




MINIMUM VIABLE PRODUCT FOR SUPPORT APPLICATION: NURSING CARE MANAGEMENT OF THE AGED SKIN

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ABSTRACT

Objective: to describe the construction steps of a Minimum Viable Product for a decision support application for nurses for prevention, nursing diagnosis, and treatment of friction injury/pressure injury in the elderly people.

Method: qualitative study with technological production by the Lean Startup method. Qualitative research was conducted in a municipality in southern Brazil and integrative review for content definition. Product developed in Hyper Text Markup Language format, through the Net Beans tool. Usability Test applied.

Results: 25 nurses participated. The functionalities were organized into a navigation map containing selection boxes for risk factors and care plan, nursing diagnoses, injury staging and treatment suggestions. After usability testing, it was identified the need for adjustments in content and functionalities, which were corrected, resulting in a final version.

Conclusion: the model constitutes a feasible proposal for nursing decision making, allowing critical judgment, based on clinical findings.

DESCRIPTORS: Nursing Care; Aged; Skin; Wounds and Injuries; Pressure Ulcer; Innovation.

MÍNIMO PRODUCTO VIABLE PARA EL APLICATIVO DE APOYO: GESTIÓN DE LA ATENCIÓN DE ENFERMERÍA A LA PIEL DEL ANCIANO

RESUMEN:

Objetivo: Describir las etapas de construcción de un Producto Mínimo Viable para la aplicación de apoyo a la decisión de los enfermeros para la prevención, el diagnóstico de la enfermedad y el tratamiento de la úlcera por presión/fricción en los ancianos. **Método:** estudio cualitativo con producción tecnológica por el método Lean Startup. Se realizó una investigación cualitativa en un municipio del sur de Brasil y una revisión integradora para definir el contenido. Producto desarrollado en formato Hyper Text Markup Language, a través de la herramienta Net Beans. Prueba de usabilidad aplicada. **Resultados:** participaron 25 enfermeras. Las funcionalidades se organizaron en un mapa de navegación que contenía casillas de selección para los factores de riesgo y el plan de atención, los diagnósticos de enfermería, la estadificación de las lesiones y las sugerencias de tratamiento. Tras las pruebas de usabilidad, identificamos la necesidad de realizar ajustes en el contenido y las funcionalidades, que se corrigieron, dando lugar a la versión final. **Conclusión:** el modelo constituye una propuesta factible para la toma de decisiones de enfermería, permitiendo un juicio crítico, basado en los hallazgos clínicos.

DESCRIPTORES: Atención de Enfermería; Anciano; Piel; Heridas y Traumatismos; Lesión por Presión; Innovación.

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INTRODUCTION

Different technological solutions are developed and incorporated into the care practice of health professionals. In nursing, the use of Decision Support Systems (DSSs) through digital applications has proven to be a feasible strategy to support care, especially by allowing rapid access to scientific content, at any time or place, facilitating the conduct of nursing care practices based on clinical findings, facing decision making⁽¹⁻³⁾. Thus, DSSs can contribute to the judgment and clinical reasoning of these professionals, allowing the elucidation of more accurate diagnoses and conducts⁽³⁾.

In Stomatherapy, there is a growing development of care management tools directed to people with Pressure Injury (PI) and Friction Injury (FI), possibly demanded both by the prevalence of these injuries, especially in the home setting (reaching 23.52% for Pressure Injury and 5.5% to 19.5% for Friction Injury), and due to their negative impact on the health and quality of life of the elderly and their families⁽⁴⁻⁵⁾.

Therefore, there is a need for investment in care technologies capable of increasingly supporting the clinical decision of nurses⁽⁶⁾, considering the possibility of real-time application and aid in conducting decision-making processes. The DSSs have been increasingly in evidence, given the rapid and accurate assessment and conducts⁽⁷⁻⁹⁾.

The application of these models in nursing practice has proven successful since they can provide greater speed in processes⁽¹⁰⁻¹¹⁾. In the meantime, this study allows filling the gap in care based on the need to incorporate new forms of care, based on an assistive technology for nursing care management.

The development of this study includes the development of a Minimum Viable Product (MVP) for a decision support application for the prevention, diagnosis, and treatment of Pressure Injury (PI) and Friction Injury (FI) in the elderly, which may allow nurses to be more confident when assessing the skin and provide resolute care, including the elucidation of behaviors based on scientific recommendations.

To this end, the research question was defined as: what are the stages of construction of an MVP for a decision support application for nurses for prevention, nursing diagnosis, and treatment of Friction Injury (FI) and Pressure Injury (PI) in the elderly? The goal was to describe the steps of building a Minimum Viable Product for a decision support application for nurses for prevention, nursing diagnosis, and treatment of friction/pressure injury in the elderly.

METHOD

Qualitative study with technological production, which adopted the Lean Startup method to build a Minimum Viable Product for an application. This method seeks the development of innovative, fast products and aggregates ideas of marketing, management, design, and technology. It allows creating and testing new products under situations of uncertainty, making use of innovative proposals based on scientific discoveries and new possibilities for already existing technologies, or even the availability of a product to meet the needs of users⁽¹²⁻¹³⁾.

The construction of the tool was done in the following stages: Integrative Review, qualitative research with the nurses of the Family Health Strategy (FHS) teams, formatting, and development of the MVP.

First Phase: Integrative Literature Review

We searched the following databases: Latin American and Caribbean Literature on Health Sciences (LILACS); Cumulative Index to Nursing and Allied (CINAHL); Medical Literature Analysis and Retrieval System Online (PUBMED/MEDLINE) and Scientific Electronic Library Online (SciELO). We used Medical Subject Headings Term (MeSH) terms for MEDLINE search; Health Sciences Descriptors (DECs) for LILACS, Boolean operators AND and as delimiters of the search strategy: "Aged" OR "aging" OR "Senescence" AND "Pressure Ulcer" OR "Pressure Ulcers" OR "Decubitus Ulcers" OR "Decubitus Ulcer" OR "Bed Sore" OR "Bed Sores" OR "Pressure Sore" OR "Pressure Sores" OR "Pressure Injury" OR "Pressure Injuries" OR "Wound and Injury" OR "Wounds and Injuries" OR "Multiple Wound" OR "Skin tears" OR "Skin Tear" OR "Skin Trauma" OR "Skin Stripping" OR "Skin Flap" OR "Skin Ulcer" OR "Friction injury" OR "Friction injuries" OR "Epidermal Stripping" OR "Epidermal Strippings" OR "Skin Ulcers" AND "Nursing" OR "Nursing care".

Inclusion criteria were quantitative, qualitative or mixed studies, with the theme in the title or abstract, in people aged 60 years or older, in English, Portuguese or Spanish, published between 2012 and 2017. The exclusion criteria were duplicate productions, books, dissertations, theses, in vitro studies, programs, and health policies. The review aimed to list actions and interventions for prevention, nursing diagnosis, and treatment of Pressure Injury (PI) and Friction Injury (FI) in the elderly. The guiding question was by the acronym PICO ("P": elderly, "I": use of preventive, diagnostic and treatment interventions for Pressure Injury (PI) and Friction Injury (FI); "O": effectiveness of the use of these measures): "What are the preventive, diagnostic and treatment interventions for Pressure Injury (PI) and Friction Injury (FI) in the elderly?"

Second Phase: Qualitative Research

Qualitative research was conducted with nurses to obtain information about their profile, in order to guide the construction of the MVP. We invited 44 FHS nurses from the Municipal Health Secretariat of a municipality in southern Brazil⁽¹⁴⁾.

Inclusion criteria were effective employee with more than three months of work in the city, member of the FHS team. We excluded employees on vacation, pregnancy leave/health treatment/premium, or any other type of leave.

In all, 25 nurses participated by using data saturation criteria, defined as the end of collection when the information becomes repetitive and/or redundant⁽¹⁵⁾.

Third Phase: Construction of the technological innovation product

In this phase, the MVP construction occurred, based on the "Build-Measure-Learn Feedback Cycle", or "Build-Measure-Learn", a component of the Lean Startup method. This allows to validate the MVP building process in a cyclical way⁽¹²⁻¹³⁾.

Thus, the moments were respected: idea (definition of user profiles), construction and product (definition of functionalities and product construction) and measure/data/learn (testing, data evaluation and product adjustments)⁽¹²⁾. Initially, the user profile was defined by means of information from the qualitative investigation, using the technique of personas (avatars) created from the grouping of real information⁽¹⁶⁾. Thus, habits, behaviors, desires, and heterogeneity of users were considered.

After that, it was possible to proceed to the definition of functionalities, based on the gaps observed by the nurses' notes, in the stage of building the users' profile. With the definition of the functionalities, the theoretical framework was organized based on the information obtained in the integrative review.

The navigation map construction was transformed into Hypertext Markup Language

(HTML) and Cascading Style Sheets (CSS), originating a web page, later converted to Android® compatible format for access via mobile devices and desktops.

For testing, we used criteria from the Usability Test, which suggests the evaluation conducted based on profiles (personas) represented by three to five users, in order to identify at least 80% of the product's problems⁽¹⁷⁾.

The product was tested by five randomly selected evaluators, for a period of five days, in September and October 2018, respecting the usability test criteria⁽¹⁸⁾, whose aim is to avoid possible inferences in the evaluation of the product by professionals.

The testing occurred in two Feedback Cycles. In the first, professionals pointed out the need for adjustments; in the second, after adjusting to the suggestions, a new testing was performed, and no need for adjustment was pointed out on that occasion^(12,17).

The study was approved by the Ethics Committee for Research with Human Beings through the consubstantiated opinion no. 2.697.902. The product is part of the macro project entitled "Risk stratification and nursing interventions in the diagnosis, prevention, and treatment of skin tears and pressure injuries in the elderly".

RESULTS

In order to systematize the conduction of the MVP construction and testing processes by the users, it was decided to present the technological innovation product didactically in construction phases⁽¹²⁾, namely:

First Phase

130,926 studies were identified, with 31 eligible for corpus analysis (Figure 1).

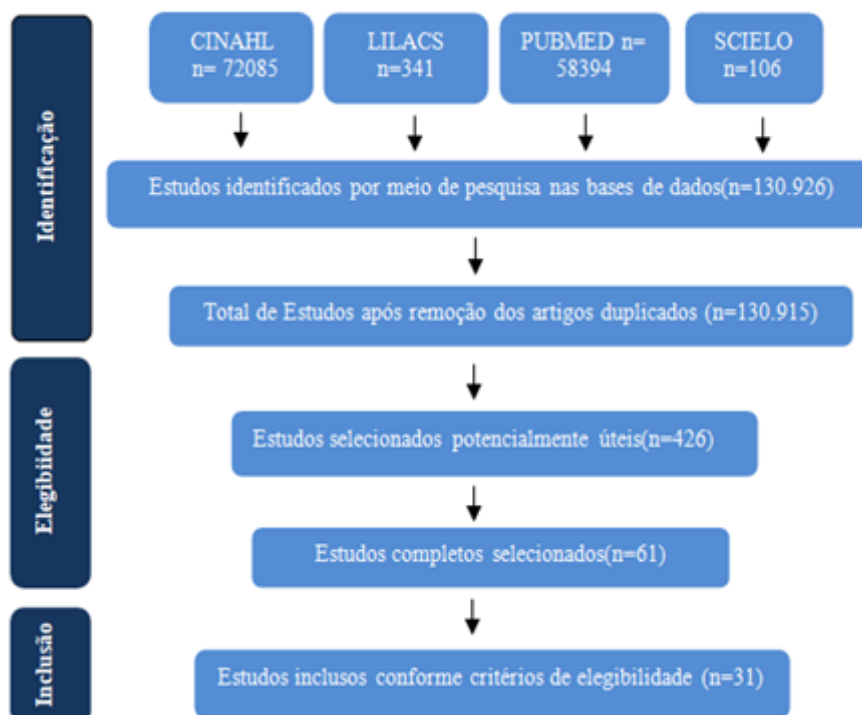


Figure 1 - Selection of Studies. São José, SC, Brazil, 2020. Source: Authors (2020)

As for the year of publication, the largest number of publications was concentrated in 2016 (n=13), mostly prospective studies (n=9; 29.03%). The publications dealt with LP in which 26 (83.87%) and 18 (58.06%) focused on identifying risks for the development of Pressure Injury (PI) and Friction Injury (FI). As for the nursing care described in the studies, five of them focused on the prevention of the lesions studied, all related to Pressure Injury (PI). As for nursing diagnoses, two Brazilian publications addressed the subject, one related to FI and the other to Pressure Injury (PI). Publications related to the treatment of Pressure Injury (PI) and Friction Injury (FI) also composed the sample, of which only two focused on the treatment of Friction Injury (FI).

Second Phase

Twenty-five nurses participated in this phase, 22 of whom (88%) were female, aged between 26 and 56 years. The performance in Primary Health Care varied from less than six months to 16 years, with 11 (44%) nurses linked to the FHS, between one and five years. Regarding education, 13 (52%) had a lato sensu post-graduation, 11 (44%) had a complete college degree, and one participant had a master's degree with a doctorate in progress.

Third Phase: building the technological innovation product

This phase is subdivided into the topics: idea, build and product, and measure/data/learn, and are presented below.

Idea

In this topic, the data from the investigation with the nurses were extracted, which gave rise to the product user profiles, comprising the three personas named Kate, Bryan, and Zoe. From the analysis of these profiles, it was observed that the elucidation of the product should serve both users with skills in the use of digital tools, and those who did not have them.

In all profiles, there was a lack of instructional tools for the management of the injuries studied, and the MVP is a viable strategy for this purpose. Moreover, in face of what was exposed by Kate, the restricted knowledge regarding the management of Friction Injury (FI) Pressure Injury (PI) and emphasized the viability of the decision support proposal. The user profiles corresponding to personas Bryan and Zoe demonstrated greater involvement with the use of technologies like the present proposal. Thus, it was observed that the structuring of a tool that could optimize the time for an adequate assessment of the elderly skin and concomitant support for the nurse's decision making were the main desires of the users (personas). Moreover, considering that nurses move through different care scenarios in the FHS, the need to access the MVP via smartphone was projected.

To ensure the scientificity of the MVP content, nursing interventions were elucidated based on studies extracted from an integrative review. For the Pressure Injury (PI), the relevance of the application of the Braden Scale for risk prediction was observed. Thus, based on the integrative review, a nursing care plan was proposed by the researchers for each altered item/subitem of the Scale. For characterization/staging of the injuries, the National Pressure Injury Advisory Panel (NPIAP)⁽¹⁹⁾ nomenclature was used for Pressure Injury (PI), and the Skin Tear Audit Research (STAR)⁽²⁰⁾ classification system for Friction Injury (FI). The images related to the stages of the lesions were also extracted from these references, with the authorization of the authors.

Given the staging of the lesions, nursing diagnoses were proposed, based on the definitions of the International Nursing Diagnoses: Definitions & Classification 2018-2020⁽²¹⁾: pressure injury, risk of pressure injury, impaired skin integrity, and impaired tissue integrity. Sequentially, treatment suggestions were constructed for each stage of the injuries, based on the findings of the integrative review.

Finally, the survey of the MVP's pertinent content was registered and organized by Word® text editor, presented in access screens by means of a navigation map, for later conversion to programming language (Figure 2).

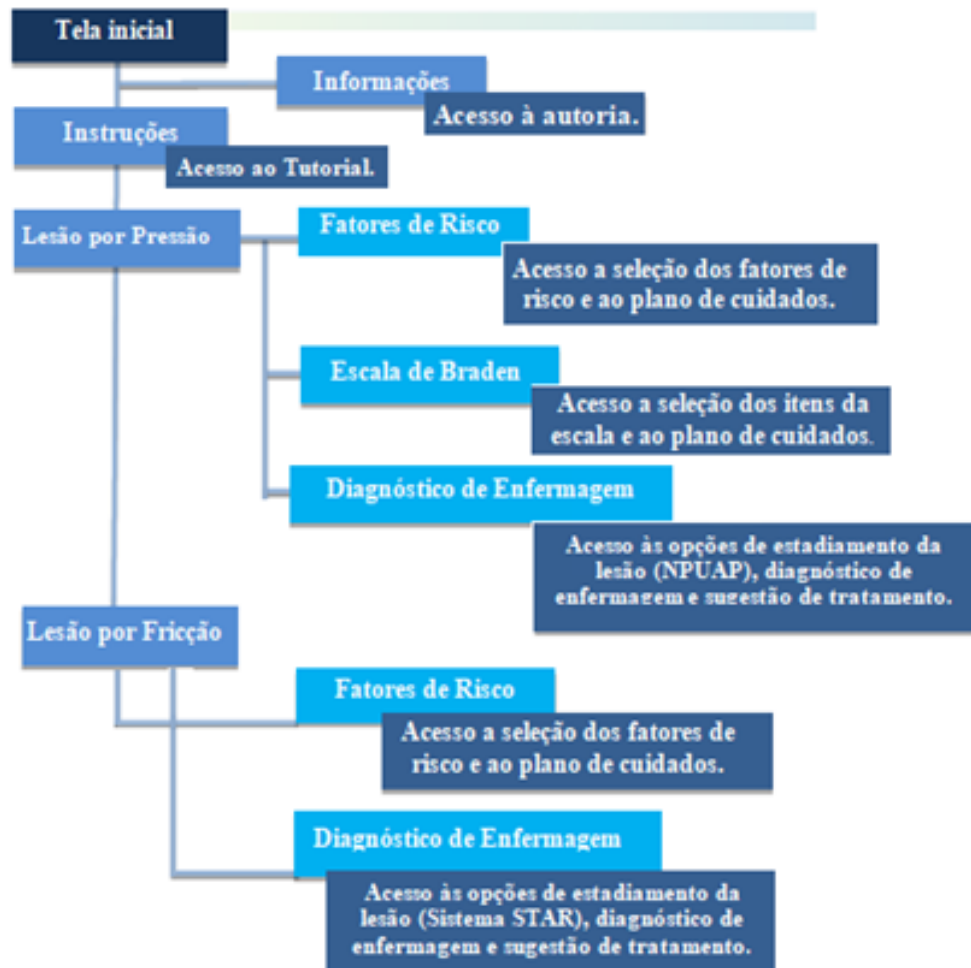


Figure 2 - MVP Navigation Map. São José, SC, Brazil, 2020
Source: Authors (2020)

It is noteworthy that, since the product is being processed for software property registration, we did not detail the options tabs and access screens and images of the product, in keeping with the criteria for preserving confidentiality.

Construction and Product



The navigation map and corresponding content (text and image) were converted to programming language. To do so, the product was built in HTML and CSS format using the Net Beans tool. This process originated a web page that was compiled into an application compatible with the Android® system, allowing access to the MVP through mobile devices and desktops. The construction of the product was conducted by a qualified professional, guided by the researchers, reaching the first version of the product (MVP1) after the conformation of the navigation map in application format.

Measure, data, and learn

After the conformation of the first version of the MPV, it is suggested to start the measurement process with representations of the product users' profiles⁽¹³⁾. Thus, a pre-testing of the version by the programmer and researchers was chosen in order to identify correction/adjustment needs before submission to measurement by users.

Sequentially, the MVP was submitted to evaluation with the target audience by means of a usability test⁽¹⁷⁾. On that occasion, the participants pointed out the need for adjustments, which are presented in Chart 1 and were performed by the programmer within five days.

Chart 1 - Data and conduct of the MVP evaluation by the participants by means of the usability test. São José, SC, Brazil, 2020

Suggestion	Id	PC	Conduct
Indicate on the images used as a "selection key", that clicking on the image will allow visualization of the care plan.	P1	Zoe	Adjustment made
Add in all treatment options "record characteristics of the lesion" as well as measure the size of the injured area.	P2	Zoe	Adjustment made
Replacing the term "yes" in the listing of risk factors, for icons:  	P3	Zoe	Adjustment partially made. Although this suggestion has been pointed out in general, only the "👍" icon for selection was added to the socio demographic risk factors (age, gender and ethnicity). It is justified because the "👎" icon, when it comes to socio-demographic aspects, entails and/or suggests the idea of distinction.
Return key to the lesion image on the nursing diagnosis screen	P4	Bryan	Adjustment performed. By selecting the "back" key on the "smartphone" you can view the image again.

Legend: Id= Participant ID; PC= Corresponding Persona.

Source: Authors (2020).

It should be added that the programmer also suggested the adequacy of the colors of the tool, in order to ensure visual comfort to the user. To this end, it was decided to use cool colors (blue), making use of the overlapping of these tones, since this, besides attracting the user, stimulates concentration⁽²²⁻²⁵⁾.

After the adjustments, the first "Build-Measure-Learn Feedback Cycle" was completed, which originated the version called MVP2, submitted to re-measurement by the users and showed no need for adjustments.

DISCUSSION

The final version of the MVP for a decision support application for nurses for prevention, nursing diagnosis, and treatment of friction/pressure injury in the elderly constitutes a feasible proposal for care practice.

Considering the possibility of access to the tool in different care settings assisted by the FHS team, it is assumed that the technology in question allows for greater security for nurses in decision-making processes, since it is possible to perform accurate assessment of risk factors, diagnosis, and treatment of Friction Injury (FI) and Pressure Injury (PI), and therefore propose interventions consistent with the needs of the elderly, increasing the resoluteness of nursing actions for this clientele.

It is noteworthy that the use of applications confers, in addition to the management of various information, greater speed in the processes facing the decision making, being essential in the organization of interventions in health field⁽²⁴⁾; in nursing, there has been significant adoption of new technologies for care, especially in the form of applications.

A study⁽²⁵⁾ developed an application aimed at the prevention and treatment of Pressure Injury (PI). Among its functionalities, there is the use of the Braden Scale and the indication of possible nursing interventions according to the risk factors presented, in addition to lesion staging and therapy to be adopted⁽²⁵⁾.

Other researchers developed an application capable of stratifying the risk for Pressure Injury (PI), staging the lesion, and suggesting up to 22 preventive measures. Since Pressure Injury (PI) is an indicator of nursing care, the development of this technology surely strengthens the maintenance of continued care⁽²⁶⁾.

When it comes to Friction Injury (FI) a researcher developed an advisory application for the prevention and treatment of these injuries⁽²⁷⁾. For the author, the tool supports the early diagnosis and detailed assessment of this type of injury, positively reflecting on the user's quality of life, reducing its prevalence and, consequently, its cost to health care entities, the user and the support network. Therefore, these and other similar propositions evidence that the application of these resources in the clinical practice of nurses can subsidize and support decision making⁽²⁸⁾.

Regarding scientific production in the area of prevention, diagnosis, and treatment of Pressure Injury (PI) and Friction Injury (FI), a study was identified whose objective was to build a prototype mobile application capable of helping in the prevention and classification of Pressure Injury (PI), providing tools for risk assessment, classification, and treatment of these lesions, as well as preventive care⁽²⁹⁾.

About Friction Injuries (FIs) a recent study developed an application for the prevention and treatment of these lesions. The tool presents advisory/informative screens in logical sequence about the definition, risk factors, preventive/therapeutic measures and categories of these lesions in a descriptive manner. It is also possible to photograph the lesion and file it, identifying it by the patient's name⁽²⁷⁾.

It can be observed that, in the study we present, the identification of the needs for adjustments during the "Feedback Cycle" allowed the cyclical improvement of the product's functionalities, which, although considered a reduced version, foresees the facing of the problems on which it is proposed to intervene. Moreover, because it is an MVP, the tool also allowed successive adaptations, enabling, unlike conventional studies, the incorporation of new features and care to the product. Thus, it allowed the identification of care gaps in nursing practice, fostering new possibilities for elderly care.

In this sense, it is considered that the investment in portable technologies with the purpose of supporting the clinical decision of nurses fosters new means for the evaluation of health conditionalities and configures a new scenario in care management. Thus, its adoption in the context of health and nursing becomes a necessity, since it tends to reduce the crystallized practice of stagnant memorization of concepts, and lead to critical reflection

in face of clinical findings, especially regarding the assessment of the skin of the elderly^(8,30).

It should be added that the use of the personas` method guided the construction of the product and allowed for a clearer understanding of habits, behaviors, desires, and, above all, the heterogeneity of the user profile, transforming the needs of the clientele into tools applicable to the care context.

Accordingly, it is noteworthy that the absence of resources that allow nurses to define their conduct, in an agile and scientifically based way, can interfere with the success and resoluteness of their interventions. This fact is indicative of the existence of a gap, which points to the need for institutional investment in continuing education actions, and the proposition of tools capable of supporting the decision making of these professionals.

Furthermore, it is worth noting that the proposition of a technology focused on the Android system can be considered a limitation of the study; however, the future adequacy of the tool to other operating systems is foreseen.

CONCLUSION

The model allowed for the identification of care gaps, fostering new possibilities for elderly care. The results indicated that the Minimum Viable Product for a decision support application for nurses in the management of nursing care to the skin of the elderly is a feasible proposal, serving as support for nursing decision making, allowing the conduction of critical judgment in an objective and concise manner, based on clinical findings, evidenced through the assessment of the elderly skin.

Considering the method and resources employed, from the MVP perspective, this process reinforced the feasibility of the proposal, since its functionalities emerged from these professionals' notes, and are adaptable whenever necessary.

REFERENCES

1. Sudré GA, Vergilio HA da S, Jesus L de, Sudré MRS. Estudo da Implantação das Tecnologias de Informação na área da Saúde em Enfermagem: uma revisão integrativa de literatura. J. Health Inform. [Internet]. 2020 [accessed 10 nov 2020]; 12(1). Available from: <http://www.jhi-sbis.saude.ws/ojs-jhi/index.php/jhi-sbis/article/view/588/381>.
2. Pereira FGF, Silva DV da, Sousa LMO de, Frota NM. Construção de um aplicativo digital para o ensino de sinais vitais. Rev. Gaúcha Enferm. [Internet]. 2016 [accessed 16 set 2019]; 37(2). Available from: <https://doi.org/10.1590/1983-1447.2016.02.59015>.
3. Silva K de L, Évora YDM, Cintra CSJ. Desenvolvimento de software para apoiar a tomada de decisão na seleção de diagnósticos e intervenções de enfermagem para crianças e adolescentes. Rev Latino-Am Enfermagem. [Internet]. 2015 [accessed 09 nov 2020]; 23(5). Available from: <https://doi.org/10.1590/0104-1169.0302.2633>.
4. Palhares VC, Palhares Neto AA. Prevalência e incidência de úlcera por pressão em uma unidade de terapia intensiva. Rev enferm UFPE. [Internet]. 2014 [accessed 16 set 2019]; 8(2). Available from: <https://repositorio.unesp.br/bitstream/handle/11449/140740/ISSN1981-8963-2014-08-3647-3653-en.pdf?sequence=1&isAllowed=y>.

5. Strazzieri-Pulido KC, Peres GRP, Campanili TCGF, Santos VLC de G. Skin tear prevalence and associated factors: a systematic review. Rev. esc. enferm. USP [Internet]. 2015 [accessed 16 set 2019]; 49(4). Available from: <https://doi.org/10.1590/S0080-623420150000400019>.
6. Busanello J, Silva FM da, Sehnem GD, Poll MA, Deus LML de, Bohlke T da S. Assistência de enfermagem a portadores de feridas: tecnologias de cuidado desenvolvidas na atenção primária. Rev Enferm UFSM [Internet]. 2013 [accessed 16 set 2019]; 3(1). Available from: <http://dx.doi.org/10.5902/217976928532>.
7. Arrais RF, Crotti PLR. Revisão: aplicativos para dispositivos móveis (“Apps”) na automonitorização em pacientes diabéticos. J. Health Inform. [Internet]. 2015 [accessed 08 nov 2020]; 7(4). Available from: <http://www.jhi-sbis.saude.ws/ojs-jhi/index.php/jhi-sbis/article/view/359/245>.
8. Kasper DL, Hauser SL, Jameson JL, Fauci AS, Longo DL, Loscalzo J. Medicina Interna de Harrison. Porto Alegre (RS): AMGH; 2017.
9. Portela CF da S, Manuel FVT dos S, Antônio C da SA, José MM, Silva AM, Martins FR. Sistema inteligente de apoio à decisão e monitorização de doentes críticos em tempo-real. Port J Public Health [Internet]. 2017 [accessed 16 out 2019]; 35(3). Available from: <http://dx.doi.org/10.1159/000486146>.
10. Silva CL da, Cavalheiro MA. Sistema de apoio ao diagnóstico de enfermagem: uma necessidade no trabalho do enfermeiro. Publ UEPG Ci Biol Saúde. [Internet]. 2011 [accessed 16 out 2019]; 17(2). Available from: <http://doi.org/10.5212/Publ.Biologicas.v.17i2.0004>.
11. Silva K de L, Évora YDM, Cintra CSJ. Software development to support decision making in the selection of nursing diagnoses and interventions for children and adolescents. Rev. Latino-Am. Enfermagem [Internet]. 2015 [accessed 13 set 2019]; 23(5). Available from: <http://dx.doi.org/10.1590/0104-1169.0302.2633>.
12. Ries E. A Startup enxuta: como os empreendedores atuais utilizam a inovação contínua para criar empresas extremamente bem-sucedidas. São Paulo (SP): Lua de Papel; 2012.
13. Sarmiento MRC, Costa LFLG. O papel das aceleradoras na consolidação de novas empresas de cultura empreendedora a luz da metodologia lean startup. Empírica BR [Internet]. 2016 [accessed 13 set 2019]; 1(1). Available from: <http://www2.ifrn.edu.br/ojs/index.php/EmpiricaBR/article/view/4437/1561>.
14. Ministério da Saúde (BR). Cadastro Nacional dos Estabelecimentos de Saúde do Brasil – CNES. Informações de Saúde. [Internet]. 2018. [accessed 30 set 2018]. Available from: <http://tabnet.datasus.gov.br/cgi/tabcgi.exe?cnes/cnv/prid02sc.def>.
15. Polit D, Beck CT. Fundamentos de pesquisa em enfermagem: avaliação de evidências para as práticas da enfermagem. 7. ed. Porto Alegre (RS): Artmed; 2011.
16. Pinheiro TM, Szaniecki B, Monat A. O uso da metodologia de personas na produção de hipermídia adaptativa para visitas guiadas a museus. Dapesquisa [Internet]. 2016 [accessed 14 ago 2019]; 11(15). Available from: <http://doi.org/10.5965/1808312911152016255>.
17. Nielsen J. Usability Engineering. San Francisco (CA): Academic Press; 1993.
18. Cybis W de A. Conjunto de ferramentas para a análise de dados de log orientada à tarefa e à produção de medidas de usabilidade. LabiUtil. [Internet]. 2020. [accessed 08 nov 2020]. Available from: <http://www.labiutil.inf.ufsc.br/testeUsemonitor.html>.
19. National Pressure Injury Advisory Panel. Pressure Injury Stages. [Internet]. 2021. [accessed 04 mar 2021]. Available from: <https://npiap.com/page/PressureInjuryStages?&hhsearchterms=%22stages%22>.
20. Strazzieri-Pulido KC. Adaptação cultural e validação do instrumento “STAR skintearsclassification System” para a língua portuguesa [dissertação]. São Paulo (SP): Escola de Enfermagem da Universidade de São Paulo; 2010.

21. Herdman H, Kamitsuru S. Diagnósticos de Enfermagem da NANDA-I. Definições e Classificação 2018-2020. Tradução de Regina Machado Garcez. Porto Alegre (RS): Artmed; 2018.
22. Oliveira RM de, Duarte AF, Alves D, Furegato ARF. Desenvolvimento do aplicativo TabacoQuest para informatização de coleta de dados sobre tabagismo na enfermagem psiquiátrica. Rev. Latino-Am. Enfermagem. [Internet]. 2016 [accessed 14 set 2019]; 24. Available from: <https://doi.org/10.1590/1518-8345.0661.2726>.
23. Castro ABB de, Koizume S. Interface de aplicativos móveis: desing de telas com foco em público estudantil jovem. In: Congresso Internacional de Educação e Tecnologias [Internet]. 2018 [accessed 14 set 2019]; São Carlos (SP): CIET:ENPED; 2018. Available from: <https://cietenped.ufscar.br/submissao/index.php/2018/article/view/267>.
24. Warmling AMF. Tecnologias de informação e comunicação em odontologia: desenvolvimento de um aplicativo auxiliar no ensino [dissertação]. Florianópolis (SC): Universidade Federal de Santa Catarina; 2012. Available from: <https://repositorio.ufsc.br/xmlui/handle/123456789/96183>.
25. Carvalho MRF de. Algoritmo e aplicativo para prevenção e tratamento de lesão por pressão [tese]. Pouso Alegre (RJ): Universidade do Vale do Sapucaí; 2016. Available from: <https://docplayer.com.br/48628025-Algoritmo-e-aplicativo-para-prevencao-e-tratamento-de-lesao-por-pressao.html>.
26. Silva CPC, Dell'Acqua MCQ, Corrente JE, Castro MCN e, Zornoff D de CM. Construção do aplicativo para o indicador de úlcera por pressão. J. Health Inform [Internet]. 2016[accessed 20 set 2019]; 8(4). Available from: <http://www.jhi-sbis.saude.ws/ojs-jhi/index.php/jhi-sbis/article/view/423>.
27. Pinheiro RV. Skintears: algoritmos e aplicativo para prevenção e tratamento [tese]. Pouso Alegre (RJ): Universidade do Vale do Sapucaí; 2012. Available from: <https://docplayer.com.br/89122444-Skin-tears-algoritmos-e-aplicativo-para-prevencao-e-tratamento.html>.
28. Rosa R da. Sistematização da Assistência de Enfermagem em Unidade Neonatal: desenvolvimento de um software-protótipo [dissertação]. Florianópolis (SC): Universidade Federal de Santa Catarina; 2016. Available from: <https://repositorio.ufsc.br/xmlui/bitstream/handle/123456789/175895/345474.pdf?sequence=1&isAllowed=y>.
29. Tibes CM dos S. Aplicativo móvel para prevenção e classificação de úlcera por pressão [dissertação]. São Carlos (SP): Universidade Federal de São Carlos; 2014. Available from: <https://repositorio.ufscar.br/bitstream/handle/ufscar/3287/6796.pdf?sequence=1>.
30. Chiament C. Uso de tecnologias da informação e comunicação no ensino presencial em enfermagem [dissertação]. Rio Grande (RS): Universidade Federal do Rio Grande, Escola de Enfermagem; 2012. Available from: <http://repositorio.furg.br/bitstream/handle/1/3093/camilachiami.pdf?sequence=1>.

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