

Portable bathtub: technology for bed bath in bedridden patients

Banheira portátil: tecnologia para o banho de leito em pacientes acamados

Bañera portátil: tecnología para el baño en cama para pacientes en cama

Dirce Stein Backes^I, Carine Alves Gomes^I, Simone Barbosa Pereira^I,
Noelucy Ferreira Teles^{II}, Marli Terezinha Stein Backes^{III}

^I Centro Universitário Franciscano, Professional Master's in Maternal and Child Health. Santa Maria, Rio Grande do Sul, Brazil.

^{II} Centro Universitário Franciscano, Undergraduate Program in Nursing. Santa Maria, Rio Grande do Sul, Brazil.

^{III} Universidade Federal de Santa Catarina, Postgraduate Program in Nursing. Florianópolis, Santa Catarina, Brazil.

How to cite this article:

Backes DS, Teles NF, Gomes CA, Pereira SB, Backes MTS. Portable bathtub: technology for bed bath in bedridden patients. Rev Bras Enferm [Internet]. 2017;70(2):364-9. DOI: <http://dx.doi.org/10.1590/0034-7167-2016-0178>

Submission: 07-19-2016

Approval: 08-19-2016

ABSTRACT

Objective: determine the benefits of the Portable Bathtub as technology for bed bath in bedridden patients. **Method:** qualitative research of exploratory-descriptive character, whose data were collected by means of 30 interviews with patients, family members and professionals directly involved in bed bath, carried out with Portable Bathtub, in bedridden patients of a medical clinic, from July to December 2015. **Results:** from the data encoded by thematic content analysis resulted two categories: Portable Bathtub: from morphine to the patient's rekindled eyes; From mechanized practice to unique, transforming care. **Conclusion:** we concluded that the Portable Bathtub constitutes enhancing technology, as it enables clinical improvement of the patient's general condition and transcends traditional mechanized practices by the reach of advanced nursing care practices. **Descriptors:** Nursing Research; Nursing care; Technology; Innovation; Quality of Health Care.

RESUMO

Objetivo: conhecer os benefícios da Banheira Portátil como tecnologia para o banho de leito em pacientes acamados. **Método:** pesquisa qualitativa de caráter exploratório-descritiva, cujos dados foram coletados por meio de 30 entrevistas com pacientes, familiares e profissionais diretamente envolvidos no banho de leito, realizado por meio da Banheira Portátil, em pacientes acamados de uma unidade de clínica médica hospitalar, no período de julho a dezembro de 2015. **Resultados:** dos dados codificados pela análise de conteúdo temática resultaram duas categorias: Banheira portátil: da morfina ao brilho nos olhos do paciente; Da prática mecanizada ao cuidado singular e transformador. **Conclusão:** conclui-se que a Banheira Portátil se constitui em tecnologia agregadora, à medida que possibilita a melhora clínica do estado geral do paciente e ao transcender práticas tradicionais mecanizadas pelo alcance de práticas avançadas de cuidado de enfermagem. **Descritores:** Pesquisa em Enfermagem; Cuidados de Enfermagem; Tecnologia; Inovação; Qualidade da Assistência à Saúde.

RESUMEN

Objetivo: conocer los beneficios de la bañera portátil como tecnología para el baño en cama de pacientes postrados en cama. **Método:** investigación cualitativa de carácter exploratoria descriptiva, cuyos datos fueron recolectados a través de 30 entrevistas con pacientes, familiares y profesionales directamente involucradas con el baño en cama, realizado por medio de la bañera portátil en pacientes encamados en una unidad médica del hospital, de julio a diciembre de 2015. **Resultados:** de los datos codificados por análisis de contenido temático resultaron dos categorías: Bañera portátil: de la morfina al brillo en los ojos del paciente; de la práctica mecanizada al cuidado singular y transformador. **Conclusión:** se concluye que la bañera portátil se constituye en una tecnología agregadora en la medida que posibilita una mejora clínica del estado general del paciente y trasciende las prácticas tradicionales mecanizadas por el alcance de prácticas avanzadas del cuidado de enfermería. **Descritores:** Investigación en Enfermería; Atención de Enfermería; Ingeniería; Innovación; Calidad de la Atención de Salud.

CORRESPONDING AUTHOR

Dirce Stein Backes

E-mail: backesdirce@unifra.br

INTRODUCTION

Bed bath is a primary care that – although of extreme importance to bedridden patients – is often considered as secondary by nursing staffs. The bath represents much more than a specific and technical nursing care. It is a basic human care of utmost importance, both for active individuals and for patients requiring absolute rest⁽¹⁾.

Therapeutic properties of bath have always been recognized throughout history. With modern nursing, however, bath is now advocated due to its potential for skin sanitization, because of stimulation of blood and body movements, improvement of self-image and reduction of body odor, relief of discomfort, muscle relaxation, among others. Generally speaking, bath has always been recognized as a basic human need, despite little technical and scientific advancement in this area⁽²⁻³⁾.

Scientific evidence shows that the decline in the quality of bed bath in bedridden patients, while private care of the nursing team, has been noticeable over the last few decades, although technological advances have proposed new modes of intervention⁽⁴⁻⁶⁾, more specifically alternative techniques of bed bath in patients admitted to intensive care units. Noteworthy, in this context, is the dry bath⁽⁷⁾, which is based on the use of surfactants as skin cleaner, in order to enable the reduction of time, bath costs, and skin moisture, as well as improve client satisfaction and reduce infection rates, and the bath in patient with bed rest by means of inflatable bathtub⁽⁸⁾. Advances in this area, however, in most cases are not compatible with the economic reality of most health institutions.

Based on gaps identified and aware of the need to improve the nursing care related to bed bath, it was developed, over 2015, the technology called Portable Bathtub. It is characterized as low-cost technology of easy adaptability to health services and households. Portable Bathtub is composed of polyvinyl chloride (PVC) laminated material that is flexible and adaptable to the size of the patient's bed. This technology allows the shower bath in the patient's own bed by means of silicone hose coupled to the bathroom shower, as shown in Figure 1, below. The hose has, in one of its ends, the sprinkler shower nozzle and, at the other end, the water flow valve⁽⁹⁾.



Figure 1 - Portable Bathtub

Based on the aforementioned, this study aimed to know the benefits of Portable Bathtub as enhancing technology for bed

bath in bedridden patients in order to innovate and improve the nursing care, more specifically in this area.

METHOD

Ethical aspects

The research was conducted founded on the recommendations of the National Health Council Resolution No. 466/2012, which guides the research with human beings. The project was submitted to and approved by the Research Ethics Committee. To keep anonymity of participants, excerpts of interviews were identified in the text with the letter "P" (Patient), "F" (patient's direct family member); "N" (Nurse), "NT" (Nursing technician), followed by an Arabic numeral that corresponding to the order of the participants' interviews: P1, P2...(5); F1, F2...(10); N1, N2...(5); NT1, NT2...(10).

Type of study

This is a descriptive and exploratory study, with qualitative approach, which employed content analysis as theoretical framework for data analysis.

Methodological procedure

The process of implementing bed bath in bedridden patients using Portable Bathtub was carried out in two steps. Initially, we conducted activities to foster awareness with all professionals of the medical clinic's nursing staff through the Incubator of Learning, characterized as welcoming and instigating space for new learning and health care technologies⁽¹⁰⁾. In this first step, all professionals of the team reflected and expanded their knowledge about the importance of bed bath and also acknowledged the functioning of Portable Bathtub as enhancing technology for bed bath in bedridden patients.

Then, in the second step, researchers, with support of the nursing staff and participation of family members/direct caregivers, performed 15 bed baths in patients included, through use of Portable Bathtub, according to previously established schedule approved by the Nurse responsible for the referred unit.

Study scenario

The study population consisted of fifteen patients hospitalized for more than two weeks and receiving bed bath, in a midsize medical clinic under contract with the Unified Health System (SUS).

Data collection and organization

Research data were collected from July to December 2015 through 30 interviews conducted after bed bath with Portable Bathtub in 15 patients previously indicated by the Nurse responsible for the sector. Among those selected for interview, those who met the inclusion criteria were five patients in responsive conditions, ten family members/direct caregivers of patients, and 15 nursing staff professionals directly involved in bed bath, including five nurses and ten nursing technicians. We established as inclusion criteria: (patient) being responsive and able to answer questions after bed bath, (family) being family member/direct caregiver and being in the company

of the patient on the day and time scheduled for bed bath, and (nursing professional) being a nurse and/or nurse technician willing to assist researchers in bed bath, according to the schedule previously made available.

The interviews were conducted at the end of each bed bath based on the following guiding questions: How do you evaluate the bed bath using Portable Bathtub? Tell us about what you felt, observed, and concluded with the technology used for bed bath? What are your suggestions for the continuation of the process?

Data analysis

The interviews were transcribed and the material was submitted to thematic content analysis⁽¹¹⁾ that aimed to find the nuclei of meaning that made up the communication, whose presence or frequent added significant perspectives to the object of study. To this end, we followed the three steps recommended by the analysis technique. In the first step, called pre-analysis, we conducted exhaustive reading of the data, followed by organization of the material and formulation of hypotheses. Next, we conducted exploration of the material, that is, the raw data were coded. In the third and final step, the data were interpreted and defined in thematic categories according to the understanding of the meanings⁽¹¹⁾.

RESULTS

From the data organized and coded by thematic content analysis resulted two categories, namely: Portable Bathtub: from morphine to the patient's rekindled eyes; Portable Bathtub, from mechanized practice to unique, transforming care.

Portable bathtub: from morphine to the patient's rekindled eyes

Improvement of the bedridden patients' general state after bed bath with Portable Bathtub was notorious, in most cases. In addition to improved self-esteem, patients reported muscle relaxation and comfort and, in other cases, eye opening and/or verbal expressions were favorable, as in the following reports:

I have uterine cervix AC in terminal stage. I feel a lot of pain all over my body. At first I thought I'd feel pain in the bath, but it was the best bath I've had in these past few weeks. I'm glad you washed my hair ... Despite my illness, you made me feel like a woman. (P2)

I felt a great relief in my whole body. I feel renewed ... (P5)

I really liked this new method of bath... mom felt good. It's a really good method, because the patient feels much more relaxed, you know, the bath was wonderful. Today she surprised us with her reactions. I could see it in her eyes ... it's a very good method. (F3)

When I bathed her, yesterday, she would just open her left eye, she didn't respond verbally, nor by gestures, but during bath today she opened both eyes. (NT2)

In addition to improved self-esteem and muscular relaxation, portable bathtub provided comfort and well-being, in general, minimizing the impact of hospitalization and, consequently, of

disease, as expressed in the previous report. Due to its enhancing characteristic, the portable bathtub conferred prestige and a certain status, both for professionals involved in care and family members and, above all, for patients, who felt privileged by the differentiated and humanized service.

Arriving at the hospital and seeing my mom happy, with twinkly eyes, clean and brushed hair, and happy to have had a shower in bed was very heartwarming ... She felt unique. I hope people accept and they abolish this basin bath that causes discomfort for the staff and for the patient. (F7)

I'm glad my mom had this opportunity to have this bath. She feels revived ... (F9)

I was surprised when the staff came to tell me that she didn't need to have morphine after bathing. Wow, everyone was very excited about the technology. The patient's improvement was noticeable. (N3)

Improvement of the patient's well-being resulted – as expressed in the reports – in satisfaction of patients, family members, and nursing staff. Much more than a satisfactory bath, the Portable Bathtub represented the possibility of going beyond the traditional bed bath and/or "basin bath". The technology has demonstrated that it is possible to add humane value to nursing care, by treating with cordiality, respecting the uniqueness, and satisfying basic human needs. It is important, in this process, that the family member feel recognized and valued, in order to aggregate knowledge and enhance the initiatives.

From mechanized practice to unique, transforming care

According to professionals in the nursing staff, the Portable Bathtub enabled innovation, improvement, and humanization in nursing care. This perception was noticeable as the professionals reported they felt moved when they observed they were not just overcoming a specific and linear action, but transcending the limits of traditional knowledge imposed by the mechanization of daily routine.

I was moved when I analyzed and realized that I was providing a mechanized care... I can't even say that it was care, because with the everyday routine we forget that we are dealing with human beings who are in a weakened situation because of illness and in need of humanized care. With the relaxing and stimulating bath we can save the patient's life. (NT4)

It is very touching for the staff to see a patient reacting to the new bath, to see that we can provide welfare to the patient through a care that, sometimes, to us, goes unnoticed. (NT6)

The Portable Bathtub and all the previous preparation contributed to sensitizing the team as to the differentiated care. Bed bath was already nothing but a mechanical, routine task... (N4)

Due to fact of transcending the specific and linear care imposed by the routine, the Portable Bathtub enabled a critical-reflective process in relation to the behavior and practice of the professionals, who recognized themselves human in this

process of care and (re)discovered the important value of nursing care, “able to save the patient’s life.” At the same time, the professionals were willing to revise traditional practices and challenge the new, even if apparently unknown and complex, as expressed in the following reports:

I thought I wasn’t gonna like this technology, but I did indeed and it’s also good for my back. It’s less physically exhausting, and we can see the patient’s joy in having this new bath. (NT7)

The first time I saw the Portable Bathtub I thought it would be too complex to perform this bath. But I soon realized that I would just have to get the hang of it... everything was wonderful for the patient and for the family. (NT8)

When I was invited to a training on an innovative bed bath technique I was curious, but at the same time apprehensive, because we’re always afraid of the unknown ... but I soon changed my mind. (NT9)

In addition to the benefits already mentioned, the Portable Bathtub provided greater integration and satisfaction for the nursing staff professionals. The technology enabled redirecting the focus of care, often focused on the disease and/or the sick individual and expanded the reflection regarding unique, innovative, and transforming care, according to the report:

This portable bathtub led our team to be more united, as we talk with colleagues about the case of our patient seeing him or her as an integral being. Everyone became interested in their improvement. (NT10)

In addition to making the team motivated and willing, this technique led to the desire to individualize the care and pay attention to the needs of each patient. (N5)

In addition to its important characteristics, the Portable Bathtub enabled rethinking mechanized practices and, above all, transcending the traditionally imposed care, marked by reproduction of rules and routines. The results demonstrated, in summary, that the benefits of the Portable Bathtub are not limited to the provision of innovative and humanized care, also bringing the possibility of recovering the human multidimensionality and uniqueness, for patients, family members, and professionals directly involved in the care process.

DISCUSSION

The results demonstrate that it is not enough to evolve in number and/or technological innovations, but that it is essential to raise awareness of the nursing/health professionals for the adoption of new techniques, in this case, of bed bath that approach the patients’ family reality. From this perspective, the Portable Bathtub is close to an actual shower bath, providing well-being and comfort to patients.

Similar study⁽⁸⁾ confirms this thinking, by advocating that traditional techniques of bed bath do not correspond to the way individuals bathe, as they do not result in the expected and desired

well-being, especially in those cases in which the patient remains bedridden and dependent of this care for several days.

The multiple systemic associations, relations, and interactions, as well as the understanding of the human person as unique and multidimensional being, enable distinguishing the specific and mechanized care from that which differentiates and adds humane value. Thus, attributing significance to nursing care by developing new techniques of care such as, for example, the Portable Bathtub, may not always be an easy task, especially when confronting it with traditional practices, in which objects are apprehended in a fragmentary and mechanized way⁽¹²⁾.

The human being cannot be reduced to the biological or physical dimension, that is, cannot be reduced to an object receiving care. Their nature is, by excellence, relational, providing humane value. As subjects they are members of a unique and systemic unit. Therefore, there is something more than the uniqueness or the difference between individuals, as each person is a unique and multidimensional subject. Understanding and accepting the human singularity – in this case the patient depending of care – based on humane processes, means understanding their needs and making them as close as possible to their reality⁽¹³⁾.

Nursing care, from this perspective, should be apprehended as singular and complex phenomenon, systematized by means of multiple relations, interactions and associations, aiming to promote and restore the health of the human being fully and articulated with their existential reality. Thus, nursing care needs to be (re)thought and discussed with the active participation and shared responsibility of all actors involved, in this case, patients, family members, and professionals⁽¹⁴⁾.

To provide support to the humane and transforming care, it is increasingly advocated the idea of advanced nursing practice, which assumes that nursing professionals should include, in their theoretical-practical process, unique and comprehensive knowledge, as well as skills and competencies for decision-making in the different realities of the patients. It is expected from the nurse competencies to meet the challenges arising in the context of health and to enable the production and fast availability of knowledge by the development of new technologies of care, able to contribute to the best practices of care, especially in hospital context⁽¹⁵⁾. Nurses are expected to contribute effectively through initiatives that are critical and reflective, able to rethink the practices imposed by traditional knowledge⁽¹⁶⁾.

Such premise corroborates a study in which the authors argue for the need to rethink – in the nursing management area – theoretical assumptions, in order to reconstitute practical ideas, transforming the everyday challenges in accomplishments and seeking new knowledge and skills so as to assist in critically thinking the problems that emerge in everyday work⁽¹⁷⁾.

It is acknowledged, however, that, despite all the advances in the training process, led by the inducing educational policies, the practices lack innovative technologies, capable of transforming environments and particularizing nursing care. It is observed, often, that nursing schools direct the theoretical-practical knowledge either according to requirements of the

formal labor market or taking as foundation the principles and guidelines established by Government policies, with nonsignificant role in fostering new technologies and/or proactive and transforming actions⁽¹⁸⁾.

In addition to continuous improvement and to the need to transform data and information into knowledge, the levels of quality of services, processes, and products are increasingly important indicators to meet the challenges of the changing world. To respond satisfactorily to the international policies and, more recently, to important national initiatives in relation to the improvement of health services, nursing professionals need to broaden their perspective by understanding new products, technologies, and methodologies of systematization and enhancement of nursing care⁽¹⁹⁾.

Nursing has, therefore, several reasons and possibilities to exercise entrepreneurship and invest in new technologies of care. First, because it is a profession that has a broader understanding of reality, that is, of the needs of human beings in their different dimensions. Second, because of the possibility of exploring new spaces, regardless of context or social conditions. Third, because it is the profession of care and for care, therefore the profession of the future⁽²⁰⁾.

Fostering entrepreneurship by technological innovation implies, therefore, overcoming the obstacles imposed by traditional knowledge and investing in critical-reflective processes and proactive initiatives, able to develop the real opportunities of human beings as autonomous and thinking subjects⁽²¹⁾.

FINAL CONSIDERATIONS

We concluded that the portable bathtub is an enhancing technology, as it enables the clinical improvement of the patient's general condition and transcends traditional mechanized practices by the reach of advanced nursing care practices.

The Portable Bathtub does not warrant in itself the expected quality of the bed bath. It is important and essential that the process of raising awareness and intervening, in practice, fosters and promotes new professional thinking and acting. Nursing/health professionals should feel stimulated and encouraged to rethink their referential frameworks and thus transcend the traditional care, marked by reproduction of theoretical-practical knowledge.

One limitation of the study was the limited number of scientific evidence about bed bath technologies used in bedridden patients. Another limitation refers to the number of differentiated technologies for bed bath in these same conditions. It is suggested, in this sense, that the practice of bed bath in bedridden patients is, gradually, adopted as research topic by researchers and that this topic should be widely explored in academia, in order to enhance the nursing care, in this specific area.

FUNDING

Research funded by the CNPq – Universal Call 14/2013. Process number 470500/20131

REFERENCES

1. Horta VA. Processo de enfermagem. São Paulo: EDUSP; 1979.
2. Nightingale F. Notas sobre enfermagem: o que é e o que não é. São Paulo: Cortez; 1989.
3. Ogasawara M. Banho no leito: uma contribuição ao enfermeiro baseada na percepção do paciente/cliente. [dissertação]. Rio de Janeiro (RJ): Escola de Enfermagem Anna Nery/UFRJ; 1989.
4. Maciel SSA, Bocchi SCM. Compreendendo a lacuna entre a prática e a evolução técnico-científica do banho no leito. *Rev Latino-Am Enferm*[Internet]. 2006[cited 2015 Jun 19];14(2):233-42. Available from: <http://www.scielo.br/pdf/rlae/v14n2/v14n2a13.pdf>
5. Collins F, Hampton S. The cost-effective use of Bag Bath: a new concept in patient hygiene. *Br J Nurs*[Internet]. 2012[cited 2015 Jun 19];12(984):986-90. Available from: <http://www.apodan.dk/media/19853/ProductFokus2.pdf>
6. Castledine G. Forgotten importance of giving a bed bath. *Br J Nurs*[Internet]. 2003[cited 2015 Jun 19];12(3):519-25. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12743482>. DOI: <http://dx.doi.org/10.12968/bjon.2003.12.8.11266>
7. Lima DVM. O banho no leito na Unidade de Terapia Intensiva (UTI): conceitos e preconceitos. [dissertação]. Rio de Janeiro: Escola de Enfermagem Alfredo Pinto, Universidade Federal do Estado do Rio de Janeiro; 2002.
8. Vinha VHP. Banheira inflável. *Rev Bras Enferm*[Internet]. 1993[cited 2015 Jun 19];46(1):32-4. Available from: <http://www.scielo.br/pdf/reben/v46n1/v46n1a04.pdf>
9. Teles NF, Backes DS. Banheira Portátil. In: XIX Simpósio de Ensino, Pesquisa e Extensão: Olhar sustentáveis em favor da vida, 2015, Santa Maria. Anais Simpósio de Ensino, Pesquisa e Extensão. Santa Maria: XIX Simpósio de Ensino, Pesquisa e Extensão: Olhares sustentáveis em favor da vida; 2015.
10. Backes DS, Kulakowski MO, Pereira SB, Gomes CA, Backes MTS, Erdmann AE Learning Incubator: an instrument to foster entrepreneurship in Nursing. *Rev Bras Enferm*[Internet]. 2012[cited 2015 Jun 19];68(6):794-8. Available from: http://www.scielo.br/pdf/reben/v68n6/en_0034-7167-reben-68-06-1103.pdf
11. Bardin L. Análise de conteúdo. Lisboa, Portugal: Edições 70; 2011.
12. Backes MTS, Backes DS, Drago LC, Koerich MS, Erdmann AL. Cuidado ecológico como um fenômeno amplo e complexo. *Rev Bras Enferm*[Internet]. 2011[cited 2015 Jun 19];64(5):876-81. Available from: <http://www.scielo.br/pdf/reben/v64n5/a12v64n5.pdf>

13. Morin E. El método 3. El conocimiento del conocimiento. 6 ed. Madri: Cátedra; 2009.
 14. Backes DS, Zamberlan C, Colomé J, Souza MT, Marchiori MT, Erdmann AE, Salazar AM. Interatividade sistêmica entre os conceitos interdependentes de cuidado de enfermagem. *Aqui*[Internet]. 2016[cited 2015 Jun 19];16(1):24-31. Available from: <http://dx.doi.org/10.5294/aqui.2016.16.1.4>
 15. Organización Panamericana de la Salud. Cuidados innovadores para las condiciones crónicas: Organización y prestación de atención de alta calidad a las enfermedades crónicas no transmisibles en las Américas. Washington, DC: OPS; 2013.
 16. Zanette ML. Prática avançada de enfermagem: estratégias para a formação e construção do conhecimento. *Rev Latino-Am Enferm*[Internet]. 2015[cited 2015 Jun 19];23(5):779-80. Available from: <http://www.revistas.usp.br/r/rlae/article/view/106104/104742>
 17. Matumoto S, Vieira KCS, Pereira MJB, Santos CB, Fortuna CM, Mishima SM. Production of nursing care in primary health care services. *Rev Latino-Am Enferm*[Internet]. 2012[cited 2015 Jun 19];20(4):710-7. Available from: <http://www.scielo.br/pdf/rlae/v20n4/11.pdf>
 18. Backes DS. Vislumbrando o cuidado de enfermagem como prática social empreendedora. [Tese]. Santa Catarina: Programa de Pós- Graduação em Enfermagem, Universidade Federal de Santa Catarina; 2008.
 19. Rangel-S ML, Barbosa AO, Riccio NCR, Souza JS. Redes de aprendizagem colaborativa: contribuição da Educação a Distância no processo de qualificação de gestores do Sistema Único de Saúde - SUS. *Interface*[Internet]. 2012[cited 2015 Jun 19];16(41):545-56. Available from: <http://www.scielo.br/pdf/icse/v16n41/aop3412.pdf>
 20. Backes DS, Erdmann AL. Empreendedorismo: o que este tema tem a ver com a enfermagem? In: Arribas C, Backes DS, Souza JG, Piva MG. As múltiplas faces do empreendedorismo da enfermagem Brasileira. Santa Maria: Centro Universitário Franciscano; 2011.
 21. Morais JA, Haddad MCL, Rossaneis MA, Silva LGC. Práticas de enfermagem empreendedoras e autônomas. *Cogitare Enferm*[Internet]. 2013[cited 2015 Jun 19];18(4):695-701. Available from: <http://revistas.ufpr.br/cogitare/article/view/46422>
-