ORIGINAL

Semioapp application validity for teaching skin semiology in older adults

Validação do aplicativo Semioapp para o ensino da semiologia da pele da pessoa idosa
Validación de la aplicación Semioapp para la enseñanza de semiología de la piel en ancianos

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ABSTRACT

Objective: To validate the content and appearance of an application aimed at teaching the physical examination of older adults' skin in nursing graduation. **Method:** This is methodological research applied to validate the Semioapp application content, which has as its theme physical examination of older adults' skin. It was approved by the Research Ethics Committee of the Universidade Federal Fluminense, and 27 judges participated. For data analysis, descriptive statistics and calculation of Content Validity Index were used. Items that obtained a concordance index greater than or equal to 0.78 were considered validated. **Results:** Twenty-seven judges, graduates in nursing, participated, of which 14.8% had doctoral degree, 11.1%, masters' degree, 59.3%, specialization and 14.8%, specialization in progress. Participants' sociodemographic profile shows that there was a majority participation of 88.9% of women, while there was 11.1% of men. The average of assessment chunks was 88.1%. Regarding the second chunk, the average was 79%, and the third chunk had an average of 82.4%. The total O-CVI was 86%. **Final considerations:** The objective was achieved, and Semioapp was validated, as it obtained a result above the average considered acceptable in this research.

Descriptors: Nursing. Teaching. Skin. Mobile applications. Educational technology.

RESUMO

Objetivo: Validar o conteúdo e aparência de um aplicativo voltado para o ensino do exame físico da pele da pessoa idosa na graduação em enfermagem. **Método:** Trata-se de uma pesquisa metodológica aplicada para validação de conteúdo do aplicativo Semioapp, que tem como tema o exame físico da pele da pessoa idosa. A mesma foi aprovada pelo Comitê de Ética em Pesquisa da Universidade Federal Fluminense, e participaram 27 juízes. Para análise dos dados, utilizaram-se a estatística descritiva e o cálculo do Índice de Validade de Conteúdo. Foram considerados validados os itens que obtiveram nas respostas índice de concordância entre os especialistas maior ou igual a 0,78. **Resultados:** Participaram 27 juízes, graduados em enfermagem, sendo que 14,8% eram doutores, 11,1%, mestres, 59,3%, especialistas e 14,8%, especializandos. O perfil sociodemográfico dos participantes demonstra que houve uma participação majoritária de 88,9% da figura feminina, enquanto que, na masculina, houve 11,1%. A média dos blocos avaliativos foi de 88,1%. Em relação ao segundo bloco, a média foi de 79%, e o terceiro bloco obteve média de 82,4%. O IVC-G total foi de 86%. **Considerações finais:** O objetivo foi alcançado, e o Semioapp, validado, pois obteve um resultado acima da média considerada aceitável nesta pesquisa.

Descritores: Enfermagem. Ensino. Pele. Aplicativos móveis. Tecnologia educacional.

RESUMÉN

Objetivo: Validar el contenido y la apariencia de una aplicación destinada a la enseñanza del examen físico de la piel del anciano en la graduación de enfermería. **Método:** Se trata de una investigación metodológica aplicada para validar el contenido de la aplicación Semioapp que tiene como tema el examen físico de la piel del anciano. Fue aprobado por el Comité de Ética en Investigación de la Universidade Federal Fluminense, y participaron 27 jueces. Para el análisis de los datos se utilizó la estadística descriptiva y el cálculo del Índice de Validez de Contenido. Se consideraron validados los ítems que obtuvieron un índice de concordancia mayor o igual a 0,78. **Resultados:** Participaron 27 jueces, licenciados en enfermería, de los cuales 14,8% eran médicos, 11,1% maestros, 59,3% especialistas y 14,8% estudiantes de especialización. El perfil sociodemográfico de los participantes muestra que hubo una participación mayoritaria del 88,9% de la figura femenina, mientras que, en la masculina, hubo un 11,1%. El promedio de los bloques de evaluación fue de 88,1%. En cuanto al segundo bloque, el promedio fue de 79% y el tercer bloque tuvo un promedio de 82,4%. El IVC-G total fue del 86%. **Consideraciones finales:** Se cumplió el objetivo y se validó la Semioapp, ya que obtuvo un resultado por encima del promedio considerado aceptable en esta investigación.

Descriptores: Enfermería. Enseñanza. Piel. Aplicaciones móviles. Tecnología educacional.

INTRODUCTION

The health area has resorted to digital educational technologies (DET) more and more, working together to diversify and make activities more flexible, allowing students to access content at the time and place they wanted, providing interaction between students in addition to the physical and on-site space.[1] These resources refer to videos, games and hypertexts used in face-to-face or distance activities (e-learning), and can be distributed via the internet, via DVD, CD-ROM, television or cell phone (m-learning).[2,3]

A systematic review conducted by Imperial College London on e-learning for undergraduate health professionals showed that teaching strategies using DET received positive assessments from students as a resource that streamlines activities and replaces the repetition and passivity of face-to-face teaching.[4]

Health professionals are able to reach levels of excellence, especially those in nursing, making it possible to positively enter different fields of knowledge. Technological innovations in the field of health allow professionals, especially nursing professionals, to reach levels of excellence in care, being able to positively reach different fields of knowledge. These innovations must be connected to the care process, working as a support for data collection, decision-making and knowledge generation.[5]

There is a wide range of technological innovations that work together to develop clinical skills in nursing, such as simulation, virtual learning environments and other digital learning materials.[6] The use of such technological resources has a double function: to make nursing teaching more flexible, through an active pedagogical proposal, and to develop skills with students in the use of different computer resources. Such competencies for nursing professionals are understood as knowledge, skills and attitudes mobilized for solving problems in a given situation and context.[7]

To perform a quality physical examination, nurses must have knowledge, skill and sensitivity regarding the skin's specific needs and characteristics in the different life cycles.[8] Another global challenge for health services is the aging of the population. According to statistical projections by the World Health Organization (WHO), in 2025, Brazil will rank sixth in number of older adults, with approximately 32 million people aged 60 or over.[9] It should be noted that, in the Ministry of Health Agenda of Research Priorities (APPMS - *Agenda de Prioridades de Pesquisa do Ministério da Saúde*), one of the lines is directed to older adults' health - axis 12 - considering the analysis of management and practices of teams in caring for the specificities of older adults' health adults.[10]

When assessing older adults' skin, characteristics such as humidity, texture, thickness, temperature, elasticity, sensitivity and injuries must be taken into account in each region of the body.[11]

The skin is the most evident organ in relation to the signs of aging. With the loss of support tissue, subcutaneous fat, reduction of hair and sweat and

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In a study in databases such as Latin American and Caribbean Literature in Health Sciences, International Literature in Health Sciences, Nursing Database and United States National Library of Medicine, with descriptors nursing, educational technology and information technology, whose objective was to identify evidence in the scientific literature for the use of information and communication technologies in teaching enrollment in nursing, the results were confirmed by 1,001 studies, of which 18 met the inclusion criteria, emerging three analytical categories, namely: *The use of simulation in nursing teaching practice; Case-based learning and technology support*; and *Active methodologies*. It was found that learning resources focus on the use of technology that incorporates students as heroes of their learning so that they can make the best decisions in nursing care.[14] In this regard, there was a determination regarding the potential of Semioapp.

A survey carried out to describe the apps aimed at caring for older adults in the Play store and App store showed the following results: as for the language in Portuguese, there are 12 (46.1), and in other languages, 14 (53.8); in the stratification in Portuguese according to area, it was found that 2 (66.6) were focused on teaching, and 1 (33.3), legislation (statute of older adults); regarding the stratification of applications in Portuguese for the teaching area, according to the target audience, it was found that, for health professionals, there are 3 (21.4) and aimed at older adults/family members/caregivers, 11 (78.6). Regarding the purposes of these software, each one of them was developed with a different purpose, namely: information about exercises for older adults; scheduling appointments for a specific service; location of institutions and information about professionals available for services with older adults; cell phone configuration to make the screen more readable for older adults; guidance to caregivers regarding care and other. The data obtained reaffirmed the need to create a software aimed at nursing students about the physical examination of older adults as a tool to support the development of skills, due to the lack of another one with the same purpose.[15] Considering the results of the studies, the determination of the potential of Semioapp is justified.

The identification of gaps in the development of applications related to physical examination in older adults justifies carrying out this research, which aims at student autonomy without geographic limitations for access to Semioapp and the promotion of a favorable teaching and learning environment, with reliable information based on scientific evidence. Thus, this research aimed at validating Semioapp

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content and appearance, aimed at teaching the physical examination of older adults' skin in nursing graduation.

METHODS

This is methodological research, which involved content validity by the Content Validity Index of a digital educational technology in the form of an application, for didactic support in teaching the physical examination of older adults' skin to nursing students. The methodological research is intended for development, assessment and also improvement of instruments and methodological strategies.[16] The instruments are assessed by specialists in the subject, and they may suggest corrections or additions to proposals.[17] The SQUIRE 2.0 instrument from Equator was used to guide the methodology.

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It should be noted that Semioapp is the result of previous research (prototype construction),[18] and the methodology used to build the system was prototyping.[19] The platforms selected for development were Android and IOS. The software was created in PWA (Progressive Web App), developed by Google Inc., which allows to transmit content on any device, such as mobile, tablet, desktop. The technology allows the application to adapt to the user's screen, creating a unique experience. All this goes through the internet, it is not necessary to download it, as one can accept having the icon on their mobile device screen, allowing agile, up-to-date access to content and intuitive handling, as shown in the following figures:

Figure 1. Semioapp images. Rio das Ostras, Rio de Janeiro, Brazil, 2021.
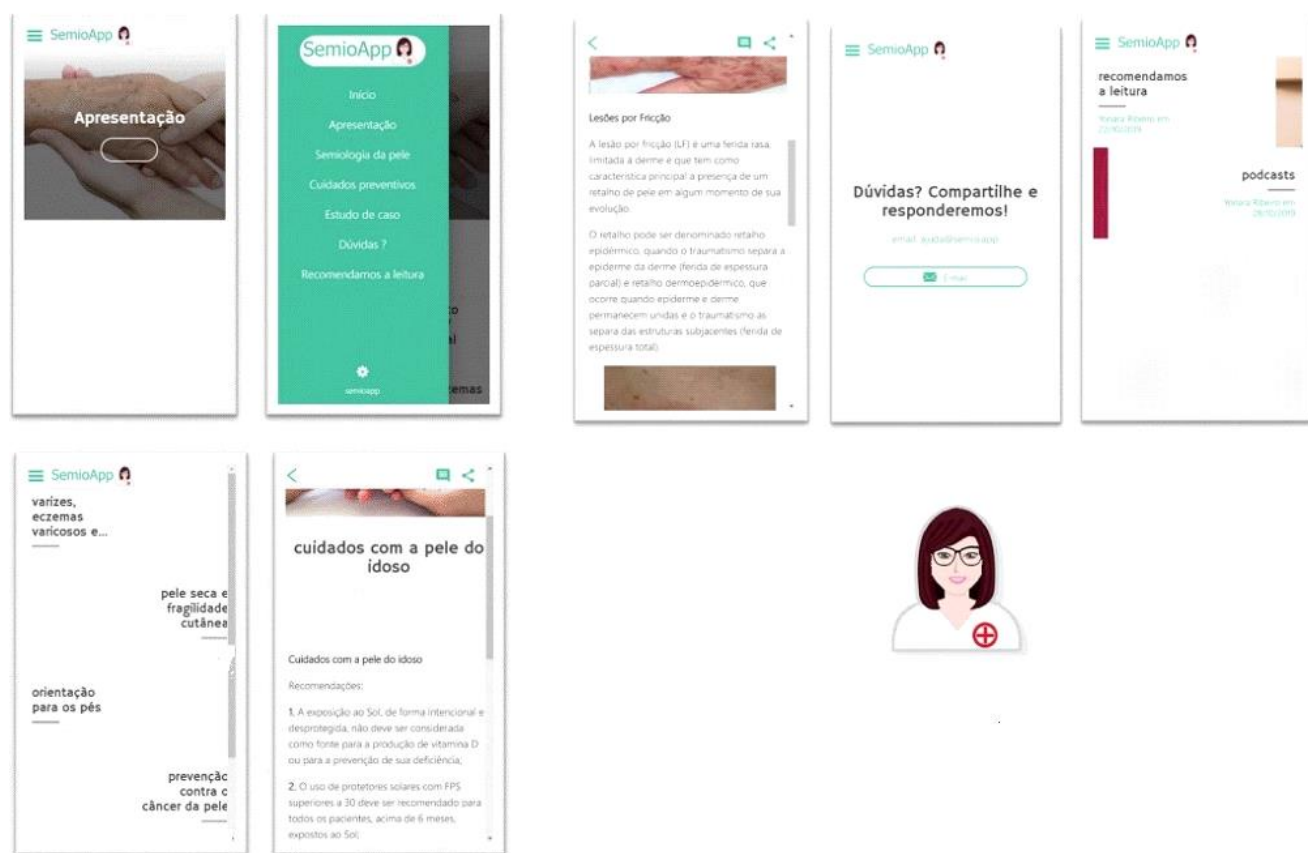
Source: authors (2022).

The pedagogical content was built based on updated scientific references in the area of preventive care for fragile skin injuries, guided by skin inspection and palpation script. The work of image design and layout was done by an IT professional.

In this research, specialist judge participants were nurses with at least six months of assistance to older adults or nursing professors, constituting the inclusion criterion. Professionals performing exclusively administrative activities and without having practical experience in the training area were excluded.

The search for judges took place through the researchers' contact network using the snowball sampling technique. In the snowball sampling, when subjects who fit the established eligibility criteria were found, they were asked to indicate other possible participants, thus being a convenience sampling.[20] The number of specialists changes

between different authors. This decision must take into account the tool's characteristics, the training, qualification and availability of the necessary specialists.[21] In this study, the recommendation of the Brazilian standard ABNT ISO/IEC 25062:2011 was adopted, which recommends a minimum sampling of eight participants.[22]

Data were collected between October 2020 and January 2021. For data collection, the virtual environment was used, providing a form through a link via Google Forms that aimed to facilitate access and participation of individuals from all regions of Brazil. The first part gave access to the Informed Consent Form (ICF), and after accepting to participate in the research, it evolved into the second part, which led to the completion of individual and professional information. Then, in the third part, access to the application was given so that they could fully handle its interface and then access to the application assessment instrument.

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Data were compiled and analyzed using Microsoft Excel and descriptive statistics. Then, the validity instruments were expressed by calculating the Content Validity Index (CVI).

The CVI estimates the proportion or percentage of judges who consent to certain aspects of an instrument and its items.[23] The specialists answered a questionnaire to assess the objectives, structure and relevance, adapted by the researcher from the instrument validated in another study,[24] consisting of a Likert-type scale with scores from 1 to 4.[25] For this validity, the following nomenclatures were used: 1- I: inadequate; 2 - PA: partially adequate; 3 - A: adequate; 4 - TA: totally adequate. In order to assess the entire instrument, it was divided into 3 chunks: 1 chunk is aimed at Semioapp's objectives; chunk 2 deals with application structure and presentation; and chunk 3 is open to free suggestions or criticism. The form used in this study was the average of item values calculated separately, when all I-CVI calculated separately were added and divided by the number of items in the instrument. To calculate the overall instrument CVI, the sum of all I-CVI calculated separately was performed, divided by the number of items. Items that obtained a concordance index between specialists greater than or equal to 0.78 were considered validated.[26] Thus, items with a lower I-CVI were restructured in order to meet the suggestions.

The development of this study complied with national and international standards of ethics in research involving human beings. The research was approved by the Research Ethics Committee of the *Universidade Federal Fluminense* (UFF), under CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration) 34647520.2.0000.8160 and Opinion 4,160,528. The study complied with Resolution 466/2012 of the Brazilian National Health Council in all its prerogatives.

RESULTS

A total of 27 judges, graduated in nursing, participated in the content validity, of which 14.8% had doctoral degree, 11.1%, masters' degree, 59.3%, specialization and 14.8%, specialization in progress. Regarding the areas of knowledge, there was a predominance of fundamental nursing, with 66.8% of judges, followed by 22.2% of dermatological nursing. Gerontology was represented by 7.4%, followed by care management, with 1.2%, as well as public health and biotechnology which, together, gave a total of 2.4%, as follows:

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Table 1. Profile of research participants. Rio das Ostras, Rio de Janeiro, Brazil, 2021.

Variable	Absolute freq.	Relative freq.
Sex		
Female	24	88.90%
Male	3	11.10%
Age group		
24 to 34 years	8	29.60%
35 to 44 years	15	55.60%
45 to 55 years	4	14.80%
Qualification		
Specialist	16	59.30%
Specialist in progress	4	14.80%
Master's degree	3	11.10%
Doctoral degree	4	14.80%
Area		
Fundamental nursing	18	66.80%
Dermatology and its branches	6	22.20%
Gerontology	2	7.40%
Care management	1	1.20%
Public health	1	1.20%
Biotechnology	1	1.20%

Source: authors (2022).

Participants' sociodemographic profile shows that there was a majority participation of 88.9% of women, while there was 11.1% of men. In terms of age, there was a variation with a minimum of 24 and a maximum of 55 years.

Figure 2. Training X experience time. Rio das Ostras, Rio de Janeiro, Brazil, 2021.
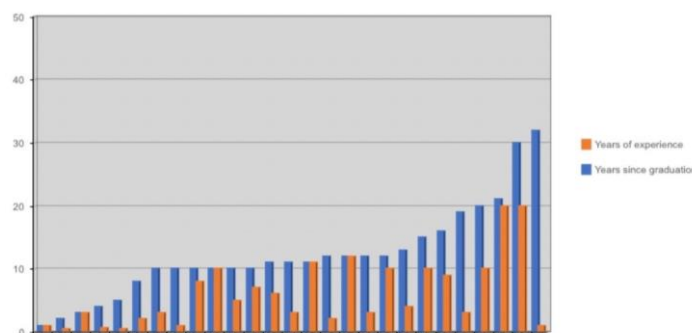
Source: authors (2022).

In the graph above, we can infer that nurses' training time was reported between 1 and 32 years. Regarding the time of experience with skin semiology in older adults, there was a description between the time of 6 months to 20 years.

Table 2. Judges' answers regarding objectives. Rio das Ostras, Rio de Janeiro, Brazil, 2021.

	TA	A	PA	I	I-CVI
Information/content are or are consistent with the target audience's daily needs	17	6	3	1	0.85
Information/content is important for the target audience's professional practice	18	7	-	2	0.93
It invites and/or instigates changes in behavior and attitude	14	9	2	2	0.85
Adequate for the teaching-learning process	17	7	2	1	0.89
Provides reflection on the topic	16	8	1	2	0.89

Caption: TA: totally adequate; A: adequate; PA: partially adequate; I: inadequate.
Source: authors (2022).

This table refers to the first chunk of assessment, i.e., the objectives refer to purposes, goals or purposes that one wants to achieve with the use of DET. In this first assessment topic, all items reached the desired score, indicating that there is no need for adjustment and that the application is fulfilling its initial objective. It can be seen that the highest CVI was linked to the item that mentions the importance of this theme for the target audience's professional practice, emphasizing the teaching role in construction. The O-CVI of this chunk is 0.88.

Table 3. Judges' answers regarding structure and presentation. Rio das Ostras, Rio de Janeiro, Brazil, 2021.

	VALIDITY BY ROUND	TA	A	PA	I	I-CVI
Appropriate language for the educational material	2	14	8	4	1	0.9
The messages are presented in a clear and objective way	2	14	8	4	1	0.9
The appropriate language for the target audience	1	10	12	4	1	0.88
There is a logical sequence of the proposed content	1	11	11	4	1	0.88
The information is well structured in concordance and spelling	1	15	8	3	1	0.85
The information presented is scientifically correct	1	17	6	3	1	0.85
Interactive language, allowing active involvement in the educational process	1	12	11	3	1	0.85
The logo, layout and presentation information are consistent	2	14	5	7	1	1
The size of the title of each tab and of the topics is adequate	1	14	7	5	1	0.88
The illustrations are expressive and sufficient	2	12	5	6	4	0.9
The material is appropriate	2	12	10	4	1	0.9
The number of tabs is adequate	1	12	8	6	1	0.9

Caption: TA: totally adequate; A: adequate; PA: partially adequate; I: inadequate.
Source: authors (2022).

In this second assessment chunk, the questions dealt with the application structure and presentation, referring to the way the instructions are presented. This includes general organization, structure, presentation strategy, coherence and formatting. It can be seen that 3 items did not obtain sufficient scores, indicating the need for adjustment. There were recommendations regarding the need for more expressive and sufficient illustrations about skin injuries, replacement of explanatory texts about different injuries by illustrative figures, in order to provide an easy understanding and identification of them during physical examination of patients' skin. A revision of the number and distribution of tabs, as well as their order, was also proposed. These suggestions were considered relevant by the researchers, and the readjustment was provided for the proposal of a new assessment. The O-CVI of this chunk was 0.79, i.e., it obtained considerable strength of agreement.

A second round of assessment was considered, in order to obtain judges' agreement specifically on items identified as fragile, considering the CVI equal to or greater than 80%. The achieved O-CVI was 0.88, confirming validity by specialists. The O-CVI in the second round was 0.88, confirming content validity with specialists.

Table 4. Judges' answers regarding relevance. Rio das Ostras, Rio de Janeiro, Brazil, 2021.

	TA	A	PA	I	I-CVI
The topics covered encourage learning	19	4	3	1	0.85
DET contributes to knowledge in the area	14	8	3	2	0.81
DET proposes the construction of knowledge	14	8	3	2	0.81
DET arouses interest in the subject	14	8	4	1	0.81

Caption: TA: totally adequate; A: adequate; PA: partially adequate; I: inadequate
Source: authors (2022).

Table 4 expresses judges' assessment in relation to the third chunk entitled relevance, referring to the characteristics that assess the degree of significance of DET. It can be seen that, based on their assessment, the technology does not require adjustments. The O-CVI of this chunk reached 0.82, considered of good consistency among judges.

The last item of the research was the survey of suggestions or criticisms by judges, in which each judge could make more than one note, which led us

to a total of 39 suggestions for educational technology. Therefore, 18 judges used the space to praise the application, and said they had no suggestions for improvements. When it comes to application structure, there was 1 requirement to change the title of the tabs, in addition to 1 report of the need to reorganize the tabs. Regarding the DET information material, there was a request by 8 judges to add information in some specific part, in addition to the insertion of more figures and a reduction of the text by 4 judges. Furthermore, 1 judge requested the exchange of words and, finally, 1 judge made the recommendation to send alert information to DET users. Finally, 3 judges used the space to criticize or point out doubts. In addition, 2 pointed out the need to generate proximity with DET users.

Regarding the overall estimate, judges' assessment of objectives, structure and presentation and relevance had a CVI=0.86.

DISCUSSION

In this study, the validity process was carried out with the participation of nurses, and it was necessary to improve the proposed DET. In general, judges' answers were consistent, as can be seen in the results presented.

Teaching undergraduate nursing students, keeping them updated and, mainly, assessing them is a great challenge.[27] The concept of skill is associated with know-how, that is, the ability to apply and productively use acquired knowledge to achieve a specific purpose.[28]

Corroborating these data, other methodological studies on the development of educational technologies also validated their materials with high statistical indices. Validating a digital application for teaching surgical instruments in its results obtained the participation of eleven specialists in the field of nursing, who assessed the application and found a CVI greater than 0.78. It was concluded that the application proved to be valid for use in the teaching scenario of surgical instrumentation for nursing students and, therefore, it can serve as a support to the traditional teaching method, since it can be consulted offline.[29]

It is worth highlighting another study that validated and made available the instrument Patient Safety Assessment in Medication Administration (ASPAM - *Avaliação da Segurança do Paciente na Administração de Medicamentos*) as a technological resource, bringing advances to nursing and aiming to improve the quality of care provided and, thus, promote hospitalized patient safety. In this study, the ASPAM achieved a CVI of 0.77 for simplicity, 0.76 for clarity, and 0.93 for relevance. Exploratory factor analysis proved to be adequate for the instrument (Kaiser-Meyer-Olkim 0.66 and Bartlett's sphericity with p<0.001). The final Cronbach's alpha of a 28-item scale was 0.85. In conclusion, ASPAM proved to be accurate and reliable in identifying conditions that pose a risk of adverse drug reactions.[30]

In this sense, in a study of the construction and validity of an educational technology (pamphlet format) for metabolic syndrome prevention in

Semioapp application validity for teaching skin.. adolescents, methodological studies were carried out from March 2015 to September 2016 in the state of Piauí. The study was developed in 3 distinct phases: in the first phase of the study, an integrative literature review was performed; in the second phase, with the aid of graphics, the graphic project was developed through the creation of figures and formatting, configuration and layout of pages; in the third phase (validity of the constructed material), specialists and the target public were consulted. At the end of the study, it can be said that the intended objective was achieved, as the educational booklet entitled "*A síndrome metabólica: como evitá-la?*" (Metabolic syndrome: how to avoid it?) has been peer reviewed for content, language and design by specialists, and for writing style, presentation and understanding by the target population.[31]

Another study developed and validated a management software for clinical and quality indicators in nursing care of patients on hemodialysis, called the Hemodialysis Support System (SAHD - *Sistema de Apoio à Hemodiálise*), which was a tool created to monitor patients, helping with information collection, storage and search. It allowed the dynamism in the adoption of adequate intervention measures to intercurrences and adverse events, very common during this renal replacement therapy. It was developed in order to be incorporated into the health team's work routine at the hemodialysis service at the study hospital as a tool to face the challenges of those who assist patients with chronic kidney disease. Its 112 items and sub-items were validated by nine nurses who met the inclusion criteria and agreed to participate in the study, concluding that the information made available in the system can support nurses in the Nursing Process.[32]

The study that elaborated and validated the booklet, entitled "*Aplicando o fator de coagulação em domicílio na pessoa com hemofilia*" (Applying the coagulation factor at home in the person with hemophilia), and the infographic, entitled "*Campo de autoinfusão*" (Self-infusion field), aiming at providing the construction of knowledge of a person with hemophilia through of meaningful learning capable of promoting real changes in attitudes. Furthermore, the purpose of creating the infographic is to provide a step-by-step, guided and summarized, as a physical support of materials used during home intravenous infusion. It is concluded that educational materials can contribute to treatment compliance and care support, by standardizing home intravenous infusion guidelines for people with hemophilia. Moreover, the educational technologies developed, assessed and awarded in this study, give credibility to the products, making them promoters of knowledge, complying with treatment and care support, allowing people with hemophilia to become protagonists of their own treatment through greater autonomy, for safe performance of care. [33]

It should be noted that, although the application was well assessed by judges, they recorded their contributions and observations, in order to guarantee the best quality of educational material for students. Such details contribute to enriching the final product and to the improvement of its applicability, through

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reformulation of information, substitution of terms and revision of illustrations.

The construction of didactic materials, which provide a comprehensive training of nursing professionals, becomes increasingly necessary, to bring educational theory closer to professional practice. This methodology takes students beyond their expectations by inserting concrete examples of the professional world into their teaching process. [32]

DET proved to be valid in terms of content and appearance, with the potential to contribute to teaching, research and, especially, to future nurses' work. The limitations, however, consisted of compliance of nursing professionals in relation to participation in the study. It should be noted that validity by Semioapp students is in the data compilation process, as it is understood that it is appropriate that, during the assessment of educational materials, the target audience can opine about content, language and appearance so that the material becomes adequate for the population for which it is intended. Consequently, the material will achieve its purpose when applied during clinical practice. Afterwards, it will proceed to technical validity with ICT specialists. From this assessment and possible gaps corrected in the system, it will be made available in app stores.

CONCLUSION

It is concluded that the objective was achieved, since Semioapp was validated in terms of content, language and appearance with specialists. In teaching, this study may sensitize nursing professors regarding the items identified regarding the physical examination and academic preparation of future nurses to perform skin physical examination, general and specific to older adults. It is hoped that the results presented can contribute to future studies and that theoretical and practical correlations occur and can also motivate nurses for further research within this theme. The aim is to contribute and raise awareness among academics regarding the importance of carrying out a physical examination, especially of older adults' skin, as a fundamental part of the Nursing Process.

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