

## **CRITICAL THINKING, A CROSS CURRICULAR SKILL FOR LIFELONG EDUCATION**

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### **1 THEME OF PROPOSAL, RATIONALE AND FORMAT OF CONTRIBUTION**

- a) How to keep up with the needs of future lifelong learners.
- b) Rationale of the proposal: Our project is about researching different ways to provide the students with specific tools, thereon they can create and develop their vocabulary as an independent-individual learning (and outside the classroom), according to their professional, familiar and social requirements. This comes up after detecting a possible connection between the reduction of the students' vocabulary and their communication skills as they draw on in their undergraduate program, since they stop practicing certain activities and reading and writing dynamics which increase their vocabulary and develop their critical thinking.
- c) Paper.

### **2 DESCRIPTION OF PROPOSAL**

- a) Introduction to the proposal: According to the Modelo educativo TEC 21, our institution looks forward to “evolve to a new educative model, which allows the students to become leaders capable to deal with challenges and opportunities at XXI Century”, and in order to get it, seeks “to improve competitiveness by developing the required abilities and skills in various professional fields” [1]. The previous isn't only a goal of the Tec de Monterrey but a part of the world's current requirements. For example, The World Economic Forum proposes “10 skills you need to thrive in the Fourth Industrial Revolution”. Among which are listed Complex Solving Problem, Critical Thinking, Creativity, Coordinating with Others, and Cognitive Flexibility [2], skills that have already been put into practice by Tec de Monterrey via Semana i and Semester i. These skills are fundamental to face challenges which, in turn, need to become cross curricular subjects, such as in Critical Thinking (understood as “a technique for evaluating information and ideas, for deciding what to accept and believe”) which is so close to Critical Reading (understood as “a technique for discovering information and ideas within a text”) that “in actual practice (...) work together” [3]; however, what would happen, or actually happens, once reading habits are one of the weakest items evaluated by international organizations? At the present time, Critical Reading seems to be, if not the only way to develop Critical Thinking, one of the most powerful tools in order to get it. Even so, the problem doesn't stop here: how can professors involve students into reading and, even most importantly, how can professors involve students into Critical Reading in order to develop Critical Thinking into undergrad students? How can Critical Thinking become a lifelong and necessary tool for the Fourth Industrial Revolution?
- b) Objectives of proposal: So, the *Laboratorio transversal para el desarrollo de lectoescritura crítica y aplicada* involves a research divided into three main goals: 1) Identify the best and most successful activities designed in order to bring together cross curricular subjects that involve reading and writing activities among senior high school students and college students, along their university education. 2) Unravel the common procedures between those activities that can develop reading and writing skills and also strengthen significantly the students' lexical field. 3) During the last stage, we'll choose and evaluate a series of strategies, as well as tools, that can be applied inside and outside the classroom, with the purpose to increase as many abilities as possible, related to Critical Thinking, and which can be used for the students even after they graduate.
- c) Work methodology:

Participants: The participants who contributed to this study were more than 300 students, of whom one quarter were of high school level (Multicultural Program) and the rest undergraduate students (Engineering Programs) in campus Santa Fe of Tecnológico de Monterrey, Mexico City.

Instrumentation: The instruments for data collection and the criteria for their subsequent analysis allowed to establish well-founded conclusions. After a thorough review of the experiences in other universities in the world, we adopted a modified Spanish version of the Miniature Guide by Paul & Elder [4].

Procedure: The research methodology of the project was quantitative-experimental, the most appropriate to establish causal relationships between groups of variables. Experimental research allow to influence a variable and establish cause-effect relationships. The research hypothesis was that cross curricular incorporation of specific didactic activities for the development of reading and writing basic skills in curricular courses, leads to greater critical thinking (process skill), which will improve social & management skills (cross-functional skills) of future lifelong learners.

d) Conclusions/results.

The results obtained so far are very encouraging. The NOVUS2015 Project (Lexical Enrichment) allowed us to find the structural deficiencies in the reading and writing skills of the students (reduced lexicon, spelling, syntax and grammatical errors) and we were able to verify that the lexical level of both undergraduate students and young engineers can be quite reduced, which results in a lower level of logical reasoning and critical thinking. We also realized that the student's daily contact with what we call "simplified writing" (Facebook, Twitter, Snapchat, SMS-type messages) not only does not help but damages the communication and reasoning skills acquired in high school and university. The NOVUS2017 Project (Critical Thinking Laboratory), currently under development, has allowed some important advances: It has been possible to identify the teaching and learning strategies of high school teachers that encourage the development of students' effective communication skills and compare them with those of college counterparts. It has been possible to design specific didactic activities for areas like mathematics, physics sciences, electronics, and computer technologies that encourage the development of these skills across the engineering curricula. Before the end of the year we will release a repository of activities designed for the enrichment of Critical Reading / Writing Skills (CLEC, Centro de LectoEscritura Crítica), adaptable to different disciplines, that take advantage of the combination of techniques such as Storytelling, Design Thinking and Gamification, among others. The free access to the CLEC will allow lifelong learners to practice didactic activities that fulfill the triple purpose of: consolidating knowledge in the discipline, increasing the lexicon and developing critical thinking skills.

## 5 REFERENCES

- [1] <https://sitiosmiespacio.itesm.mx/sites/tec21/profesores/que-es-el-modelo.html>
- [2] <https://www.weforum.org/agenda/2016/01/the-10-skills-you-need-to-thrive-in-the-fourth-industrial-revolution/>
- [3] [http://www.criticalreading.com/critical\\_reading\\_thinking.htm](http://www.criticalreading.com/critical_reading_thinking.htm)
- [4] [https://www.criticalthinking.org/files/Concepts\\_Tools.pdf](https://www.criticalthinking.org/files/Concepts_Tools.pdf)