



TECNOLÓGICO NACIONAL DE MEXICO
Instituto Tecnológico de Zacatecas

Implementing ISO/IEC 29110 in the “ITZ Spin-Off”

Silvia Jiménez Hernández,
Teacher of the Zacatecas Institute of Technology
and the Spin-Off leader, Mexico (ITZ)
Jesús Ramírez Vargas, Student (ITZ)
Manuel de Jesús Peralta Márquez, Student (CIMAT)

Mini Case Study

México – Case Study Number 001

March 2018

The "ITZ Spin-Off" is an educational initiative that emulates a business environment dedicated to the development of software, promoted by members of the student community of the Zacatecas Institute of Technology, Mexico (ITZ), which is characterized by basing its activity on the exploitation of new processes, products or services based on the knowledge acquired and the results obtained in the Institute itself. Its objective is the transfer of knowledge with an ideal scope of application, offering students the possibility of taking their software projects to the business practice. The educational initiative was founded in 2014, however, it started under the concept of ITZ Spin-Off in August 2016. Its staff is composed of students of Computer Systems Engineering. In 2017, when the implementation of ISO/IEC 29110 began, there was a staff of 24 students.

The VSE and its Environment

The "ITZ Spin-Off" is an educational initiative that emulates a company dedicated to the development and maintenance of Software, composed of twenty-four collaborators. Founded in August 2016 at the Zacatecas Institute of Technology, Mexico. In February 2017, the State Department of Economics (Sezac), “Mathematics Research Center (CIMAT)”, and the Professor Claude Y. Laporte signed a collaboration agreement to help Zacatecan companies in the implementation of the ISO/IEC 29110 Standard. The "ITZ Spin-Off" managed to be one of the 8 companies participating in the

process. In order to implement the standard in the "ITZ Spin-Off" the first step was to evaluate if the company met the entry conditions. The CIMAT was the institution in charge of carrying out the study of the current status of the entity to detect opportunity areas in the adoption of the Standard. After verifying that the entry conditions were met, the team began to implement the Basic Profile under the advice of both the State Department of Economics and the CIMAT, in order to support the preparation of the adoption of the standard. From this point, you can consider the ITZ Spin-Off as a Very Small Entity (VSE) or Software Development Center (SDC).

Starting Point

Since the "ITZ Spin-Off" was a newly created SDC, it had not implemented a specific software development process, but it had been using different methodologies for the documentation of their projects such as CMMI, PMBOK, PSP, TSP. And an agile work methodology based on the Scrum framework that focuses mainly on generating the Software product, whose functionality is approved by the customers. An analysis was made of the benefits of implementing ISO/IEC 29110 in the SDC, denoting the following:

- Information corresponding to the project is ordered and evidenced, improving communication among team members.
- It allows optimizing the monitoring and control of project management, it can show progress and determine potential problems to provide solutions.
- By having a concise definition of the processes and activities, the personnel in charge of developing the Software use their time more productively, allowing the progress of the project to be optimal.
- It is for small organizations (VSEs / SDCs), certifiable and recognized worldwide.

Once exposed the benefits that the SDC would gain by implementing the standard, ITZ Spin-Off accepted to participate in the implementation stage of the standard and work in conjunction with the team.

The Improvement Project

The implementation project of ISO/IEC 29110 was carried out within the ITZ Spin-Off, with four students responsible for the process, dedicated during a month to design the templates and tools necessary to implement ISO/IEC 29110.

The first resource was the general leader. Its role was to participate in all phases of the implementation by providing all the necessary assistance to achieve the objectives, documenting the processes and templates and coordinating the implementation. A Project Manager and two quality analysts were assigned, who had the responsibility of supporting him in all activities, as well as providing all the necessary assistance for the implementation of the basic profile. In addition to implementing the processes of ISO/IEC 29110 and collaborating in the development of templates, the role of the ITZ Spin Off leader was to guide the implementation team providing advice to help them produce their deliverables based on their experience with ISO/IEC 29110.

The objectives of the ITZ Spin-Off were to:

- Implement the two Basic Profile processes of ISO/IEC 29110.
- Apply ISO/IEC 29110 processes to the SDC projects.
- Implement ISO/IEC 29110 within a period no longer than 4 months.
- Obtain a certificate of conformity for ISO/IEC 29110.

Results

The implementation of ISO/IEC 29110 in ITZ Spin-Off lasted 16 weeks (1 academic semester) with 24 students for a total effort of 1440 hours.

On August 10th, 2017 the process of Gap Analysis to the Software Development Processes was carried out in accordance with the International Standard ISO/IEC 29110-4-1: 2011 to the Basic Profile, by NYCE, obtaining very encouraging results that they give guidelines to the second step, pre-audit. On August 31th, the second step is the pre-audit that demonstrates the successful

implementation of the basic profile of ISO/IEC 29110. Obtaining zero non-conformities and 2 opportunities for improvement.

On September 25th, 2017 was conducted the Certification Audit on ISO/IEC 29110-4-1: 2011, which is carried out at the ITZ Spin-Off facilities, achieving this Certification, by the certifying body NYCE. The certification process was a success, thanks to the proactive participation of the students who took ownership of the implementation challenge. It was always a committed and enthusiastic team, despite how difficult it is to motivate other colleagues to promote the adoption and implementation of ISO/IEC 29110 in the ITZ Spin-Off. Daring to live the process of implementation of the standard is a big challenge, but the satisfaction that remains for the achievement of the ITZ Spin-off certification is even greater.

Lessons Learned

- It is important to gain knowledge of the interpretation of the standard before initiating the implementation of ISO/IEC 29110, due to self-training, sometimes, is not enough because the guidelines requested by the standard can be misinterpreted.
- The fact of participating in the process without training and starting the implementation with a project that is already in development process was very laborious, doubling the time and effort dedicated.
- When the gap analysis was carried out by the certifying body, it was pointed out that it's important to start the implementation of ISO/IEC 29110 as much as possible with a new project in order to understand each and every one of the activities to be carried out and not just focus on work products. But it is, until that moment, that we realized that the

standard was not being well interpreted.

- Do not assume that having the work products already meets what is required by the standard, the transcendental is to carry out the activities to achieve optimal results.
- Having to design templates for documentation without having defined the obligatory nature of mandatory and optional work products was a complicated task.
- After having corrected the points marked in the Gap Analysis, the pre-audit comes up, resolving all the observations, it was not easy because the team's effort doubled again, becoming stressful.
- Having completed the certification process has enabled the ITZ Spin-Off to draw conclusions from the completed project, improving its objectives in relation to the application of ISO/IEC 29110.

For example:

- Due to most of the artifacts are now available and there is no need to create new templates for the necessary documentation, these templates help the processes to be implemented in a shorter time, making the students move faster in their learning process.
- Since ISO/IEC 29110 provides a table that describes the proposed content of the work products used as inputs or outputs for to the 2 processes (for example, Project Plan, Requirements Specification). We have determined to merge two or more documents into a template. For example, the verification results and the validation of the requirements specifications and of the software design.
- Due to the acquired experience with the implementation of the good practices suggested by the standard, now everything is easier to perform

Plans for the Future

Mastering the processes of Project Management and Software Implementation in order to:

- Apply the processes of ISO/IEC 29110 to all future projects developed in the ITZ Spin-Off.
- Generate a process of continuous improvement, based on the positive and negative experiences that are acquired by

putting knowledge into practice and optimizing the quality of software products.

- Maintain the certificate of conformity with the ISO/IEC 29110 standard.
- Continue, as a second step, with the application of the practices of ISO/IEC 29110 Intermediate profile.

References

ISO/IEC TR 29110-5-1-2:2011 – Software engineering - Lifecycle Profiles for Very Small Entities (VSEs) – Part 5-1-2: Management and Engineering Guide – Basic Profile. International Organization for Standardization/International Electrotechnical Commission: Geneva, Switzerland.

Available at no cost from ISO at: <http://standards.iso.org/ittf/PubliclyAvailableStandards>

More information is available on the following web sites:

<http://profs.logti.etsmtl.ca/claporte/VSE/index.html> and <http://www.29110.org/>