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Usability of computerized nursing process from the ICNP® in Intensive Care Units*

Usabilidade do processo de enfermagem informatizado a partir da CIPE® em Unidades de Terapia Intensiva

Usabilidad del proceso de enfermería informatizado desde la CIPE® en Unidades de Cuidados Intensivos

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ABSTRACT

Objective: To analyze the usability of Computerized Nursing Process (CNP) from the ICNP® 1.0 in Intensive Care Units in accordance with the criteria established by the standards of the *International Organization for Standardization* and the Brazilian Association of Technical Standards of systems. **Method:** This is a before-and-after semi-experimental quantitative study, with a sample of 34 participants (nurses, professors and systems programmers), carried out in three Intensive Care Units. **Results:** The evaluated criteria (use, content and interface) showed that CNP has usability criteria, as it integrates a logical data structure, clinical assessment, diagnostics and nursing interventions. **Conclusion:** The CNP is a source of information and knowledge that provide nurses with new ways of learning in intensive care, for it is a place that provides complete, comprehensive, and detailed content, supported by current and relevant data and scientific research information for Nursing practices.

DESCRIPTORS

Nursing Process; Nursing Informatics; Information Systems; Intensive Care Units; Classification; Terminology.

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INTRODUCTION

Application of Information and Communication Technologies (ICTs) in health has the potential to transform the working environment, welfare and the quality of care as it encourages professionals to develop skills and knowledge to strengthen their practice, it makes the most accurate and efficient procedures and promotes reducing the risk of human error[1-2].

ICTs have been used as a way to improve clinical records in health and support the development of the Nursing Process (NP) as they allow for their integration into a logical data structure, information and knowledge for clinical decision-making of nursing care[3].

The integration between ICTs and NP can provide positive effects for nursing, such as: monitoring the quality of patient care; improvement in direct care, results, patient satisfaction and practice environments; management performance control; access to clinical patient data anywhere and anytime; reduction of documentation and clinical record time; development of electronic alert systems focused on patient safety[2,4-9], among others.

Therefore, it is understood that the information technology and information systems are increasingly available to support the practice, education, research and the political, social and economic profession. That is, Nursing can align itself with ICTs to establish Computerized Nursing Process (CNP) in their everyday care practices in Intensive Care. In a sector such as the Intensive Care Unit (ICU), the CNP not only integrates, organizes and ensures the continuity of nursing staff information, it also allows for evaluating its efficiency and effectiveness, modifying it according to the results in the recovery of patient and still serves as a permanent foundation for education, research and management in nursing[10].

It is important to highlight that in order to integrate the NP/CNP data, various nursing terminologies have been developed and studied in recent years, especially the International Classification for Nursing Practice (ICNP®). The ICNP® is a structured classification to be computerized, and since version 1.0 it adopted a model of seven axes establishing nursing diagnoses, nursing interventions and outcomes for nursing care in accordance with the priority health needs of patients[11-14]. In this study, the CNP for ICU is structured from the ICNP® version 1.0.

Another angle to be evaluated refers to the negative aspects of ICT and other technologies found in care environments. These aspects include the lack of involvement of nurses in choosing the system and the development of guidelines for the quality of documentation; better support system of information technology; lack of learning opportunities for the use of new technologies; usability, repair and proper maintenance of equipment; and ergonomically inappropriate technology (heavy, far from the bed, inappropriate design, etc.)[4 5].

Thus, it is understood that use and the application of ICTs, including the CNP in the ICU nursing care, require continuous evaluation of their effectiveness and applicability specifically related to usability criteria. This study aimed to analyze the usability of the Computerized Nursing Process from the ICNP® 1.0 in Intensive Care Units by bringing nurses and computerized technology closer together in the clinical practice of nursing, safe and risk-free care to patients, and contributing to the knowledge, organization, control and nursing care management in the ICU. The study was in accordance with the criteria established by the standards of the *International Organization for Standardization* (ISO: 9126-1, 9241-1) and the Brazilian Association of Technical Standards (NBR: 9241-11) for systems.

METHOD

A before-and-after semi-experimental quantitative study was conducted with equivalent groups. The research was conducted in three Intensive Care Units (adult) of three large hospitals in the state of Santa Catarina/Brazil, in the period from May to August 2012.

The sample was intentional nonprobability by judgement, consisting of nurses, professors and systems programmers. The nurse population consisted of 28 professionals who worked in the ICU. A significance level of $P < 0.05$ for a 95% confidence interval without sample loss was considered, so a sample of 26 nurses and four specialist professors in Health Informatics and/or intensive care and four systems programmers was established, totaling 34 participants.

The inclusion criteria of the study were: I) Nurses: being a nurse from the ICU for at least six months; II) Professors: being post-graduate professors, specialized in the IT area of Health/Nursing and/or intensive care; III) Programmers: being a systems programmer graduated in Information Systems or Computer Science. The only exclusion criterion was if the participant did not complete all steps of the outlined protocol.

The survey was conducted in four steps, as explained below:

1st step: preparing two simulated clinical cases, according to the characteristics of the patients assisted in their ICU, containing the medical history and all data, information and clinical changes of some human systems of fictitious patients. Study case 1 referred to a 67-year-old man, 93 kilograms, a history of untreated hypertension, coronary artery disease and smoker for 47 years (30 cigarettes per day), admitted into the ICU with a diagnosis of *pneumonia.* Study case 2 referred to a 35-year-old patient, 70 kilograms, smoker, admitted to the ICU in the immediate post-operative period of an *appendectomy.* The patient developed hemodynamic instability, also presenting clinical *septic shock.*

2nd Step: data collection began at this time, conducted between February and July 2012. The nurses received a notebook containing case one printed on a paper along with the items that comprise the Nursing Process from the ICNP® version 1.0, as specified: Nursing history, clinical assessment, diagnosis and nursing interventions of the respiratory, cardiovascular, neurological, gastrointestinal and renal systems (five human systems). Participants were instructed to place an "X" for the items that required the nursing process. Subsequently, nurses received documents

containing the clinical case 2 with respiratory, cardiovascular, neurological, gastrointestinal, renal and integumentary printed on paper (six human systems). It is noteworthy that the researchers chose to print only human systems considered in clinical cases 1 and 2, meaning the musculoskeletal female and male reproductive and biopsychosocial systems were not covered in the notebook for data collection.

3rd step: the nurses evaluated the clinical cases in the computerized system CNP on average 18-21 days after the end of the 2nd stage. Participants (nurses, professors and systems programmers) were registered in the computerized system via the *login* ID of the record and password for each participant. The CNP was presented to each nurse who was then guided through the identification pages and patient nursing history to accomplish a clinical assessment, diagnosis and nursing interventions of each human system, fluid balance and laboratory tests. Professors received an e-mail containing the clinical cases, *login* ID, password, and detailed guidance on the CNP.

4th step: programmers received the electronic message containing the *login* ID, password, and detailed guidance on the CNP. After finishing the implementation of the clinical cases, nurses and professors, as well as programmers, filled out the assessment tool containing the criteria established by the standards of the *International Organization for Standardization* (ISO: 9126-1, 9241-1) and the Brazilian Association of Technical Standards of systems (NBR: 9241-11) for CNP usability analysis.

The instrument consisted of 21 questions distributed in three criteria: *System Use*, four questions; *System Content*, 11 questions, and *System Interface*, six questions. The items were distributed on a scale of values with the following response categories: (1) *I strongly disagree*; (2) *I partially disagree*; (3) *I do not agree nor disagree*; (4) *I partially agree*; (5) *I strongly agree*. In the evaluation it was considered that the mean values between 1 and 1.5 received a classification of '*I strongly disagree';* between 1.51 and 2.5, '*I partially disagree';* between 2.51 and 3.5, '*I do not agree nor disagree';* 3.51 and 4.5, '*I partially agree*' and between 4.51 and 5, '*I totally agree*'. A space for *comments* was inserted at the end of each item where the participant could express criticisms and/or suggestions about the CNP. There was no obligation for participants to complete any of the subjective questions (comments). They were then categorized according to the evaluated criteria, serving as the basis for their discussions on the results achieved.

Regarding the professors who participated in the survey, it was observed that they only completed Steps 3 and 4 of the study. Systems programmers, depending on their specialty, only answered the specific questions directed towards their respective areas (seven content questions and six system interface questions).

Descriptive (means, standard deviation, maximum and minimum value) and inferential (ANOVA) statistics were used for data processing and analysis of data to establish the statistical significance of the usability of CNP.

The study complied with the ethical requirements and the provisions of resolution 196/96 of the National Health Council through compliance and Informed Consent (TCLE), information rights of the individual and respect for freedom of the participants so that they could withdraw from the study at any time. Because it is a research study involving human subjects, the study was approved by the three Committees on Ethics in Research (CEP) of the respective institutions, protocols: No 947/10; No 036.11; en the 069.2011. In regard to ethical issues, participants were identified as follows: Nurses - N1, N2, N3, successively; Teachers - Pr1, Pr2, Pr3, Pr4; Programmers - Pg 1, Pg 2, Pg 3, Pg4.

RESULTS

Table 1 shows the evaluation results of the nurses related to system usage criterion comprising four items. It is noteworthy that these items have not been evaluated by system programmers, because they are specific issues related to the interest of system usability in the professional practice of nurses and professors.

The four items in the *system use* criteria obtained averages between 4.34 (± 0.745) and 4.76 (± 0.429), being evaluated by the nurses between '*I partially agree*' and '*I totally agree*.' The overall average was 4.53 (± 0.140), demonstrating that nurses '*totally agree*' with the use of the system. The evaluation by professors received an overall mean of 4.75 (±0.333), indicating that these participants also '*totally agree*' using the system.

The ANOVA test conducted from the average obtained by each nurse and teacher for the four items of the *System Use* category obtained p-values = 0.08 and 0.16 respectively, showing no significant difference between the evaluated items by the participants, as explained in Table 2.

The positive assessment of this criterion can also be asserted by the following comments from some reviewers:

> *It minimizes the nurse's workload, thereby speeding up the nursing process, making it more agile and practical (N16).*

> *Maybe this system demands more time in comparison to the System Used in the institution today. A factor that can change with using time, familiarity and experience with the system. However, the gains related to a planned service with quality and safety make up for it (N18).*

> *Practical, divided by systems, presents logical reasoning for evaluation of the intervention; resulting in a nursing prescription according to reality (Pr1).*

Table 3 presents the evaluation done by Nurses regarding the system content criteria, composed of 11 items.

Of the 11 items evaluated on the *system content* criteria, only the items of '*the system provides clear error messages telling me how to fix a problem or a mistaken decision*' and '*if I make a mistake in the system I can easily and quickly recover my already stored data';* obtained means of 3.84 (±0.833) and 3.92 (±0.796) respectively, being considered as '*I partially agree*' by the nurses. All other nine items were rated as '*I totally agree*' by these professionals.

Table 1 – Usability evaluation - nurses: *System Use* criteria - Florianópolis, SC, Brazil, in 2012.

ITEMS OF EVALUATION	Average	Standard Deviation	Max.	Min.	Variance
The CNP will be useful in your work.	4.76	0.429	5	4	0.1846
I am happy to use this system.	4.53	0.508	5	4	0.2584
By knowing the application of this system, I think it will help me save time to develop my activities with patients in the ICU.	4.50	0.648	5	3	0.42
I intend to use this system in my practice.	4.34	0.745	5	3	0.5553
STANDARD AVERAGE	**4.53**				
STANDARD DEVIATION	**0.140**				

Table 2 – ANOVA test - evaluation of nurses and professors in the category *System Use* - Florianópolis, SC, Brazil, 2012.

ANOVA – NURSES						
Source of variation	**SS**	**DF**	**MS**	**F**	**p-value**	**F critical value**
Between groups	2.384615	3	0.794872	2.241504	**0.088087**	2.695534
Inside groups	35.46154	100	0.354615			
Total	37.84615	103				
ANOVA – TEACHERS						
Between groups	1	3	0.33333	2	**0.1678**	3.490
Inside groups	2	12	0.166667			
Total	3	15				

Legend: SS – Sum of Squares; DF – Degrees of Freedom; MS – Mean Square.

Table 3 – Usability Evaluation - Nurses: *System Content* criteria – Florianópolis, SC, Brazil, 2012.

ITEMS OF EVALUATION	Average	Standard Deviation	Max.	Min.	Variance
It was simple to use this system and I understand the issues it addressed.	4.65	0.485	5	4	0.2354
I managed to make appropriate clinical evaluations to determine diagnoses and nursing interventions using this computerized system.	4.57	0.577	5	3	0.3338
The system does not replace my actions; it helps me decide the best way to make decisions according to the scenario / case presented.	4.92	0.271	5	4	0.0738
I felt comfortable using the system.	4.76	0.514	5	3	0.2646
It was easy to learn to use this system.	4.80	0.401	5	4	0.1615
I believe that I could quickly become more productive using this system.	4.57	0.643	5	3	0.4138
The system provides clear error messages telling me how to fix a problem or wrong decision.	3.84	0.833	5	2	0.6954
If I make a mistake in the system, I can easily and quickly recover my data already stored.	3.92	0.796	5	2	0.6338
The information provided by the system (messages, questions, options and other documents) are clear.	4.57	0.577	5	3	0.3338
It's easy to navigate the system to find the information I need.	4.73	0.452	5	4	0.2046
The information in the system is organized properly and includes the physical examination of the ICU patient.	4.65	0.485	5	4	0.2354
STANDARD AVERAGE	**4.54**				
STANDARD DEVIATION	**0.164**				

The comments of some evaluators reflect the positive assessment of this criterion:

> *The system itself directs the nurse to suggest diagnoses and interventions from the clinical evaluation and helps so that no items are forgotten. Indeed, the evaluation, diagnosis and interventions become complete (N5).*

> *Content consistent with the practice, providing support for nurses to complete the nursing process in ICU (N23).*

> *Comprehensive content, detailed, separated by human systems. Comprises the steps of the nursing process, using the ICNP as terminology (Pr2).*

> *Detailed clinical evaluation, diagnosis and nursing interventions consistent with the nursing practice in ICU (PR3).*

The ANOVA test conducted from the average obtained by each nurse obtained a p-value = 0.000, indicating that there were significant differences between the evaluated items, meaning that at least a couple of items

were evaluated differently from other items, as shown in Table 4.

Table 4 –ANOVA test – Nurse's evaluation: *System Content*– Florianópolis, SC, Brazil, 2012.

ANOVA						
Source of variation	**SS**	**DF**	**MS**	**F**	**p-value**	**F critical value**
Between groups	31.161	10	3.11608	9.5581	**1E-13 (0.000)**	1.8652
Inside groups	89.654	275	0.32601			
Total	120.81	285				

Legend: SS – Sum of Squares; DF – Degrees of Freedom; MS – Mean Square.

The *Least Significant Difference* test (LSD) was performed after the analysis of variance and aimed to verify which means were different among them. From a difference of 0.53 between the obtained averages taken of each item of *system content* criterion, it can be stated that the items were different. LSD showed the existence of two groups within this criterion, specified as: Group 1 - equal questions among each other (nine questions); Group 2 - equal questions among themselves but different from the items (two questions). The two questions evaluated differently by nurses and evidenced by the LSD test were '*the system provides clear error messages telling me how to fix a problem or mistaken decision*' and *'if I make a mistake in the system I can easily and quickly recover my data already stored.'* It is noteworthy that these two questions were the same that received the lowest average assessment as scored by nurses.

In order to confirm results obtained by the LSD test, the ANOVA test was conducted again excluding the means of the two items that were evaluated differently by nurses. The p-value = 0.15 showed that there was no significant difference between the other nine items evaluated in the *System Content* criteria.

The evaluation scores of the professors had an overall mean = 4.47 (±0.235) and as occurred in nurses evaluation, the items '*the system provides clear error messages telling me how to fix a problem or mistaken decision*' and '*if I make a mistake in the system I can easily and quickly recover my data already stored,'* had the lowest averages of 4.00 (±0.816) and 4.25 (±0.957) respectively, considered as '*I partially agree'* by professors. However, the ANOVA test p-value = 0.53 obtained showed no significant difference between the items evaluated by the professors.

The comments of some evaluators reflect this statement:

> *There was no error message (N4).*
>
> *I did not notice any device to warn about this or for duplicate or inconsistent information (N8).*
>
> *During use, no error condition was reported (Pg 1).*
>
> *Only relevant information and that which brings forth any doubts in filling in information are properly explained with a help icon with the necessary information (Pg 2).*
>
> *The use of the system for both addition and for data editing is excellent. The database appears to be robust and concise (Pg 3).*

The seven items in the *system content* criteria assessed by systems programmers received an overall average = 4.57 (±0.268), being considered as '*I totally agree*.' The evaluated items obtained the following averages: '*it was simple to use this system and I understand the issues it addressed*,' 4.75 (±0.5); '*I felt comfortable using the system*,' 4.75 (±0.5)*; 'it was easy to learn how to use this system*,' 4.5 (±0.57); '*the system provides clear error messages telling me how to fix a problem or mistaken decision*,' 4.00 (±0); '*if I make a mistake in system I can easily and quickly recover my data already stored*,' 4.5 (±0.57); '*the information provided by the system (messages, questions, options and other documents) are clear*,' 4.5 (±0.57); '*it is easy to navigate the system to find the information I need*,' 5.00 (±0). As professors, the obtained ANOVA test p-value = 0.40, showing no significant difference between the items evaluated by the programmers.

All six items in the *system interface* criteria were evaluated by nurses, professors and systems programmers. Table 5 presents the evaluation performed by nurses only.

The six items in *system interface* criterion obtained averages between 4.53 (±0.508) and 4.76 (±0.429), and an overall average = 4.68 (±0.032) was assessed as '*I totally agree'* by nurses. The assessment carried out by professors and systems programmers received an overall average of 4.66 (±0.039) and 4.54 (±0.181), pointing out that these participants also '*completely agreed'* with the use of the system.

The ANOVA test conducted from the average obtained by each nurse, teacher and systems programmer for the six items that make up the *system interface* category received the following p-values = 0.48; 0.93; and 0.69, respectively, showing no significant difference between the items evaluated by the participants.

Comments and suggestions of some evaluators reflect the positive assessment of this criterion and also contribute to the improvement of the CNP:

> *A type of system which can be used without need for training (N1).*
>
> *Clear and objective interface; information provided objectively. Simple computer system handling (Pr2).*
>
> *System functions with appropriate professional practice. The supplementary information icons present on physical examination clarify any doubts for professionals about possible questions during physical examination (Pr4).*
>
> *Focuses attention on the filling out of forms work, showing consistency in the provision of menus, buttons and icons, as well as the formatting of the characters, having a simple layout and understanding (Pg 2).*

The general average of CNP usability evaluation from the ICNP® version 1.0 for each category of participants was: nurses, 4.58 (±0.191); professors, 4.58 (±0.244) and programmers,

Table 5 – Usability Evaluation - Nurses: *System Interface* criteria – Florianópolis, SC, Brazil, 2012.

ITEMS OF EVALUATION	Average	Standard Deviation	Max.	Min.	Variance
The system interface is nice (colors, image, layout of items, navigation, etc.)	4.73	0.452	5	4	0.2046
I liked using the interface of this system.	4.65	0.485	5	4	0.2354
This system has all the functions that I expected it to have.	4.53	0.508	5	4	0.2585
Overall I am satisfied with this system.	4.65	0.485	5	4	0.2354
It is simple and easy to use this system.	4.76	0.514	5	3	0.2646
The organization and the provision of information in the system screens are clear and objective.	4.76	0.429	5	4	0.1846
STANDARD AVERAGE	**4.68**				
STANDARD DEVIATION	**0.032**				

4.55 (±0.257). These results indicate that all the professionals evaluated for the category as '*I completely agree*' with the usability of CNP from the ICNP® 1.0 in Intensive Care Units.

DISCUSSION

The evaluation of the usability of computerized information systems involves the analysis of the ergonomic aspects, user interface, and use of the content itself[15]. According to ISO 9241-11[16], usability measures the effectiveness, efficiency and satisfaction with which a user can perform a specific set of tasks in a particular environment. Among its objectives, assessing whether the simple and basic tasks are easily performed by users stands out. That is, a system is considered effective when it allows users to achieve their goals.

Analyzing the usability of CNP from the ICNP® Version 1.0 involved showing its qualities, efficiency and user satisfaction by means of the criteria set by the ISO standards and NBR systems. It is noteworthy that all the criteria were positively evaluated by participants, obtaining high average assessments.

In relation to the *System Use* criteria, both nurses and professors completely agreed that CNP is useful and can be used in ICU, which will take less time to develop activities with patients, and they were happy to use the system.

The clinical record needs to be objective and clear so that all members of the health team with access to such information understand its context and meaning. A major challenge to be overcome by Nursing is the effective and qualified conduct of the clinical recording through the nursing process, making it more complete, detailed and integrated with records/information systems of other health professionals[4,7-8,17-19].

Electronic records in health, particularly in nursing, help the organization and administration in increasing the volume of information; providing any and all data that nurses need to develop their actions[19-21] in real time, and allowing nurses to electronically record the technical and scientific documents that ethically and legally support them towards patients and society[22].

The *system content* criterion was assessed by all three categories of participants as '*I totally agree.*' Nurses and professors pointed out that the data and information contained in the system are properly organized and include the physical examination of the patient hospitalized in ICU, the system provides the realization of the Nursing Process through an appropriate clinical evaluation, determination of diagnoses and Nursing interventions without replacing the actions/decisions of professionals.

It was observed in the *system content* criterion that the two items '*the system provides clear error messages telling me how to fix a problem or mistaken decision*' and '*if I make a mistake in the system I can easily and quickly recover my data already stored,*' had a lower average evaluation of the participants considered as '*I partially disagree.*'

It is noteworthy that the error messages in the system provide the user with information about committed mistakes or steps that have not been saved by the user before proceeding to the clinical evaluation of another human system, or the determination of diagnoses after clinical evaluation, or nursing interventions after the nursing diagnoses. A sample error message that can be displayed on CNP refers to the clinical evaluation of the female reproductive system of a male patient and vice versa.

As the evaluators did not receive any error messages during the evaluation of the usability of the system, some have chosen to review these two items as '*I partially disagree,*' contributing to the average decrease.

The CNP content for the ICU is anchored in ICNP® version 1.0. This global classification system is used in the design of information systems to support planning and implementation of the care process. The components of the ICNP® encompass the elements of nursing practice, addressing what nurses do when facing certain human needs to produce certain results (Nursing diagnoses, interventions and outcomes). It is a unified language that expresses the nursing care elements[11].

The ICNP® is outlined in *Reference Terminology Model for Nursing,* established in 2003, denominated ISO 18104. This standard has provided guidance to accommodate the various terminologies and classifications most used by nurses for recording patient data and to facilitate the mapping of Nursing terms with other standards/health terminologies, to promote the necessary integration of information systems[13 -14].

Regarding the *system interface* criterion, participants '*fully agreed*' that the interface system is competent and has the appropriate functions, the handling is simple and easy, and the organization and provision of information on the screens are clear and objective.

A computer systems interface is understood as parts of an information system with which users may interact. It's an operating system feature that uses graphic symbols or icons and instead of typing commands, the user takes the cursor to the appropriate icon by moving a mouse on a table [21]. Today, with the evolution of mobile devices (*tablets*, *smartphones*, *personal digital assistance*, etc.) that allow different forms of access, users can browse and access information without restrictions on time or place, providing that the criteria of usability and appropriate security are guaranteed. In this sense, the user interface in the evaluation of usability is a key attribute for the level of satisfaction, effectiveness and efficiency with which users perform their tasks[21,23] .

Reflecting on the high average and the comments of the participants obtained in the *system interface* test, it is understood that because it is an information system designed for patients in intensive care, a central element of attention, care and making Nursing decisions, which are impossible to do without the information related to the evaluation, diagnosis and interventions that support the practice of nursing. Thus, it was decided to build a system with the clinical evaluation process being as inclusive as possible, giving nurses a range of possibilities for nursing care, according to the complexity of many clinical situations presented by ICU patients.

CONCLUSION

The evaluation of the computerized system usability criteria established by the ISO 9126-1 standards, and 9241-1 and 9241-11 NBR systems, show that the proposed CNP structured from the ICNP® version 1.0 enables nurses to apply it to care practices in the ICU because it integrates a logical data and information structure to clinical assessment, diagnosis and Nursing intervention, divided by human systems.

The CNP usability evaluation suggests that this computerized system can be considered a source of information and knowledge that makes new modes of learning in intensive care available to nurses, because it is a space that provides complete, ample and detailed content to nursing practice, supported by current and relevant scientific research data and information. It is further considered that CNP is an ongoing and reflective learning environment that encourages research and dialogue between the various professionals that make up the health team and sound decision making regarding the ICU nursing care.

Computer recording of the structured Nursing Process and founded on terminology and classification systems with usability criteria is a way of communicating between users that guarantees the quality of the computer-user in order to accept a technological product in practice and promote the continuity of care in the ICU.

For future research, it is suggested to update and evaluate CNP using the ICNP® version 3.0, along with the articulation and mapping of data and information from the ICNP® 3.0 with other terminology/reference classification systems (NANDA, NIC, NOC and CID 10).

RESUMO

Objetivo: Analisar a usabilidade do Processo de Enfermagem Informatizado (PEI) a partir da CIPE® 1.0 em Unidades de Terapia Intensiva de acordo com os critérios estabelecidos pelos padrões da *International Organization for Standartization* e Associação Brasileira de Normas Técnicas de sistemas. **Método:** Trata-se de estudo quantitativo, semiexperimental do tipo antes e depois, com uma amostra de 34 participantes (enfermeiros, professores e programadores de sistemas), realizado em três Unidades de Terapia Intensiva. **Resultados:** Os critérios avaliados (uso, conteúdo e interface) evidenciaram que o PEI possui critérios de usabilidade, pois integra uma estrutura lógica de dados, avaliação clínica, diagnósticos e intervenções de Enfermagem. **Conclusão:** O PEI é uma fonte de informações e conhecimentos que disponibiliza aos enfermeiros novas modalidades de aprendizagem em terapia intensiva, por ser um espaço que fornece um conteúdo amplo, completo e detalhado, alicerçado por dados e informações de pesquisas científicas atuais e relevantes para prática de Enfermagem.

DESCRITORES

Processos de Enfermagem; Informática em Enfermagem; Sistemas de Informação; Unidades de Terapia Intensiva; Classificação; Terminologia.

RESUMEN

Objetivo: Analizar la usabilidad del Proceso de Enfermería Informatizado (PEI) desde la CIPE® 1.0 en Unidades de Cuidados Intensivos de acuerdo con los criterios establecidos por los estándares de la *International Organization for Standartization* y Asociación Brasileña de Normas Técnicas de sistemas. **Método:** Se trata de estudio cuantitativo, semiexperimental del tipo antes y después, con una muestra de 34 participantes (enfermeros, profesores y programadores de sistemas), realizado en tres Unidades de Cuidados Intensivos. **Resultados:** Los criterios evaluados (uso, contenido e interfaz) evidenciaron que el PEI tiene criterios de usabilidad, pues integra una estructura lógica de datos, evaluación clínica, diagnósticos e intervenciones de Enfermería. **Conclusión:** El PEI es una fuente de informaciones y conocimientos que facilita a los enfermeros nuevas modalidades de aprendizaje en terapia intensiva, al ser un espacio que proporciona un contenido amplio, completo y detallado, cimentado por datos e informaciones de investigaciones científicas actuales y relevantes para la práctica de Enfermería.

DESCRIPTORES

Procesos de Enfermería; Informática aplicada a la Enfermería; Sistemas de Información; Unidades de Cuidados Intensivos; Clasificación; Terminología.

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