' health. When associated with new teaching methodologies, technological innovations can provide more dynamic teaching-learning spaces, transform care practices, and reduce complication rates. Available communications technologies are sought to optimize care and enable more effective communication, which can help minimize barriers to access and accessibility for people with disabilities⁽¹²⁾.

The use of mobile applications that address the cultural competence of nurses is fundamental to impacting health practices, since this technology is available 24 hours a day through smartphones, within reach of any professional practice environment, expanding access to care and information⁽¹³⁾.

This raises the following question: how can we build a prototype mobile application to self-assess the cultural competence of nurses and nursing students in caring for people with disabilities?

Using the Transcultural Nursing Theory⁽⁸⁾ and the ISATCCPwD, a mobile application prototype was built to improve nurses' and nursing students' self-assessment of their cultural competence in caring for PwD.

Therefore, the aim of this study was to describe the construction of a prototype mobile application for self-assessment of the cultural competence of nursing professionals and students in providing care to people with disabilities.

Methods

For the development of this methodological research, the Transcultural Nursing Theory⁽⁸⁾ was applied as a theoretical reference, which presents, among other aspects, the levels of responsiveness that

guide nursing professionals and students at the time of self-assessment, namely: greet, accept, help, background and advocate. This reference was the basis for the development of the ISATCCPwD⁽¹¹⁾, for the self-assessment of nursing professionals and students on the development of competencies for caring for PwD.

The ISATCCPwD has five levels of responsiveness: Welcoming, Understanding and Respecting, Helping, Experiencing and Defending. In addition to the levels of responsiveness, it also consists of 23 items grouped into five types of disability: hearing, visual, physical, intellectual, and multiple⁽¹¹⁾. The instrument has undergone cultural adaptation, appearance, and content validation and is currently being published by the authors.

This is methodological research, technological development, which consists of building and developing a prototype application, to produce a tool that can be easily accessed and practiced, so that it can be explained by other scholars, and which has the potential to be used in the educational and care environment. The research was carried out in the city of Juazeiro do Norte, CE, Brazil, between May and December 2023.

The application prototype was developed following the Systems and Software Engineering - Systems and Software Quality Requirements and Evaluation standard, which defines models for evaluating software quality. The standards can be adopted to evaluate any software model, and their evaluation focuses on product quality and quality of use. The Product Quality Model determines eight quality elements, including functional capacity, efficient performance, integration, ease of use, reliability, security, ease of maintenance, and portability. Quality in use, on the other hand, characterizes the following as quality criteria: effectiveness, agility, compliance, risk mitigation, and contextual comprehensiveness⁽¹⁴⁾.

In order to develop the evaluation interfaces for the application entitled "NURSE SELF AVALIATION", the methodology was used, which includes the five stages for making a technology prototype, adapted to improve the approach to the object of the research, clarity, and simplicity. Stage 1: defining the object and

checking the feasibility of building the application; Stage 2: defining the methodological framework and drawing up the content of the application; Stage 3: drawing up the prototype based on the methodological framework⁽¹⁵⁾; Stage 4: validating the appearance of the application; Stage 5: registering the application.

During the first stage, the justification for the choice of theme was established and the instrument used to build the prototype of the application was adapted; in this sense, the objectives proposed for the creation of the technology, the content, the target audience, and the environment in which the application would be used were analyzed⁽¹⁵⁾. The theme implemented in the mobile application was based on ISATCCPwD⁽¹¹⁾. The viability of the mobile app, the development proposal, the methodology, and all the stages relating to the content were examined by professionals in the field of technology, including a programmer and a graphic designer.

The second stage consisted of designing the layout and organizing the content. The organization of the technology's self-assessment content was built and adapted, based on the ISATCCPwD levels of responsiveness, which scores nurses' competencies based on microtasks: identifying the patient's type of disability, obtaining a competency, probing for supporting evidence, demonstrating the development of skills, reinforcing what was correct and correcting errors⁽¹⁶⁾.

The third stage, the development of the application prototype, established the materialization of the design proposed in the previous stage, using software, programs, and recordings in order to create an interactive and evaluative environment and select the documents and the language of the exhibits⁽¹⁵⁾. The fourth stage, validation of the application's appearance, involves evaluating and validating the application's design using a tool for validating the appearance of educational technology in health. This stage is being developed by another researcher who has continued the research with the study: "Validation of a mobile

application to self-assess cultural competence in the care of people with disabilities". Finally, in the fifth stage, registration of the application, the forms requested were filled in together with the Innovation Department of the Regional University of Cariri (*Secretaria de Inovação da Universidade Regional do Cariri*), to start the software registration process.

Results

The prototype of the "NURSE SELF EVALUATION" mobile application has a total of 42 screens, featuring images, interfaces, and articles that will help and facilitate self-assessment by nursing professionals and students of the care offered culturally to PwD.

The 42 screens are made up of initial screens containing information about ISATCCPwD; a registration interface, in which the user can do it manually; access to the application will be made possible by using their login and password. The next screens are made up of the self-assessment for each disability (hearing, visual, physical, mental, and/or intellectual and multiple) and its particularities, carried out according to the user's competence to welcome, understand, and respect, help, experience and defend PwD in their singularity.

The initial interface displays the presentation and explanation screens for the entire process of process of self-assessment of cross-cultural competence for the care of PwD, with the objectification of the self-assessment. The registration screens and then the login screen. Upon logging in, the mobile app will launch a profile screen, where the user can navigate through the consecutive tabs.

To begin the cultural self-assessment, the nursing professional or student will see a screen in the app with the types of disability and a button that says "START". This word will serve as a stimulus for the user to begin their self-assessment of cultural competence in caring for PwD. It is recommended that the user self-assesses all disabilities, in order to have

a parameter of which disability needs to be studied, develop skills, and have the attitude to offer culturally competent nursing care.

Afterward, the user will have access to the definition of each disability and its classification, so the self-assessment begins, following the levels of responsiveness as shown in Figure 1.

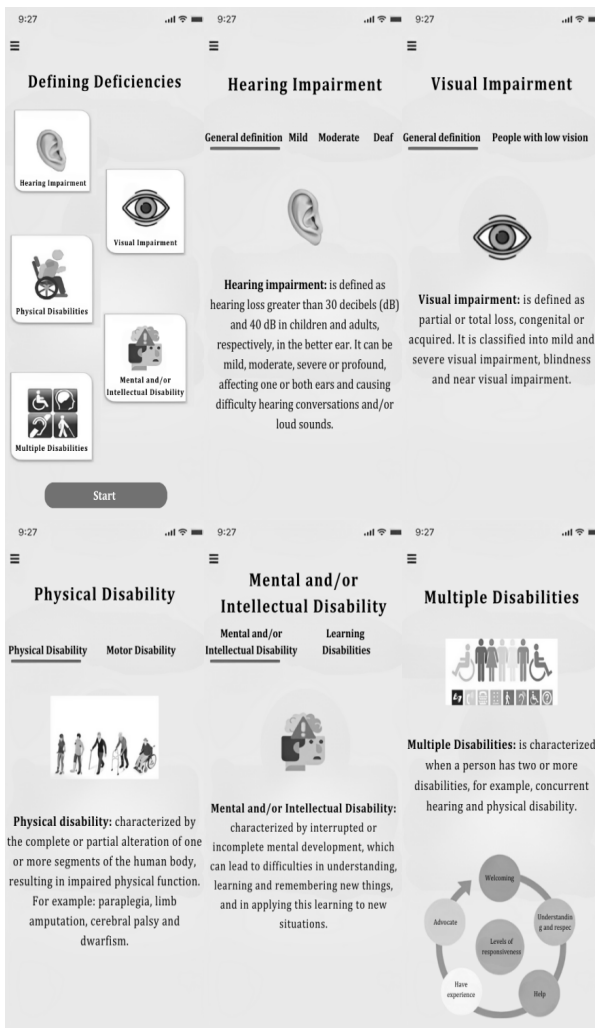


Figure 1 – Screen interface of the “NURSE SELF EVALUATION” application prototype. Crato, CE, Brazil, 2023

Next, the user of the “NURSE SELF EVALUATION” self-assesses, marking the items (C) for competent, (P) for partially competent, and (I) for Incompetent, in terms of cultural competence for nursing care according to the components of the value cycle.

For users who are self-assessing during the development of the levels of responsiveness of care for PwD, a tab will appear stimulating and encouraging the user to examine and explore their skills and competencies for caring for this person. After self-assessing the level shown, the user will continue to the next steps after pressing the answer button. The screens show the definition of each level of responsiveness as shown in Figure 2.

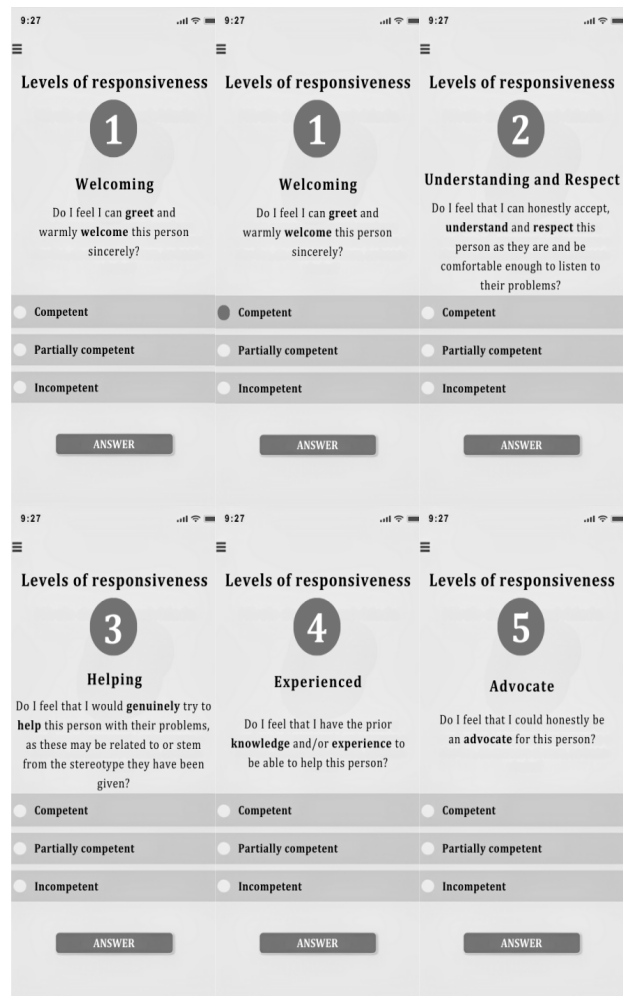


Figure 2 – Interface screens of the “NURSE SELF EVALUATION” application prototype on responsiveness levels. Crato, CE, Brazil, 2023

After carrying out the self-assessment, the user will receive a score according to their competence in caring for the PwD. The “one minute preceptor” ap-

plication was used as a reference for formulating the results. Users who rate themselves as competent will receive positive feedback, while users who rate themselves as partially competent or incompetent will receive a screen encouraging them to develop their competence in caring for PwD.

In addition, the application prototype contains a screen with theoretical support and content to help professionals and/or students strengthen their levels of responsiveness when caring for PwD. The content

includes screens with the alphabet in Braille and Libras (*Língua Brasileira de Sinais* - Brazilian Sign Language) to help with basic communication between patients and professionals.

Finally, after users have completed the self-assessment, the app will display a screen congratulating them and motivating them for their determination and attitude in carrying out the self-assessment of cross-cultural competence for the care of PwD. All these stages can be seen in Figure 3.

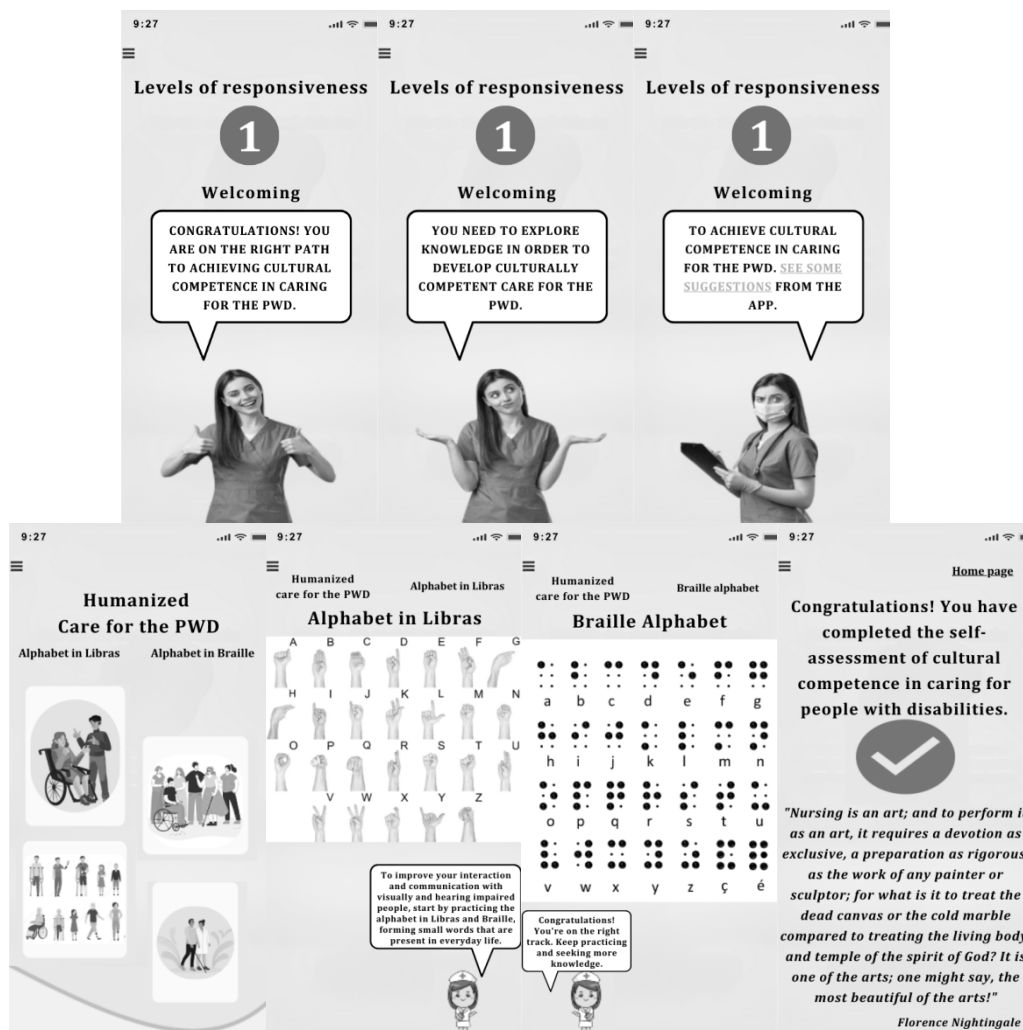


Figure 3 – Screen interface of the “NURSE SELF AVALIATION” application prototype. Crato, CE, Brazil, 2023

Discussion

Nursing is characterized by being a profession that is always seeking to develop new actions aimed at the community that has different particularities, actions that encompass diverse subjects, such as atypical people. PwD belong to a community that needs attention because of the barriers and difficulties in accessing health services, communication with health professionals, especially nurses, and the lack of actions that address the needs relevant to the limitations and disadvantages caused by disability⁽⁹⁾.

Nursing professionals must at all times set goals and plan interventions that are capable of including the PwD and offering care that is based on integrity and resoluteness, in the most holistic way possible. It's important to emphasize that the practices carried out in health services are inserted within the particularities of the user^(11,17).

During the course of their work, nurses may encounter some difficulties in caring for PwD. In order to minimize this, the professional must develop competencies, cognitive and practical skills, and expand their knowledge through continuing education in order to provide the necessary nursing care to people with some kind of disability or limitation⁽¹⁸⁾.

It is important to point out the lack of skills in developing more effective communication between the nurse and the patient. A common example, which occurs frequently in health services, is the lack of training and qualification of nursing professionals in communication in Libras. It has been observed that 63% of users with disabilities have stopped or given up going to the health units because of the difficulty in communication, the lack of a mediator, and, often, the lack of a mediator during appointments. This highlights the importance and need to implement these themes as subjects and content within the curricula of undergraduate nursing courses⁽¹⁹⁾.

In view of the evidence presented, it is necessary to implement measures capable of helping nursing professionals or nursing students during their profes-

sional training, so that effective communication can be established between the user and the professional, also taking into account the progress made in drawing up the care plan, always bearing in mind the particularities, needs, beliefs, attitudes, and values of each user.

During the problem-solving process, attention must be focused entirely on the patient and their particularities, so that nurses can carry out a more effective physical examination, better analyze the patient's priority criticisms, and draw up a diagnosis and nursing interventions for the problems encountered. It is recommended that this process be carried out in a logical, orderly, and systematic sequence, built over five stages: cultural assessment, goals, planning, implementation, and evolution⁽⁸⁾.

The use of health technologies, known as Mobile Health (m-health), and computer tools are being increasingly sought after by both users and professionals, as they are related to the ease of developing the techniques, skills, and competencies mentioned above. By using technological tools during nursing consultations, the professional is automatically consuming processes of continuing education, accessibility of information, and improving the care and assistance provided to the entire population⁽²⁰⁾.

The applicability of Information and Communication Technologies (ICTs) towards improvements in the health field has contributed to positive changes in the work environment, in care, and the quality of nursing care provided. The results of a survey involving 57 participants revealed that 93% of them have already used educational technologies for their academic training, 97.7% are interested in covering knowledge about technologies during their undergraduate studies and more than 90% prefer software that helps them understand subjects covered in the classroom and is similar to professional practice. This shows that the use of applications helps to encourage professionals and users to have moments of reflection, criticism, and the development of new collaborative activities⁽²¹⁾.

Working together between health profes-

nals and ICT professionals can help develop incredible work that develops new technologies with the most diverse approaches, guaranteeing an increase in the quality of care provided in health care systems, promoting not only patient safety but also holistic, humanized care, without prejudices and failures that can be avoided when adequate training is obtained⁽¹⁵⁾.

The prospect of developing technological innovation in the field of health, and more specifically in nursing, presupposes incorporating some technologies into the nurse's work process that make it easier to carry out inclusive activities and promote health equity for the most vulnerable populations.

Study limitations

A limitation of the study is the lack of a validation stage for the app, which implies that the app is unavailable in the Android or IOS online stores. However, this stage is underway by another researcher in the study entitled: "Validation of a mobile app to self-assess cultural competence in caring for people with disabilities". It should be noted that even when searching for relevant studies in national and international databases, there were fewer articles directly addressing cultural competence in caring for people with disabilities.

Contributions to practice

The NURSE SELF AVALIATION mobile app has quality content properties that could enable nurses and nursing students to learn and improve their cultural competence in caring for people with disabilities. It is hoped that, after the validation and registration phases, the app can be used in clinical practice and in nurse training, as a technological strategy to add competence to the nursing care provided and also to give assertive meaning to the professional practice of nursing.

Conclusion

The study enabled the development of a prototype technological application based on the Instrument for Self-Assessment of Transcultural Competence for Caring for People with Disabilities, aimed at self-assessment and promoting the acquisition of cultural competence among people with disabilities in Brazil. It highlights the importance of using this tool in the training process in undergraduate nursing courses and in health services throughout the country, with the aim of improving professional practices in relation to cultural competencies for caring for these people. The importance of building the mobile application and the need for an appearance validation process to finalize its version and make it available on digital platforms is highlighted.

Authors' contribution

Conception and design or analysis and interpretation of data; Agreement to be responsible for all aspects of the manuscript relating to the accuracy or completeness of any part of the manuscript being adequately investigated and resolved: Benedito MHA.

Writing of the manuscript or relevant critical revision of the intellectual content: Lacerda JFE, Feitosa JG, Pagliuca LMF.

Final approval of the version to be published: Maia ER.

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