Implementing the Software Requirements Engineering Practices of the ISO 29110-5-1-1 standard with the Unified Process

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***Abstract*—In an attempt to increase the competitiveness of small organizations, the ISO has developed a standard, the ISO 29110. Due to its recent emergence, the high rates of the unknowledge about its implementation and associated costs, it is still difficult for small organizations to take this standard into practice. With the aim of to reduce the conceptual gap, in this paper has been purposed a software process model (UP-VSE) based on the Unified Process, which implements the requirements engineering practices of ISO 29110-5-1-1 in order to give to software companies an illustrative and reusable case allowing them to increase both, the interpretation and implementation of the standard. This proposal has been empirically evaluated defining PRODIGIA software process in the context of a research and development group around of industrial automation.**

***Index terms*—Software Process Improvement, Very Small Entities, ISO 29110, Unified Process, Software Requirements Engineering.**

I. Introduction

The SC7-WG24 work group has developed the ISO/IEC 29110 standatd, a process model reference that aims to the software process improvement (SPI) for VSE [1], however, its recent emergence as international standard, its high implementation and evaluation costs in VSE, as well as its inherent complexity, have become principal obstacles to its adoption [2]. The extensive experience of the Unified Process in both, industry and teaching, has been exploited to try an implementation of the ISO/IEC 29110 standard, using the software requirements engineering attempting to reduce the understanding and implementation efforts in the VSE. To assess applicability in this approach was performed a case study in a VSE.

II. Related works

Lutteroth et al. [3] created a complete workflow model to a ICT company that aims to achieve the CMMI level 3 reusing the Unified Process life cycle model. The work of Motschnig-Pitrik [4] illustrate the experience of the Unified Process usage to develop a web application with an agency cooperation highlighting their strengths and weaknesses

III. The PRODIGIA case study

The case study scope consist in the subprocesses evaluation related with the requirements capture in a VSE according to the ISO/IEC 29110-5-1-1 and the Unified Process in a very small entity that does not have a defined software development process. The PRODIGIA requirements capture subprocesses denotes that UP-VSE is complete enough to cover the critical aspects as well as software engineering due to organization such as generated artifacts of the software development methodology, however, the PRODIGIA software engineering is lighter and less robust, which impacts in a process restricted scope, specifically the surgical simulation projects.

IV. Conclusions

This work illustrate how the Unified Process can be a usable as reference to establish solutions about software process in VSEs. To achieve this, has been analyzed its practical applicability through the PRODIGIA case study, despite the no achievement of the standard completeness, this allowed the implementation of many software process model elements in short time and few human resources.

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References

[1] C. Laporte, S. Alexandre, and R. O'Connor, "A Software Engineering Lifecycle Standard for Very Small Enterprises," in *Software Process Improvement*, R. O'Connor, N. Baddoo, K. Smolander, and R. Messnarz, Eds. Springer Berlin Heidelberg, 2008, vol. 16, ch. 12, pp. 129–141.

[2] V. Ribaud, P. Saliou, R. O'Connor, and C. Laporte, "Software Engineering Support Activities for Very Small Entities," in *Systems, Software and Services Process Improvement*, A. Riel, R. O'Connor, S. Tichkiewitch, and R. Messnarz, Eds. Springer Berlin Heidelberg, 2010, vol. 99, ch. 15, pp. 165–176.

[3] B. Day, K.-Z. Sean Chin, L. Lovelock, and C. Lutteroth, "Climbing the Ladder: CMMI Level 3," in *Enterprise Distributed Object Computing Conference, 2009. EDOC '09. IEEE International*, 2009, pp. 97–106.

[4] R. Motschnig-Pitrik, "Employing the Unified Process for Developing a Web-Based Application - A Case-Study," in *Proceedings of the 4th International Conference on Practical Aspects of Knowledge Management*, ser. PAKM '02. London, UK, UK: Springer-Verlag, 2002, pp. 97–113.

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