Agile Scrum Methodology: implementation by the nurse in an educational game on safe medication management

Metodologia ágil Scrum: uso pelo enfermeiro em jogo educativo sobre manejo seguro de medicamentos

Metodología ágil Scrum: utilización por el enfermero en juego educativo sobre el manejo seguro de medicamentos

Jossandro Rodrigues da Cruz[a]
Luciana Schleder Gonçalves[b]
Ana Paula Magalhães de Abreu de Giacomo[b,c]

ABSTRACT

Objective: To demonstrate the role of nurses as project managers in the planning and development phases of an educational game about safe medication management for nursing technicians.

Method: Case report of the experience in the use of the Agile Scrum Methodology with the objective of creating an educational game in the fortnightly sessions of the participating group, between December 2015 and December 2018, in a university hospital in Curitiba.

Results: The nurse's abilities to lead the group using the Scrum Methodology were demonstrated in an effective way, which led to the achievement of the objectives.

Conclusions: By sharing their clinical and educational experience, combining management skills developed throughout their professional practice, the nurse is able to contribute not only with scientific knowledge about patient quality and safety, but also in management of projects and achievement of goals set by the team.

Keywords: Patient safety. Health education. Nursing informatics. Educational technology. Education, continuing.

RESUMO

Objetivo: Evidenciar o papel do enfermeiro como gerente de projeto nas fases de planejamento e desenvolvimento de um jogo educativo sobre manejo seguro de medicamentos para técnicos de enfermagem.

Método: Relato de caso de experiência no emprego da metodologia ágil Scrum com o objetivo da criação do jogo educativo, realizada em reuniões quinzenais do grupo participante, entre dezembro de 2015 a dezembro de 2018, em um hospital universitário de Curitiba.

Resultados: As habilidades do enfermeiro em conduzir o grupo empregando a metodologia ágil Scrum foram demonstradas de forma efetiva e levaram ao alcance dos objetivos.

Conclusões: Ao compartilhar sua experiência clínica e educacional, aliando as competências gerenciais desenvolvidas ao longo da sua prática profissional, o enfermeiro é capaz de contribuir não só com o conhecimento científico sobre qualidade e segurança do paciente, mas também no gerenciamento de projetos e alcance de objetivos traçados em equipe.

Palavras-chave: Segurança do paciente. Educação em saúde. Informática em Enfermagem. Tecnologia educacional. Educação continuada.

RESUMEN

Objetivo: Resaltar el rol del enfermero como gerente de proyectos en las etapas de planificación y desarrollo de un juego educativo sobre el manejo seguro de medicamentos para técnicos de enfermería.

Método: Relato de caso de experiencia por el uso de la metodología ágil Scrum, con el objetivo de crear un juego educativo, llevado a cabo en reuniones quincenales del grupo que participó, entre diciembre de 2015 y diciembre de 2018, en un hospital universitario de Curitiba.

Resultados: Las habilidades del enfermero para conducir un grupo, utilizando la metodología ágil Scrum, resultó efectiva y condujo a las metas.

Conclusiones: Al compartir su experiencia clínica y educacional, junto a las competencias de gestión desarrolladas a lo largo de su práctica profesional, el enfermero es capaz de contribuir no solo con el conocimiento científico sobre la calidad y seguridad del paciente, sino también en la gestión de proyectos y en el alcance de los objetivos propuestos en equipo.

Palabras clave: Seguridad del paciente. Educación en salud. Informática aplicada a la enfermería. Tecnología educacional. Educación continua.

[a] Universidade Federal do Paraná (UFPR), Complexo Hospital de Clínicas da UFPR, Departamento de Enfermagem, Programa de Pós-Graduação em Enfermagem. Curitiba, Paraná, Brasil.

[b] Universidade Federal do Paraná (UFPR), Departamento de Enfermagem, Programa de Pós-Graduação em Enfermagem. Curitiba, Paraná, Brasil.

[c] Secretaria de Estado da Saúde, Terceira Regional de Saúde de Ponta Grossa, Ponta Grossa, Paraná, Brasil.

■ INTRODUCTION

The pervasive inclusion of Information and Communication Technologies (ICT) in all areas of society and, especially, in health education seems to be a permanent and irreversible phenomenon. The technological development seen in the contemporary world inserted the current society in the knowledge and science generation[1]. However, the shortage in the production of digital educational materials and resources for mid-level nursing professionals indicates the need to develop products aimed at this audience, in order to transform the learning process, making it more interactive and meaningful[2].

It is believed that the use of ICT in learning processes will enable the overcoming of the fragmentation of knowledge, creating an integrated pedagogical process, incorporated into pedagogical practices in a planned way, guiding changes, and making the teacher a facilitator in the generation of new knowledge and transformations for the student[3]. In this sense, the use of electronic games, in addition to be an entertainment, can be used as vehicles of communication, interaction, and immersion in a determined educational content or reality to be learned. Its use as an object of learning promotes cognitive development and broadens human relations from digital media[4].

The use of *serious game* (term used for those games not only for entertainment purposes, but rather for educational purposes) as a component of educational strategies have been reported in the literature for some time[5-7]. However, in order to achieve their educational purpose, a reflection based on situations and practices that students and professionals encounter in the daily life of the work environment is required[8].

Thus, in response to the need to develop new products that meet the market demand and make a difference in the process of creation and development during the 90s, the Agile *Scrum* Methodology emerged with an approach to reorganize the creation and production process, stimulating teams to be more productive, while turning the environment in a more relaxing and encouraging place, aiming at reaching goals initially established so that the development of a new product happens more quickly and efficiently[9-10].

This report aims at highlighting the role of nurses as *Scrum Master* in the planning and development phases of an educational game about the safe management of high vigilance drugs as an innovative strategy for continuing education of mid-level professionals nursing.

■ CASE EXPOSURE

This is the case report of a nurse's experience as a process manager in the creation of an educational game about safe management of high vigilance medications aimed at the continuing education of mid-level nursing professionals, assigned to an Intensive Care Unit (ICU) adult in a university hospital in Curitiba. This report is part of a larger research on technological innovation to develop continuing education tools for professionals and upper mid-level students: the first stage of the *serious game* addressed the quality and safety protocol for drug administration; contemplated the planning, development, and evaluation phases, approved by the Ethics Committee of the Complex of the Clinical Hospital of the Federal University of Paraná, under the opinion 1.826.706/2016, following the ethical precepts required by Resolution No. 466/2012 of the National Health Council – CNS made between December 2015 and December 2017.

The Agile *Scrum* Methodology refers to the workgroup as *Scrum Team*, which performs creation and production activities; the team is led by the *Scrum Master*, who is responsible for managing and facilitating the development of group activities and ensuring achievement of the goals proposed to finish the product. The Scrum Master is recommended by the *Product Owner*, the "owner of the idea and the product". Thus, the activities to be developed are defined and monitored in a process referred to as *backlog*, according to the priorities and scope of the actions[9-10].

The literature shows that the application of the Agile Scrum Methodology enables the development of complex products, with a diversity of professionals involved, optimizing time and efforts to "deliver the product with the highest possible value", allowing flexibility and adaptation of the professionals to the group[9].

■ RESULTS

The planning and development phases of the game counted with the *Scrum Team*, divided into 3 subgroups (health, represented by three nurses and two nursing students; programming services, represented by a student of systems analysis and a technologist in virtual games, and arts, represented by a graphic design and an artist). One of the nurses was the *Product Owner*, and the other, the *Scrum Master*. The entire group participated in the biweekly meetings, in which demands and deliveries were presented to the subgroups involved in the creation of the educational game.

From the start the programmers, the game technologist, the arts professional, and the graphic *design* struggled with the terms, work processes, and scenarios that were discussed by the health subgroup. Thus, a technical visit to the ICU was planned and organized, providing an alignment of concepts involving the environment, routines, inputs, equipment, and professional performance, making it easier for the team to emulate the reality in the scenario of the educational game.

In the meetings of the group (*Scrum Team*), the nurse (*Scrum Master)* was responsible for: maintaining the focus of the product (in terms of the proposal, target audience, scope, and prompt delivery); ensuring an updated *backlog* (the record of all meetings, including orders and deliveries, deadlines, and general remarks for the group); creating the

Game Design Document (GDD), a document with information regarding the authors, characters, an overview, plot, environments, perspective, interfaces, and technical details related to the game creation; facilitating the communication between the members and subgroups, mediating conflicts; managing the achievement of objectives in the short, medium, and long term, facilitating the participation in events and commitments signed between the team, in order to deliver the final product in the period established. The most relevant activities of the *Scrum Team* include the creation of fictitious clinical cases, as well as the game script, the scenarios, animations, characters and dialogues, definition of the platform used, programming, and the final artwork. Chart 1 summarizes the activities developed to create the *serious game* on safe management of high vigilance drugs.

Position	Product Owner	Scrum Master	Scrum Team
Role in the Agile *Scrum* Methodology	Owner of the idea; requested the product.	Project manager	Product development team
Professional	Nurse	Nurse	Nursing care professional and students, systems analysis, virtual game technology, graphic design, and arts.
Activities in the planning stage	Defined the theme and the pedagogical proposal.	Suggested the theme and the pedagogical proposal to the *Product Owner*, prepared the educational goals and the pedagogical plan (the game plan).	Did not participate.
Activities of the development stage	Made the final decisions related to the product.	Defined and planned the activities and priorities, helped to make the group more cohesive, facilitated the communication between the participants, prepared the GDD, kept the group focused on the goals.	Preparation of cases, dialogues, images, characters, scenarios, and animations, programming services, and conclusion of the serious game**.**

Chart 1 – Summary of the participants' activities in the development of the serious game on high vigilance drug management
Source: Authors, 2018.

■ DISCUSSION

The use by the nurse of the Agile Scrum Methodology was an important strategy to achieve the goal of the educational game. The reality of the work scenario was emulated, the players learned, and the deadlines were met. The members of the team got closer, the deliveries were punctual, and the critical issues were correctly addressed, thus the *Product Owner* and the *Scrum Master* were able to pos-

itively influence the team and encourage their production, with direct impacts on the achievement of the objectives, deadlines and budgets anticipated[11].

The methodology states that, for the role of *Scrum Master*, it is necessary to have abilities related to the promotion of the functionality and productivity of the team. It is also necessary to conduct meetings, encourage the cooperation, and promote the self-management and interdisciplinary. The Scrum Master is also responsible for managing the

backlog, communicating the vision of the objectives in the short, medium and long term, facilitating the interaction and participation of events according to the requirement regarding the product[12].

It can be noticed that there are similarities with respect to the skills that are part of the nurse's desirable profile related to decision making, which include: "clinical/demographic data management; clinical/administrative documentation and care plan management; use of decision support systems for clinical protocols; facilitation of communication and education of users and professionals and interaction with the clinical workflow"[13]. This fact is in line with the assumption that nurses' training already contemplates the development of knowledge, skills and attitudes that prepares them to lead teams that must work towards common objectives and in an effective way. What qualifies its practice, in this sense, is the initiative in assuming leadership positions and the appropriation of methodologies supporting it. When leading, nurses have the opportunity to build relationships of trust, facilitate relationships, stimulate active participation in planning, development, and evaluation of proposals, allowing everyone to act throughout the manufacturing process of services or products[14]. Again, these competencies are in line with those related to the Agile Scrum Methodology regarding the development of technological innovation projects.

Regarding the specific skills in the use of computers and information systems in the professional practice of nurses, there is evidence[15] of the need for greater interest, development, and appropriation by the professionals in all dimensions of their practice. Among them, there are those related to the acquisition of knowledge to manage data and information and to implement and evaluate training programs for the use of *software* and applications, stressing their ability to manage software development projects, providing strategies for the development of researches, application and use of systems and applications related to health care[15].

■ CONCLUSION

This study contributes as an experience for nurses including, in addition to the development of clinical competences, managerial, interpersonal and teaching abilities; demonstrating that the nurse is able to play the role of development manager of an innovation product, such as the educational games for health care. It is believed that the nurse as the holder of the specific knowledge of the health and nursing area and, as it develops in relation to the competences that link nursing and informatics, can and should

act as a communication link between members of a development team, in a role of interpreter between both worlds – health care and technology, combining knowledge and professional experience to create products more coherent to the reality of these areas.

The composition of the *Scrum Team* with professionals and students from the areas of health, technology, *design*, and arts allowed both the individual growth of these professionals and the maturation of perceptions about the reality of health by the *designers*, artists, and programmers, and also enabled to the health professionals and students, perspectives and innovative approaches to everyday issues of the professional practice due to the interaction with professionals from other areas.

Based on this successful experience of the nurse as the *Scrum Master*, it is possible to continue the research aiming at planning, developing, and evaluating the educational game for nursing professionals and students, which shall contemplate the expansion of the game to the other goals on patient safety. It is recommended the appropriation of the Scrum methodology by nurses intending to work as manager of technological innovation projects, an area not very explored by this professional, which constituted a limitation to the work in terms of time for its appropriation, but with possibility to expand its participation.

■ REFERENCES

1. Lorenzetti J, Trindade LL, Pires DEP, Ramos FRS. Technology, technological innovation and health: a necessary reflection. Texto Contexto Enferm. 2012;21(2):432-9. doi: https://doi.org/10.1590/S0104-07072012000200023.

2. Góes FSN, Camargo RAA, Hara CYN, Fonseca LMM. Tecnologias educacionais digitais para educação profissional de nível médio em enfermagem. Rev Eletr Enf. 2014;16(2):453-61. doi: https://doi.org/10.5216/ree.v16i2.21587.

3. Azevedo AB. Trilhas de formação docente para EAD: compartilhando dados. In: Simpósio Internacional de Educação a Distância, Encontro de Educadores do Ensino a Distância 2014: Anais do SIED: EndPED 2014 set 15-26; São Carlos, Brasil. Universidade Federal de São Carlos. 2014. São Carlos: SEaD; 2014. 8 p.

4. Ribeiro L, Castro CE. Videojogos, entre a mídia, o entretenimento e os espaços de aprendizagem: possibilidades de uso social entre diferentes gerações de jogadores de Brasília. In: Busarello RI, Bieging P, Ulbricht VR. Inovação em práticas e tecnologias para aprendizagem. São Paulo: Pimenta Cultural; 2015. p. 235-56.

5. Domingues AN. Desenvolvimento e avaliação do serious game cuidando bem: simulação por computador sobre segurança do paciente [dissertação]. São Carlos (SP): Centro de Ciências Biológicas e da Saúde, Universidade Federal de São Carlos; 2017.

6. Domingues NA, Guimarães ACP, Silva AFS, Esteves JGSF, Lotufo ML, Santiago DL, et al. Desenvolvimento de jogo educativo sobre segurança do paciente para ensino profissionalizante de enfermagem. In: Simpósio Internacional de Educação a Distância, Encontro de Pesquisadores em Educação a Distância 2014: Anais do SIED: EndPED 2014 set 15-26; São Carlos, Brasil. Universidade Federal de São Carlos. 2014. São Carlos: SEaD; 2014. 15 p.

7. Veneu ACS, Jesus CMS, Cortez EA, Schroeder LM, Assis MM, Neves YYF. Atuação do enfermeiro: orientando, estimulando e educando através de jogos educativos. Rev Pesqui Cuid Fundam. 2010 cited 2008 Jul 15];2(2):922-35. Available from: http://www.seer.unirio.br/index.php/cuidadofundamental/article/view/466/pdf__27 .

8. Machado LS, Moraes RM, Nunes FLS, Costa RMEM. Serious games baseados em realidade virtual para educação médica. Rev Bras Educ Med. 2011;35(2):254-62. doi: https://doi.org/10.1590/S0100-55022011000200015.

9. Schwaber K, Sutherland J. Guia do Scrum – um guia definitivo para o Scrum: as regras do jogo [Internet]. [atualizado em 2017 Nov, cited 2016 Sep 21]. Available from: https://www.scrum.org/resources/scrum-guide.

10. Sutherland J. Scrum: a arte de fazer o dobro do trabalho na metade do tempo. 2. ed. São Paulo: Leya; 2016.

11. Nunes RD. A implantação das metodologias ágeis de desenvolvimento de software scrum e extreme programing (XP): uma alternativa para pequenas empresas do setor de tecnologia da informação. ForScience. 2016;4(2):e00117. doi: https://doi.org/10.29069/forscience.2016v4n2.e117.

12. Neves DM, Melo LPC, Silva RO. Uma breve visão sobre a metodologia scrum dos discentes de sistema de informação da faculdade de Sobradinho/DF. Tecnol Projeção. 2017 [cited 2018 Jul 10];8(1):40-50. Available from: http://revista.faculdadeprojecao.edu.br/index.php/Projecao4/article/download/820/722.

13. Jensen R, Guedes ES, Leite MMJ. Competências em informática essenciais à tomada de decisão no gerenciamento em enfermagem. Rev Esc Enferm USP. 2016;50(1):112-20. doi: https://doi.org/10.1590/S0080-623420160000100015.

14. Silva VLS, Camelo SHH, Soares MI, Resck ZMR, Chaves LDP, Santos FC, et al. Práticas de liderança em Enfermagem hospitalar: uma self de enfermeiros gestores. Rev Esc Enferm USP. 2017;51:e03206. doi: https://doi.org/10.1590/s1980-220x2016099503206.

15. GONÇALVES LS. Competências em informática requeridas de enfermeiros na prática profissional brasileira [tese]. Curitiba (PR): Programa de Pós-graduação em Enfermagem, Universidade Federal do Paraná; 2013.

◼ **Corresponding author:**
Jossandro Rodrigues da Cruz
E-mail: jossandroc@gmail.com