



**POLLEN learning lab**  
**to improve the public education system and PISA.**

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Designing the future

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Monday March 26, 2012

## Abstract

The OECD groups 30 member countries committed to democracy and market economy that provides a unique forum for discussion, development and improvement of economic and social policies. OECD's mission is to promote policies designed to:

- To achieve a maximum possible expansion of economic growth and employment, and improved living standards of the member countries while maintaining financial stability and, thus, contribute to the development of world economy;
- Contribute to healthy and solid economic expansion in countries, both members and non-members who are in the process of economic development;

To achieve this, given the results of public education in Mexico, we have taken the first steps to develop a new learning lab that helps us to visualize the impact of our decisions to improve the education system, and avoid the possible, the impact of the unintended consequences of changes in public education policy to be implemented in social, cultural, economic and ecological.

**Keyword** - Learning Labs, Social Sciences, PISA, OECD, simulation, modeling, public policy, education, system dynamics.



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## Introduction

### What PISA Is?

PISA (Program for International Student Assessment) is an international study which began in the year 2000. It aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students in participating countries/economies. Since the year 2000 over 70 countries and economies have participated in PISA. This is a population that is about to enter post-secondary education or who is about to join the workforce. It is important to note that the program has been designed as a resource to provide abundant and detailed information to enable member countries to adopt the decisions and policies needed to improve educational standards.

The assessment covers the areas of reading, mathematical and scientific competence. The emphasis of the evaluation is on the domain of processes, the understanding of the concepts and the ability to act or function in various situations within each domain.

### Tests

Tests used in the evaluation process does not require anything other than pencil and paper and each student has two hours to answer it.

Each exam is a combination of direct questions with one correct answer (questions that only support a few words or short phrases for response, or offering multiple options for students to check one or more), and questions that require students to develop their own answers. The questions of the first type can only be right or wrong, and the second types are more complex evaluation and support partially correct responses. Importantly, while PISA uses the tool of multiple choice questions, a significant portion of the reagents, particularly the most complex, requiring the student essay writing and even charting.

Not all students have the same test on the table the day of the test to different students will play different booklets. As test was applied in 2006, there were 13 different test booklets, each with four chapters or groups of evaluation activities.

In addition to the actual examination, students must answer a questionnaire in which they ask questions about themselves and their homes. This survey of context is an important tool for the use of the PISA test, and talk about it later.

### The simple

For the implementation of PISA are used representative samples of between 4,500 and 10,000 students per country. This sample size allows inferences of



the country as a whole but does not allow inferences by regions or states. Some countries ask for samples to use the test also in the exploration of regional differences. Such was the case of Mexico, which in the 2003 evaluation cycle conducted an evaluation with **29.983 students** and in the 2006 cycle with 30.971 students.

## The results

PISA aims to provide a profile of the capabilities of students 15 years of all the countries which apply the test. It also provides information on the personal, family and school participants in the sample.

The cyclical nature (triennial) allows evaluation indicators on trends in each country and in all the countries involved in the project. Ultimately, the quality and richness of the data obtained in the evaluation process is intended as the basis for research and analysis for better policies in the field of education.

## México and PISA

The PISA international assessment program was developed between 1997 and 1999 and first applied in 2000 with the collaboration of 28 OECD member countries, including Mexico (plus four non-members, giving a total of 32 countries). Therefore, it is not an assessment tool that corresponds to the path of certain countries and has been exported to others, but that was gestated with the collaboration of these countries were to apply, and this contributed to attend universality in the focus of the review and the cultural relevance of the examples used in the reagents.

The first round of evaluations was applied in 2000 and 2002, a total of 43 countries (the initial 32 plus 11). The second cycle in 2003 covered 41 countries, and the last cycle performed up to now, 2006, included 57 countries.

## PISA assesses what?

Unlike other tests that have been used in the past, PISA is designed to meet the skills, or, in other words, skills, expertise and skills of students to analyze and solve problems, to manage information and face situations they will face in adult life and that require such skills.

PISA focuses on the evaluation of three areas: reading literacy, mathematical literacy and scientific literacy.



## Systemic vision to improve the results of the Mexican educational system and PISA.

Given the **results** of Mexico in the PISA test, looking for a better way to discover the policies and / or procedures to assist the Mexican government, to discover what **leverage points** to improve the results of this key indicator in education, we have taken the first steps for developing a new learning lab that helps us to visualize the impact of our decisions over time to improve the educational system of our country and where possible avoid, the impact of the unintended consequences of changes policy to implement public education, social, cultural, economic and ecological. Always looking for sustainable change.

### Steps for the development of learning labs.

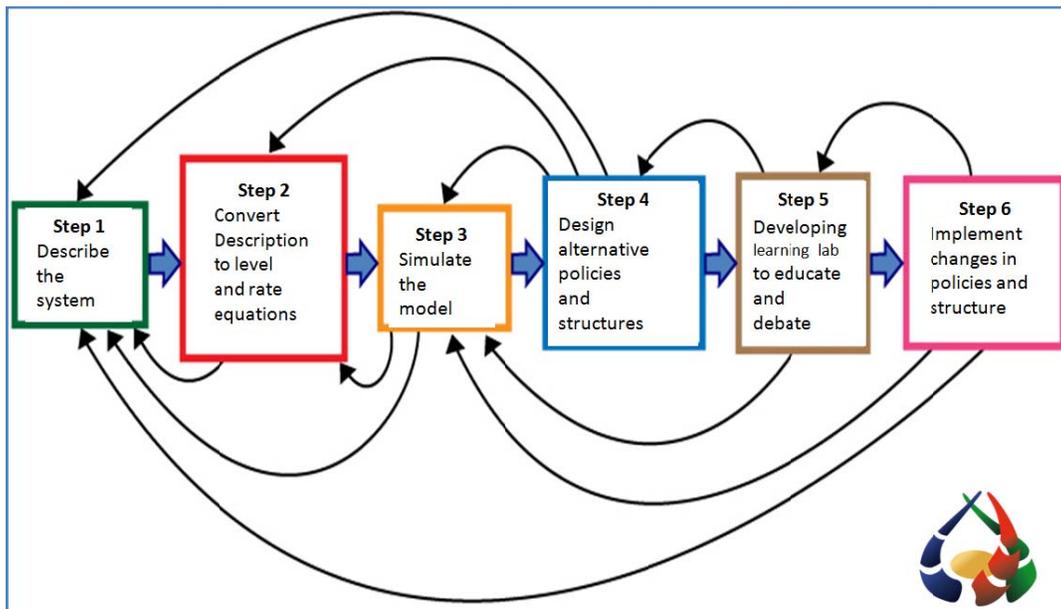


Figure 1: Steps for the development of learning laboratories and their results.

## Building the model, its cycles, cause and effect

### Structure (basic cause-effect cycle)

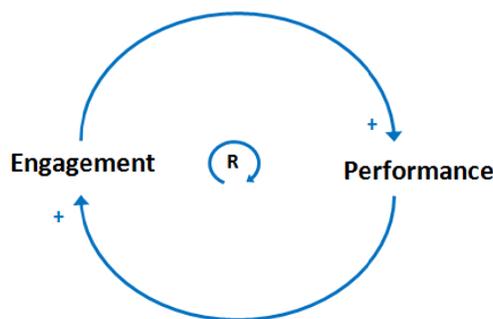


Figure 2: Is key to the performance, emotional involvement (Engagement).

Cause-effect cycle to improve education performance.

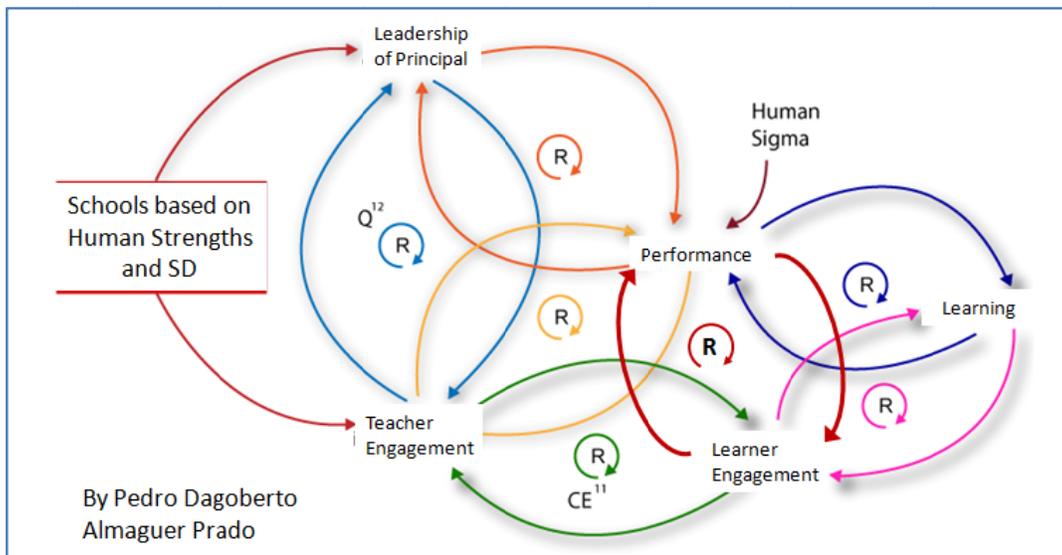


Figure 3: Cycles of cause and effect of performance in education.

Cause-effect cycles in modules, using the simulator Stella.

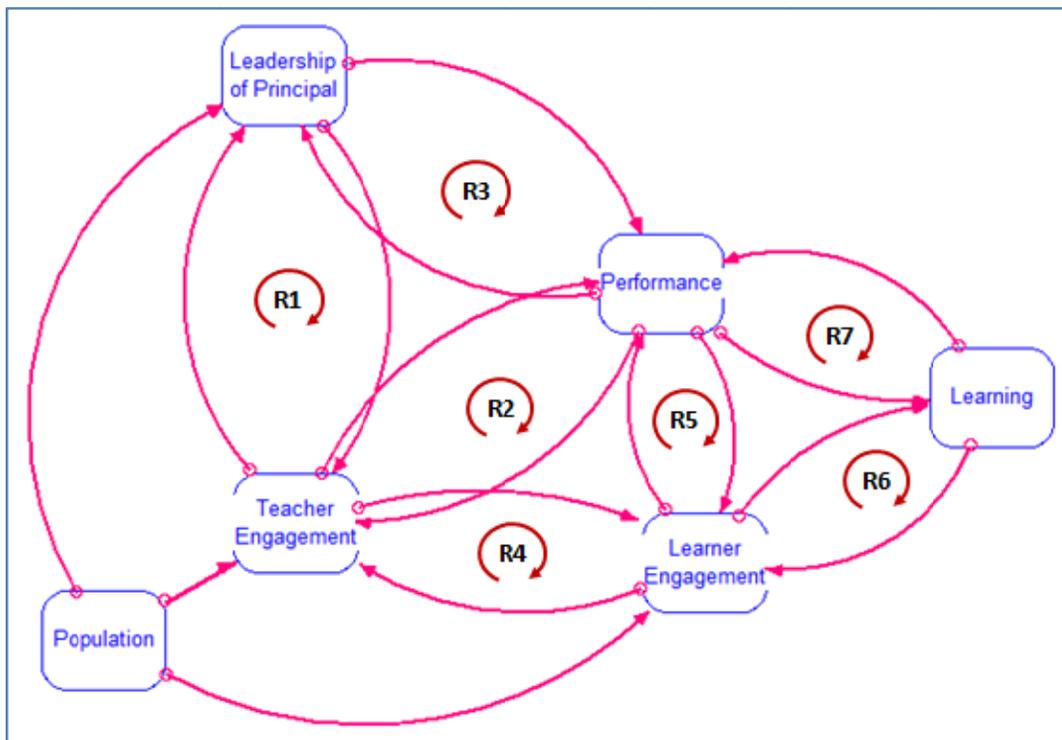


Figure 4: Cycles cause-effect, model to improve the education system & PISA.

## Cause-effect cycle, incorporating HumanSigma, to improve performance of PISA and education system.

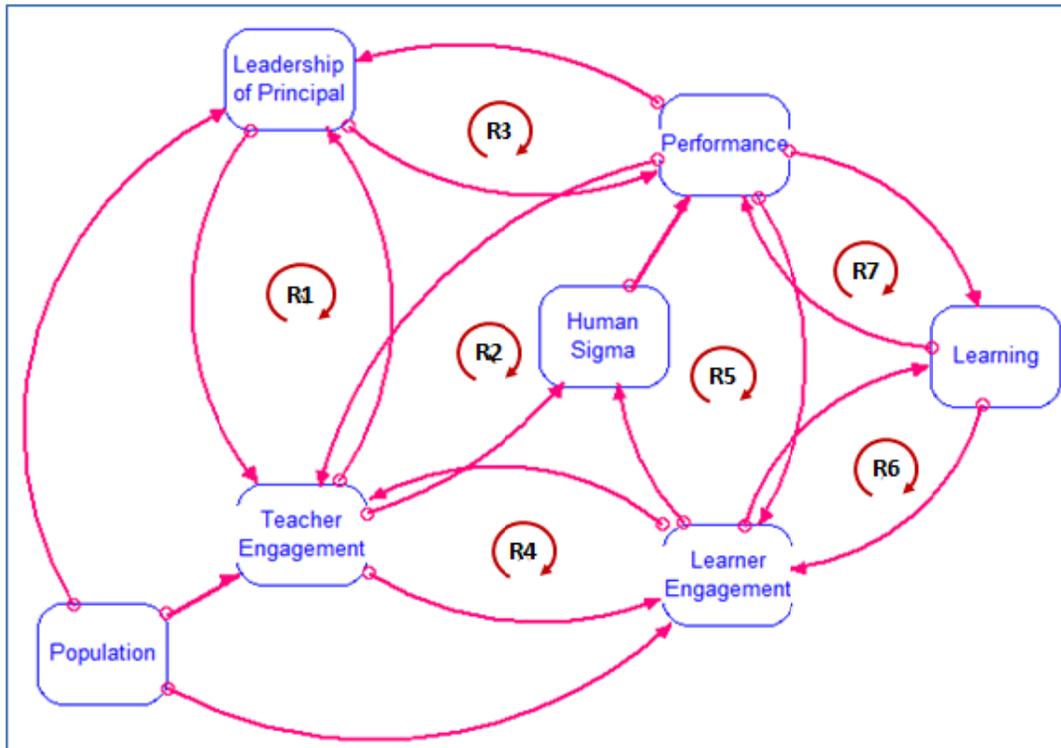


Figure 5: HumanSigma, to improve education & PISA.

### Meta-analysis of scientific validation of feedback loops R1, R2, R3, R4, and R5.

The cause-effect relationships shown in the diagram above, have been validated and tested in a scientific and statistical results of their meta-analyzes have been published by the Gallup company, [www.gallup.com](http://www.gallup.com) then documented the bibliography where these works have been published.

1. R1, R2, R3, are documented in the book referenced annex as (3) entitled "Follow this path."
2. R2, R4, R5, HumanSigma Meta-analysis is reported in reference (7).
3. R1 has been validated extensively in reference (6).
4. To better understand the importance of "HumanSigma," consider the references (4 and 5)
5. To learn how to develop better leadership style, study references (1, 2 and 8), which are useful to discover their talents and strengthen and references from the books of Daniel Goleman, Richard Boyatzis and the Dalai Lama to better manage of emotional intelligence.

## Developing the POLLEN model, step by step.

### Model for Leadership of Principal

#### Resonant or dissonant leadership of Principal (Part 1)

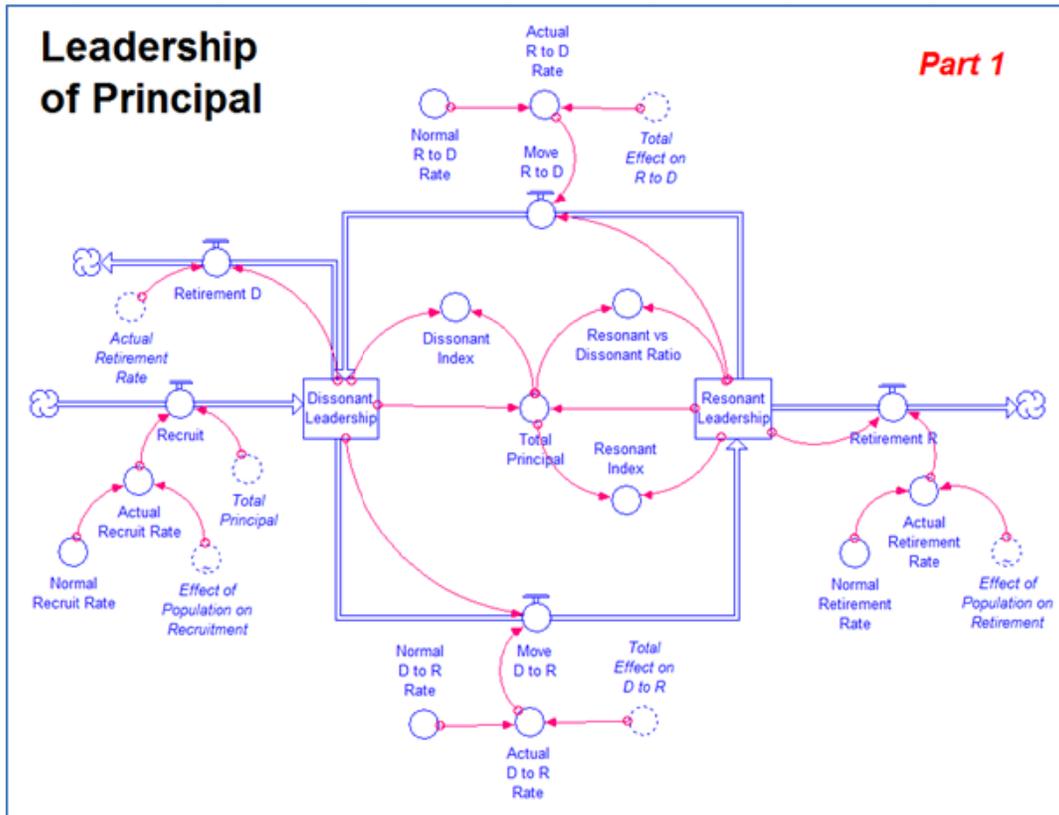


Figure 6: Leadership of Principal, or any executive position of the institution.

According to Daniel Goleman's, [Richard E. Boyatzis](#), [Annie McKee](#), Emotional Intelligence book, references (9,10, 11 and 12), especially the one entitled "Primal leadership," helps us understand a little better, the importance and role transcendent playing all the directors of any area in any institution, when exercising their leadership style, as to the performance of his team.

Daniel tells us that there are two kinds of styles of leadership, positive or so-called resonant leaders, negative or dissonant. Among the resonant are the (visionary, coaching, affiliative, democratic) and are classified as dissonant (the authoritarian or the helmsmen) both exert a negative and highly authoritarian leadership.

Based on assessments of emotional intelligence Goleman and Boyatzis ECI-360 test, you may find the leadership style of each manager, our data indicate that in northeastern



Mexico, abound in more than 75% dissonant leadership style, this means there is much work to do in this area, an authoritarian leader goes to work to sick people a psychosomatic issue, this occurs but not a word to his subordinates, the limbic part of our brain operates wirelessly connects to the human beings around us, so if the leadership style is dissonant, all this negative charge is passed to the members of our team and there is evidence that a relationship in non-nutritious, with the passage of time causes diseases.

All these considerations have been mapped in this part of the model, there is a group of resonant leaders and other dissonant and the different effects that have direct influence in transforming exercised leadership styles, such as:

1. Effect of recruitment policies that take into account or not, the current state of knowledge of emotional intelligence, knowledge of the talents, systemic skills, the discovery of purpose, mission, vision and values and harmony and alignment with shared vision of the institution.
2. Effect of the formation of emotional and social skills and strengthening of the talents in the transformation of leadership styles in both directions.
3. The effect of policies on retirement plans for succession in the workplace.

### Leadership of Principal (Part 2)

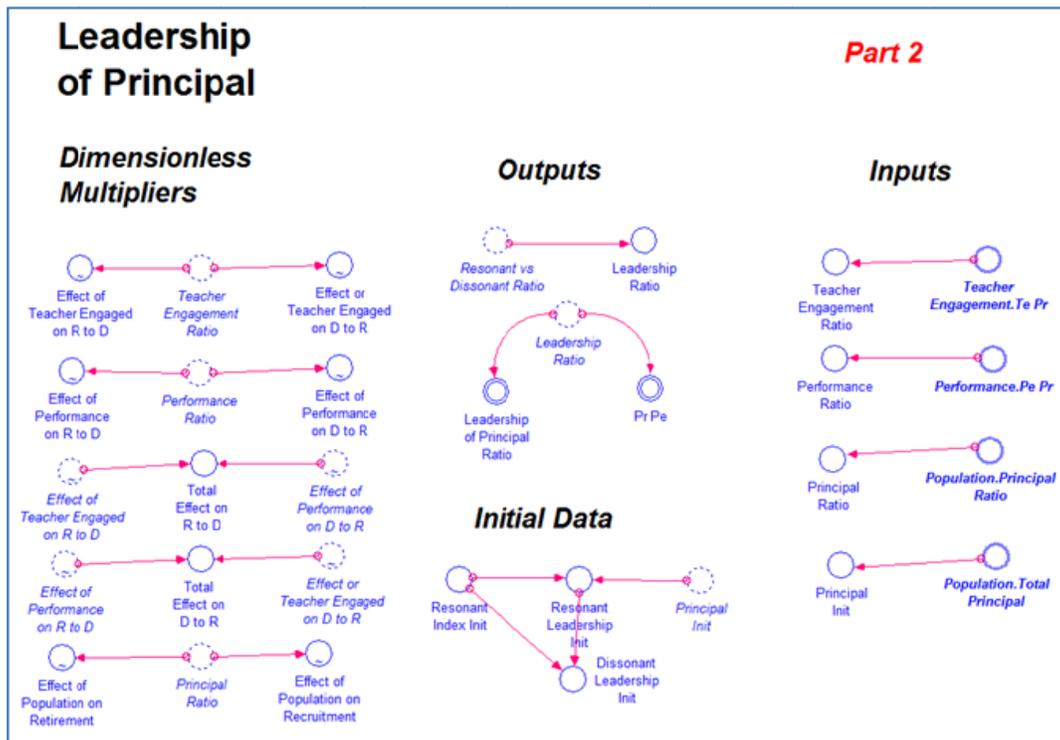
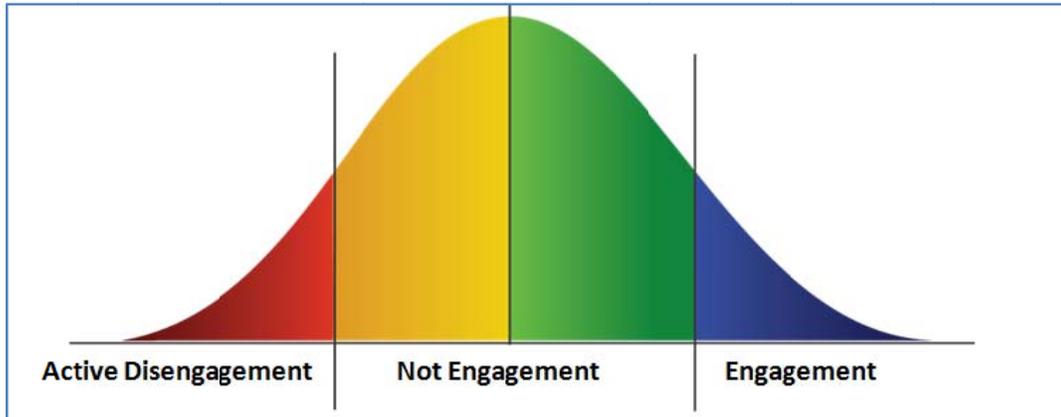


Figure 7: Variables that convey the leadership module to and from other modules, initial values and dimensional multipliers for the calculation of the effects.



## How is classified (emotional involvement) "Engagement".



For practical purposes, one can say that employees and students can be classified in three ways, (1 - The Engagement, are high performance, 2 – the “Not Engagement” are employees who are not psychologically connect with students, if students have an average performance, and 3 - the Active Disengagement, these are the ones who disapprove, or low performance.) The engagement is also known as the "emotional involvement".

## Model for Teachers Engagement.

### Model of emotional Engagement of the teacher. (Part 1)

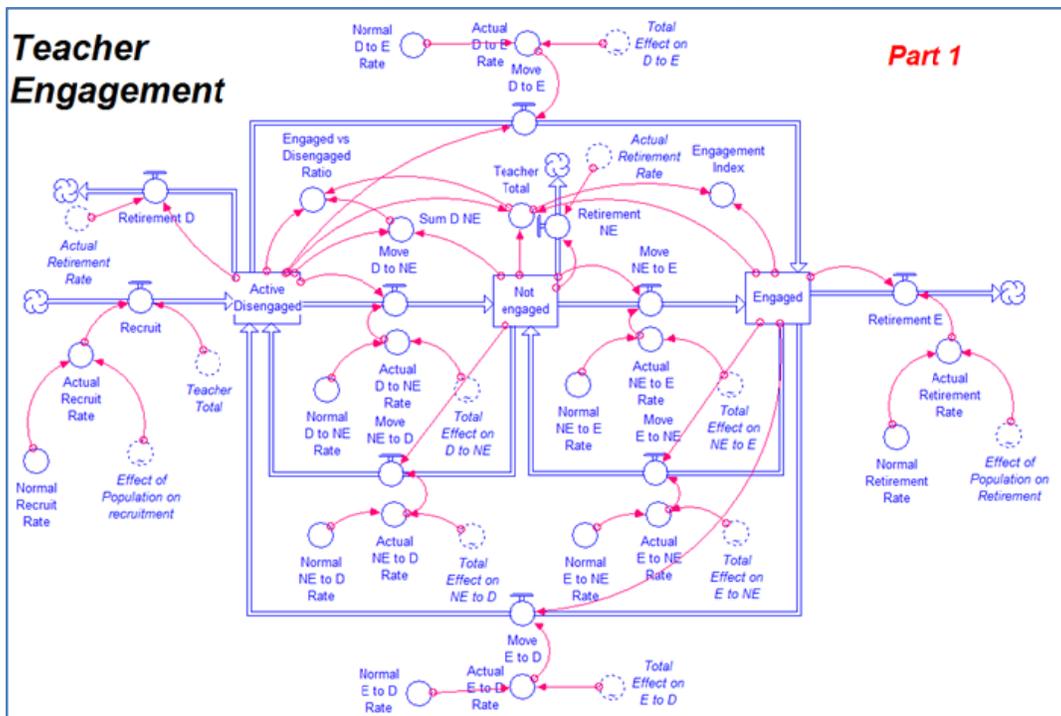


Figure 8: Module for the Teacher Engagement.



This is essential to know precisely, which is the degree of emotional involvement of every teacher or employee of the institution, it is important that the leader knows how to interpret the survey Q12 (includes 12 questions) reported in Appendix "B" and above all, known to practice the medicine to solve the problems of low involvement of their teachers, take note that this directly affects the emotional involvement of their students and their performance is directly affected, everything is connected. If you want to understand a little better depth these exciting discoveries in neuroscience, read the book "Follow this path" in reference (3).

The application of "leadership styles of resonant type, the part of managers, but **understanding what** to do to correct problems in the Engagement of their teachers, play a key role in moving from a state of Engagement, to another, for calculating the effect of recruitment and retirement plans are followed guidelines similar to those mentioned in the module for the leadership of its directors.

### Model teacher Engagement (part 2)

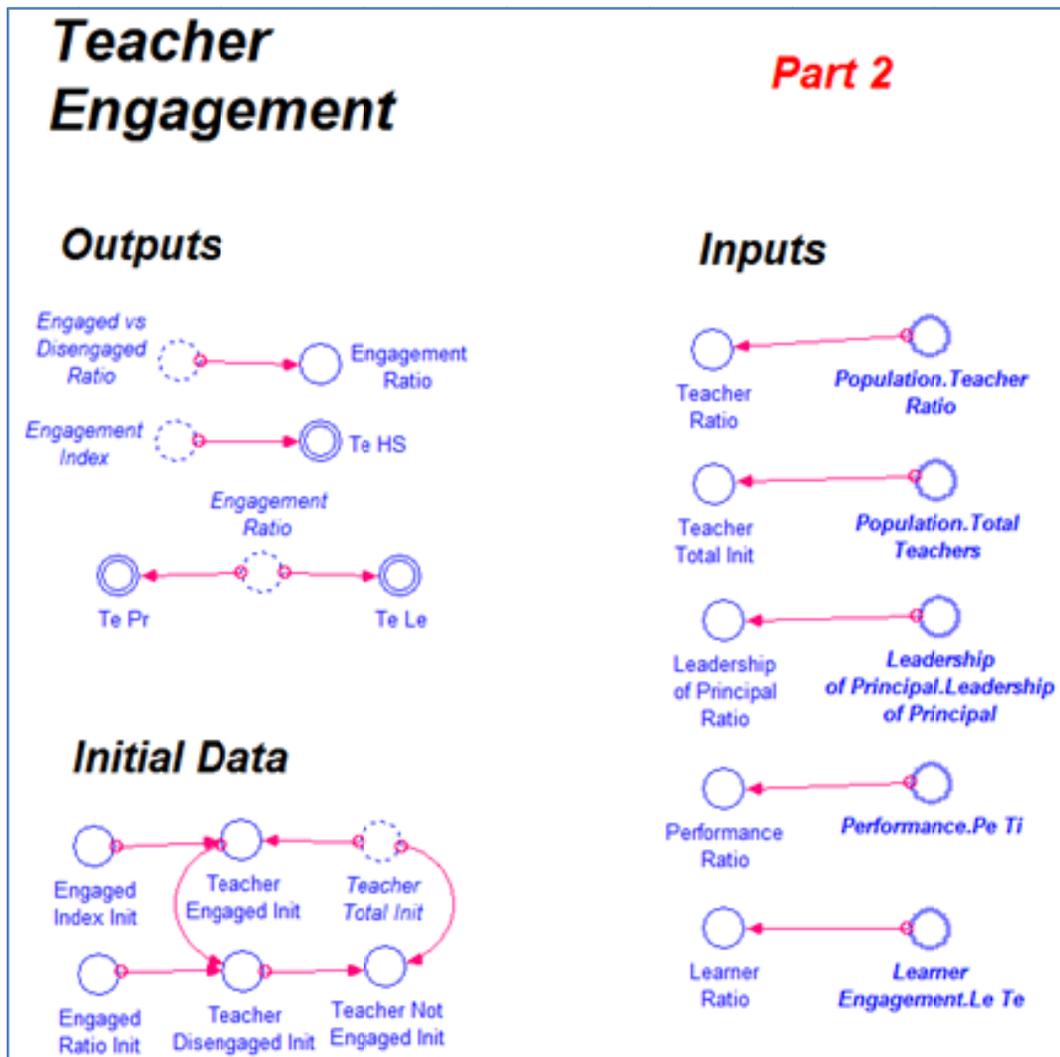


Figure 9: Communication module teachers to and from other modules and their initial data.

### Model teacher Engagement (part 3)

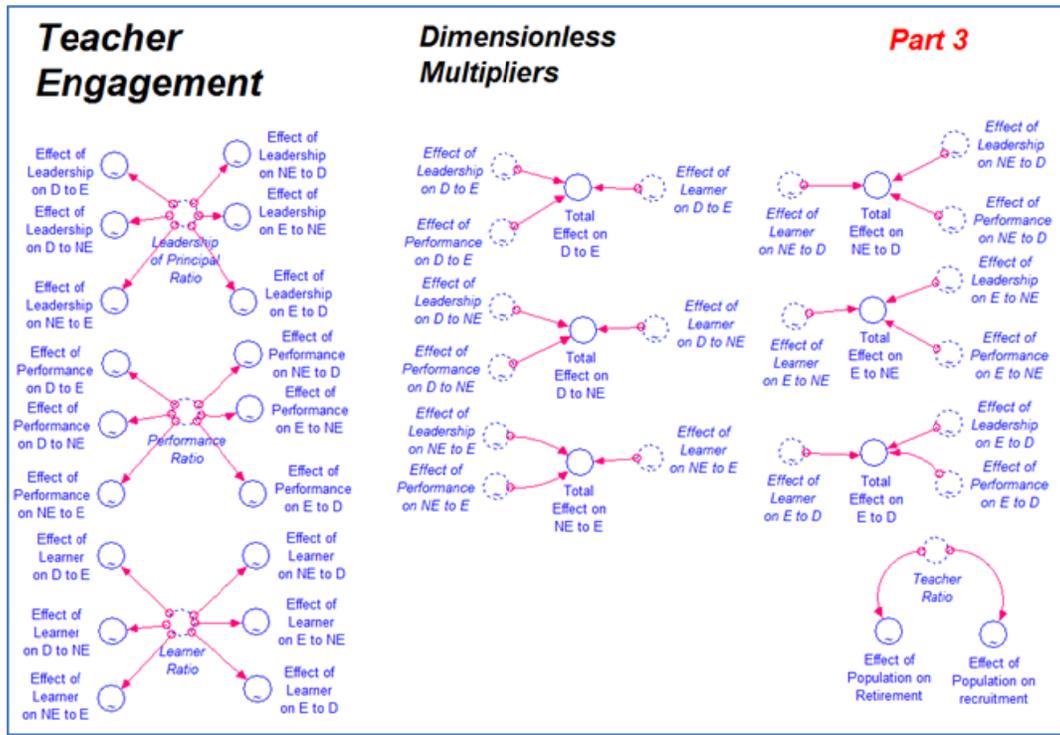


Figure 10: dimensional multiplier to calculate the effects due to the change of teacher in a state of Engagement to another.

### (UWES, UWES-S) - Another method of assessing the employee Engagement (for teachers), can also be used for students.

I recently discovered another yardstick to assess Engagement in the work area, which is being used in several first world countries such as Holland, Spain, Brazil, Portugal, etc.. and also serve to measure the emotional involvement of the employee "teacher", there is also a special version to be applied to the academic context, this means that it is also useful to measure the emotional involvement of the student, this is very relevant since is the first instrument of this type, with its reliability and validity statistics published, besides being translated into several languages including English, Spanish, Portuguese, etc.

- English is known as: **UTRECHT WORK ENGAGEMENT SCALE**
- In Spanish it is called: **Escala de Engagement en el Trabajo de Utrecht**

Or just call:

1. **UWES**: to measure Employee or teachers Engagement of a company or school. (Published in the appendix "D")
2. **UWES-S**: engagement in the academic context for students. (Published in the appendix "E")



## Model for students (learners) engagement

### Model students (learners) involved (Engagement) Part 1.

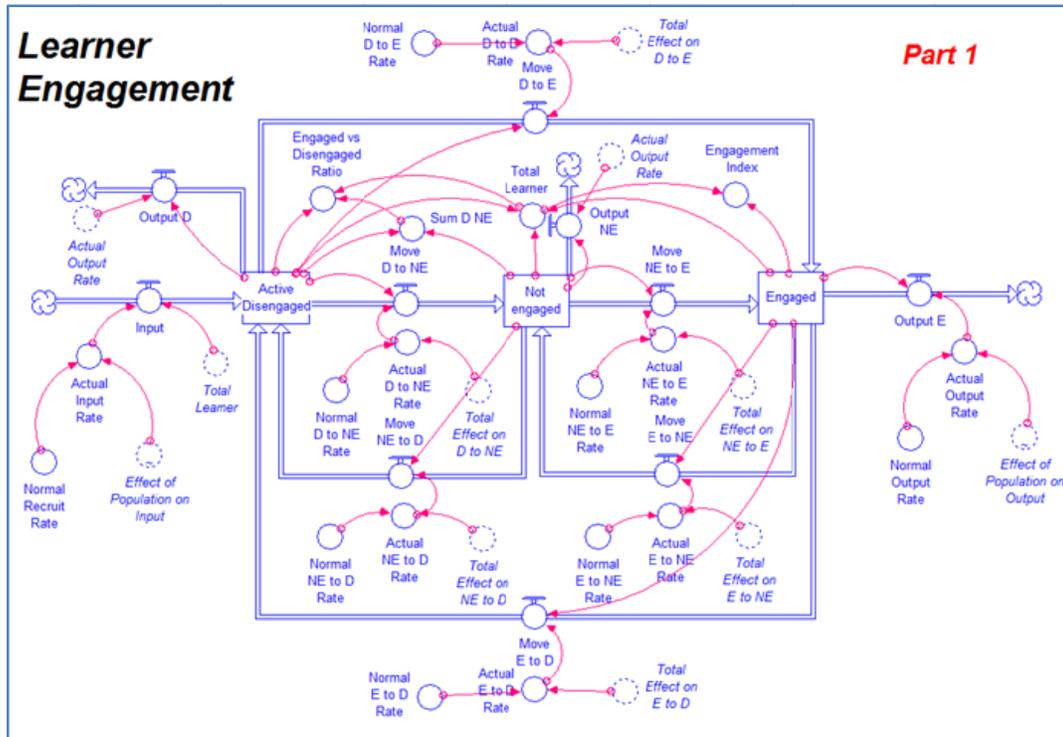


Figure 11: Module for managing the emotional engagement of the students (learners).

Gallup invented a measuring stick for the client's emotional involvement, which is reported in Appendix "C" and consists of 11 questions, this survey is known by the name of CE11 (emotional involvement of the contact between a client and a employee).

For Gallup customer engagement must pass through four states:

1. **Permanently engagement** - are the customers who are passionate about our institution and are champions of the repurchase of our service.
2. **Engagement** - it's just a lower level of emotional involvement, good customers, with lower performance than those classified as (1).
3. **Not engagement** - these are typical only want a relationship based on the price of our service or products, the value added of our attention, do not care.
4. **Actively disengaged** - these are a danger to the institution, are the lowest performing, speak ill of us and at any opportunity go to the competition..

For practical purposes we have defined only three states of Student Involvement (learners), "Customer" with a similar operation, the module developed for teachers.

To assess the emotional involvement "Engagement" student, I suggest using the survey UWES-S, which has been published in Appendix "E".



Every teacher should be trained in how to better manage the emotional involvement of their students, especially knowing what to do with students not engagement or actively disengaged, these are low-performing students and if the human relationship with their teacher, not improved, will be very difficult to change the course of these young people. Everything is connected, any change in performance, the involvement of employees, or application of the leadership of director, affect positively or negatively on student learning and his performance, and clear in the results of PISAs a global level.

**Model student (learner) engagement (Part 2)**

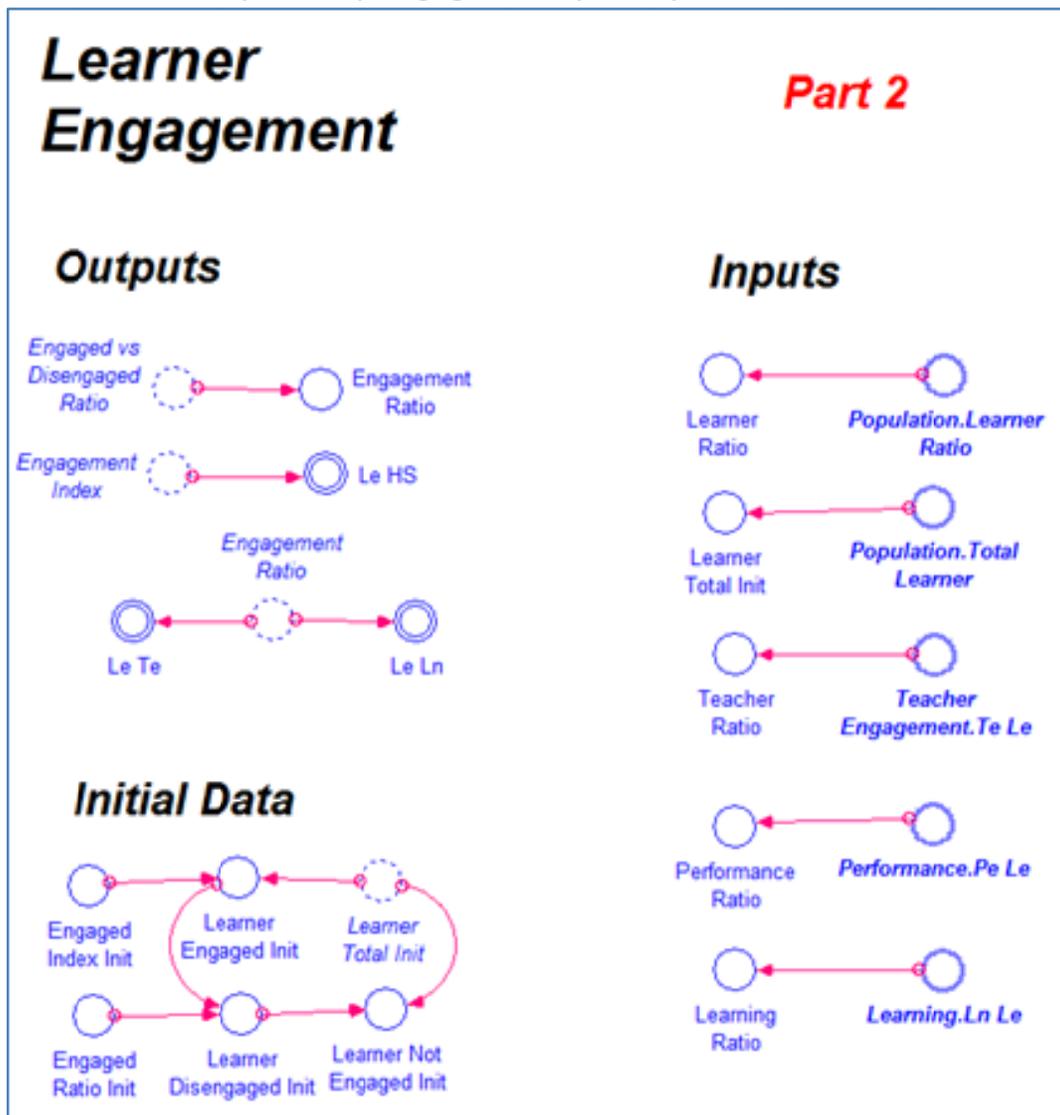


Figure 12: Communication module students (learners), to and from other modules and their initial data.



## Conclusions

So far we have only the first step, develop **POLLEN learning laboratory** for innovative public policies designed to improve the educational system and the results of PISA, is all an intellectual challenge, according to the methodology we are following, we work in the first three steps (1,2 & 3), we have devised the ways to improve the structure we have modeled, how to incorporate new elements that add value, thus we turn to the steps 4,5 and 6, the hardest part has been the paradigm shift, changing our internal mental models that sometimes cloud vision, but I think we found a leverage point, understanding what is the Engagement, and develop strategies to innovate in value to improve the level of engagement of teacher and student, is key to improving learning and performance of PISA.

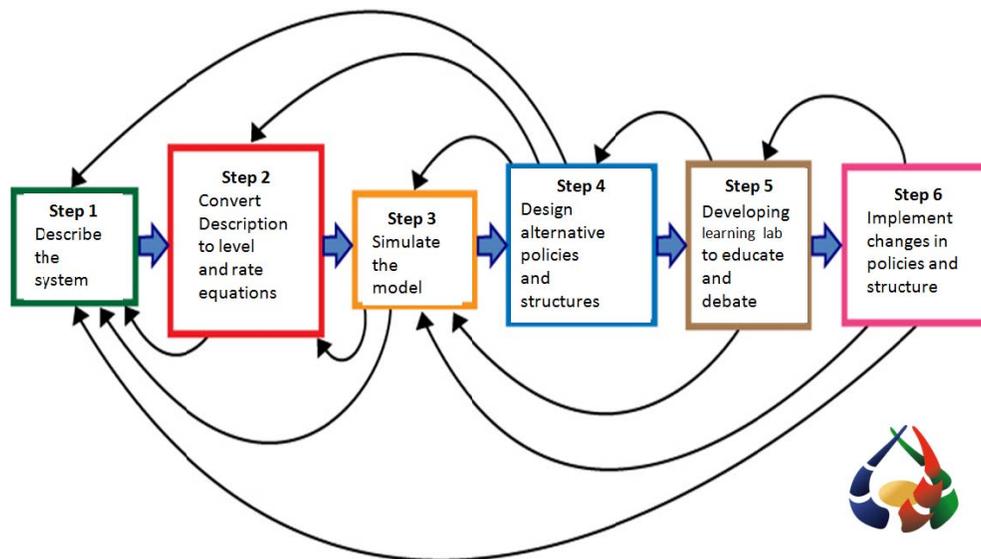


Figure 15: Methodology to develop our POLLEN learning lab.

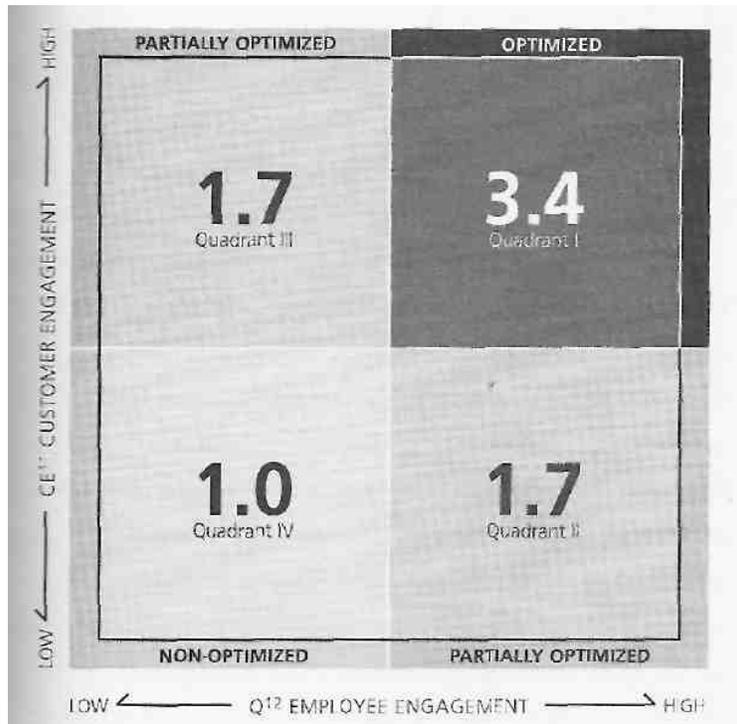
That magnificent opportunity to build a crystal ball, to invite our politicians to sit in front of it, to move levers, so they can visualize the impact of their decisions over time and especially having the opportunity to review the impact of unintended consequences in social, cultural, ecological and economic dimensions, before implementing the change, to the new strategies of public policy at the real .

## Future improvements to the model.

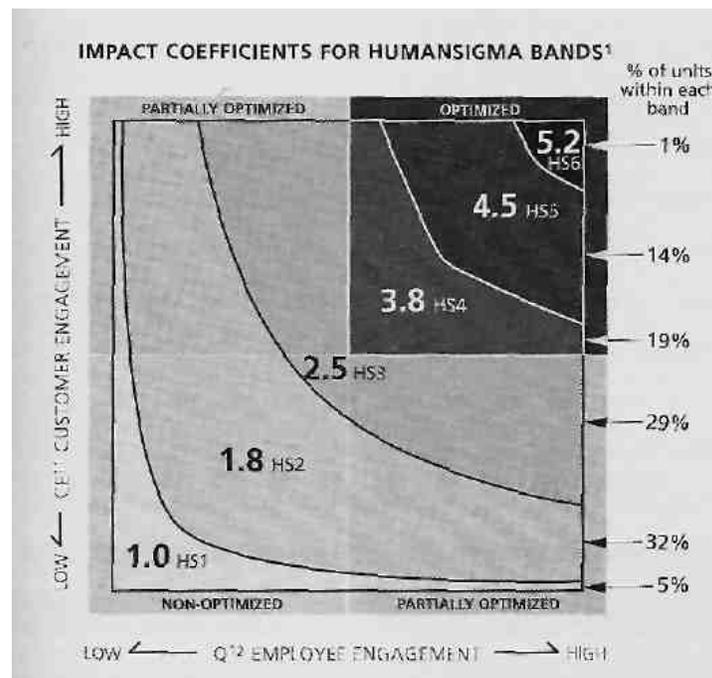
1. Add modules to a new curriculum based on improving the learning process that encourages self-reflective learning, communication with others to promote learning inspired by others and the connection of ideas with the real world, to go from "reading" to "doing" and conducive to learning connected to the real world. (Basing this with the constructivist model of education)
2. Add structure to manage workload capacity (balancing feedback cycles) for teachers, new curriculum will involve time and resources to modify the design of activities to meet the goals of improving learning and it takes time to implement this in a classroom.
3. Discovering new leverage points.

Appendix "A": HumanSigma, to evaluate human performance.

HumanSigma in English.



Graph 1: HumanSigma performance impact coefficients in quadrants.



Graph 2: HumanSigma impact coefficients by bands of performance.

**Observations:**

- $Q^{12}$  is the emotional engagement of teachers. (Published in the appendix "B")
- $CE^{11}$  is the emotional engagement of students "learners". (Published in the appendix "C")
- **UWES:** to measure Employee or teachers Engagement of a company or school. (Published in the appendix "D")
- **UWES-S:** engagement in the academic context for students. (Published in the appendix "E")

Both evaluations  $CE^{11}$  &  $Q^{12}$  has been tested its validity in different turns of business & schools regardless of culture, the idiosyncrasies, language or country where applicable, sufficient to evaluate the emotional involvement of its staff and students to transform the relations displayed in numbers in the cause-effect cycle performance, this data will become indicators of the balanced scorecard of your educational institution.

**Cause-effect cycle to improve results, based on performance**

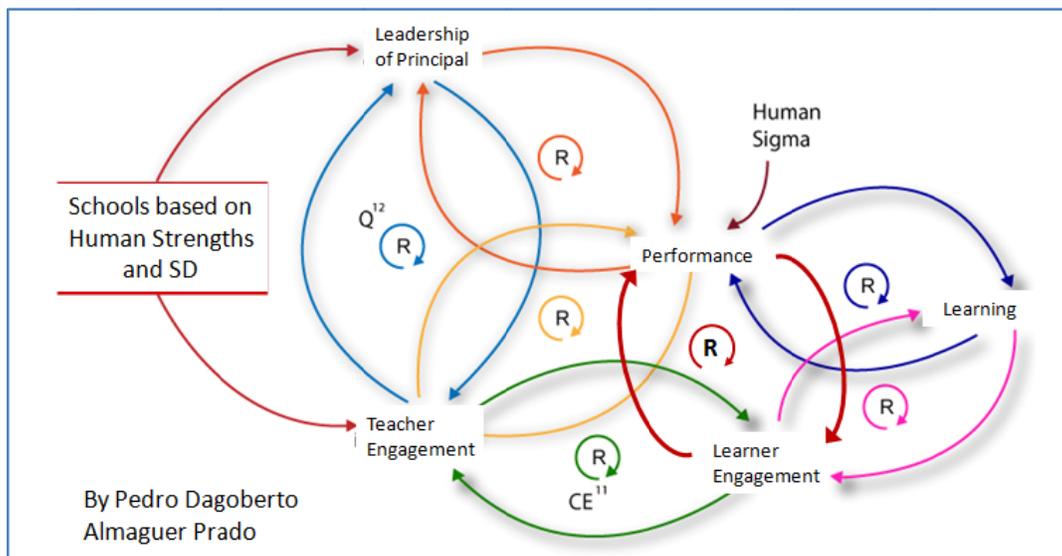


Figure 16: Cause-effect cycle to improve performance. ( $Q^{12}$  or UWES,  $CE^{11}$  or UWES-S)





## Appendix "D": Survey of Welfare and Labor (UWES) to assess the emotional involvement (Engagement) of employees or teachers.

*The following 17 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, cross the '0' (zero) in the space after the statement. If you have had this feeling, indicate how often you feel it by crossing the number (from 1 to 6) that best describes how frequently you feel that way.*

- Never "0" No time.
- Almost never "1" A few times a year or less.
- Rarely "2" Once a month or less.
- Sometimes "3" A few times a month.
- Often "4" Once a week.
- Very often "5" A few times a week.
- Always "6" Every day.

1. At my work, I feel bursting with energy (VI1)\*
2. I find the work that I do full of meaning and purpose (DE1)
3. Time flies when I'm working (AB1)
4. At my job, I feel strong and vigorous (VI2)\*
5. I am enthusiastic about my job (DE2)\*
6. When I am working, I forget everything else around me (AB2)
7. My job inspires me (DE3)\*
8. When I get up in the morning, I feel like going to work (VI3)\*
9. I feel happy when I am working intensely (AB3)\*
10. I am proud on the work that I do (DE4)\*
11. I am immersed in my work (AB4)\*
12. I can continue working for very long periods at a time (VI4)
13. To me, my job is challenging (DE5)
14. I get carried away when I'm working (AB5)\*
15. At my job, I am very resilient, mentally (VI5)
16. It is difficult to detach myself from my job (AB6)
17. At my work I always persevere, even when things do not go well (VI6)

\* Shortened versión (UWES-9); VI= vigor; DE = dedication; AB = absorption

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## Appendix "E": Survey of Welfare in the academic context (UWES-S) to assess the emotional involvement (Engagement) of the students (learners)

*The following 17 statements are about how you feel at work (in the academic context). Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, cross the '0' (zero) in the space after the statement. If you have had this feeling, indicate how often you feel it by crossing the number (from 1 to 6) that best describes how frequently you feel that way.*

- Never "0" No time.
- Almost never "1" A few times a year or less.
- Rarely "2" Once a month or less.
- Sometimes "3" A few times a month.
- Often "4" Once a week.
- Very often "5" A few times a week.
- Always "6" Every day.

1. My duties as a student make me feel full of energy (VI1)\*
2. I think my career has meaning (DE1)
3. Time "flies" when I perform my tasks as a student (AB1)
4. I feel strong and vigorous when I'm studying or I'm going to classes. (VI2)\*
5. I am enthusiastic about my career (DE2)\*
6. I Forget everything that happens around me when I'm absorbed in my studies (AB2)
7. My studies new things inspire me (DE3)\*
8. When I get up in the morning I feel like going to class or studying (VI3)\*
9. I'm happy when I'm doing tasks related to my studies (AB3)\*
10. I am proud to make this profession (DE4)\*
11. I am immersed in my studies (AB4)\*
12. I can continue studying for long periods of time (VI4)
13. My career is challenging for me (DE5)
14. I "let go" when I perform my duties as a student (AB5)\*
15. I am very "resistant" to deal with my work as a student resistant (VI5)
16. It's hard for me to leave my studies (AB6)
17. In my work as a student did not stop even if I do not feel well (VI6)

\*shortened version (UWES-9); VI= vigor; DE= dedication, AB= absorption

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