



Directorate for Education
Centre for Educational Research and Innovation (CERI), OECD

Innovative Learning Environments (ILE)

INVENTORY CASE STUDY

CEDIM: Center for Studies on Design at Monterrey

Mexico (Nuevo Leon)

This designing school has implemented a programme for students in their first two semesters of study (age 17-19), featuring an active role of the students who take responsibility for their learning, guided by teachers who act as team partners and coaches of the students. During project-based learning, students work on solutions for authentic real-life problems posed by enterprises or institutions. Each project takes several months and is integrated into coursework. Different forms of evaluations are used, including student peer feedback which is combined with exhibitions of works. The school also honours the best student work with an award.

This Innovative Learning Environment case study has been prepared specifically for the OECD/ILE project. Research has been undertaken by Anselmo Torres Arizmendi under the supervision of Alfredo Fernández from the Nuevo Leon Institute for Education Evaluation, following the research guidelines of the ILE project.

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**CEDIM: Center for Studies on Design at Monterrey,
Mexico**

**An educational institution presenting an innovative
learning environment**

OECD-CERI Innovative Learning Environments Project (ILE)

Research Report

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Abstract

The Center for Studies Design at Monterrey (CEDIM), Mexico is a higher educational institution that offers graduate programs in Design and Architecture. The base of CEDIM's educative model is the Projects Based Learning (PBL). The origin of this model is the constructivist approach on education. This has as a main purpose the constructions of knowledge thru the development of real projects all this done by the students. The projects, in PBL, must present one or several ways to solve real problems of community. The role of professors, therefore, is to guide or orient to the students to achieve the projects.

In order to evaluate the CEDIM a qualitative research methodology was applied. The method was the phenomenology. The data collection tools were three: non participant observation to the facilities and classes; depth and personal interviews to students, faculty and educational administrators as well as business administrators from the CEDIM's community. Focus groups were also applied during this evaluation to students, professors and educational staff.

Some of the benefits that CEDIM offers thru its educational model are as follows: CEDIM promotes the meaningful and collaborative learning, students' reflection on recent learned knowledge and the need of keep building new ones that can contribute to solve problems, promotes the development of higher levels of thinking; metacognition and improvement of intelligence, among others. All this has broken the paradigm of traditional education that is applied in Mexico and Latin America. The results of this qualitative evaluation confirmed the application and the benefits of CEDIM's educational model and promoted this institution as one with an Innovative learning environment as well as it pertinent and viable reproduction all over.

Key words: *CEDIM, Projects Based Learning, Constructivism, APP, México.*

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Introduction

This report has been developed for educational research project about institutions presenting innovative learning environments of the Organisation for Economic Co-operation and Development (OECD). This document is the result from documental material previous assimilation of the evaluated institution, granted by the Nuevo Leon Institute for Education Evaluation (IDEELEON), Mexico. This study was developed by Anselmo Torres Arizmendi, Ph.D., Adjunct Professor of the University of New Mexico, USA and Researcher from IDEELEON. In-person evaluation was carried out during October 2010.

Section 1.- Background of the institution presenting an innovative learning environment.

Nowadays, higher education in Mexico is in permanent growth. A serious problem in this educational level is the traditional approach applied in classroom. Even though there are Higher Educational Institutions (IES, in Spanish) interested in implementing more dynamic and alternative models, most of the Mexican IES continue implementing traditional education as a means to achieve educational process. Among main characteristics of traditional approach, we found the following:

- a) Professor is the base and condition to education success;
- b) Professor is the leader whom student must follow and imitate in order to learn;
- c) Discipline and punishment are considered the core so as to transmit knowledge;
- d) Emphasis on teaching how to learn;
- e) Memorization is supported against knowledge construction;
- f) The same teaching method is applied to all pupils and for all circumstances, and,
- g) This method uses, as main base, professor's verbal exposition, among others.

Some of consequences in applying this approach, not only in Mexico, but in the world, are the following:

- a) Students are prone to receive information and to process it instead of constructing it;

- b) Negative influence on students creativity;
- c) Knowledge individualization instead of socialization;
- d) It encloses knowledge in the physical frame of the school;
- e) School knowledge and real life relation is asynchronous, and,
- f) Student's critical thought is atrophied, among others.

It is in this national context where *Centro de Estudios Superiores de Diseño de Monterrey (CEDIM)* is developed.

1.1 CEDIM origins and its educational model which becomes an institution showing an innovative learning environment.

1978 Initially, it was named **Centro de Estudios de Diseño de Monterrey**. It started in a little house on Vallarta Street; educational offer included technical studies of Interior Design and Visual Marketing Design.



1985 From this school year on, CEDIM offers academic programs at bachelor's level.

2000 CEDIM inaugurates a new campus, new academic programs, and it launches a new design, innovation and business approach. It starts CEDIM new educational model project, which is aimed to significant learning and adopts projects based teaching.

2008 New campus facilities located in Santa Catarina, Nuevo Leon, Mexico started to work for the first time with new educational models and totally modified teaching staff oriented to significant learning.



1.2 Rationality to select CEDIM as a case showing an innovative learning environment.

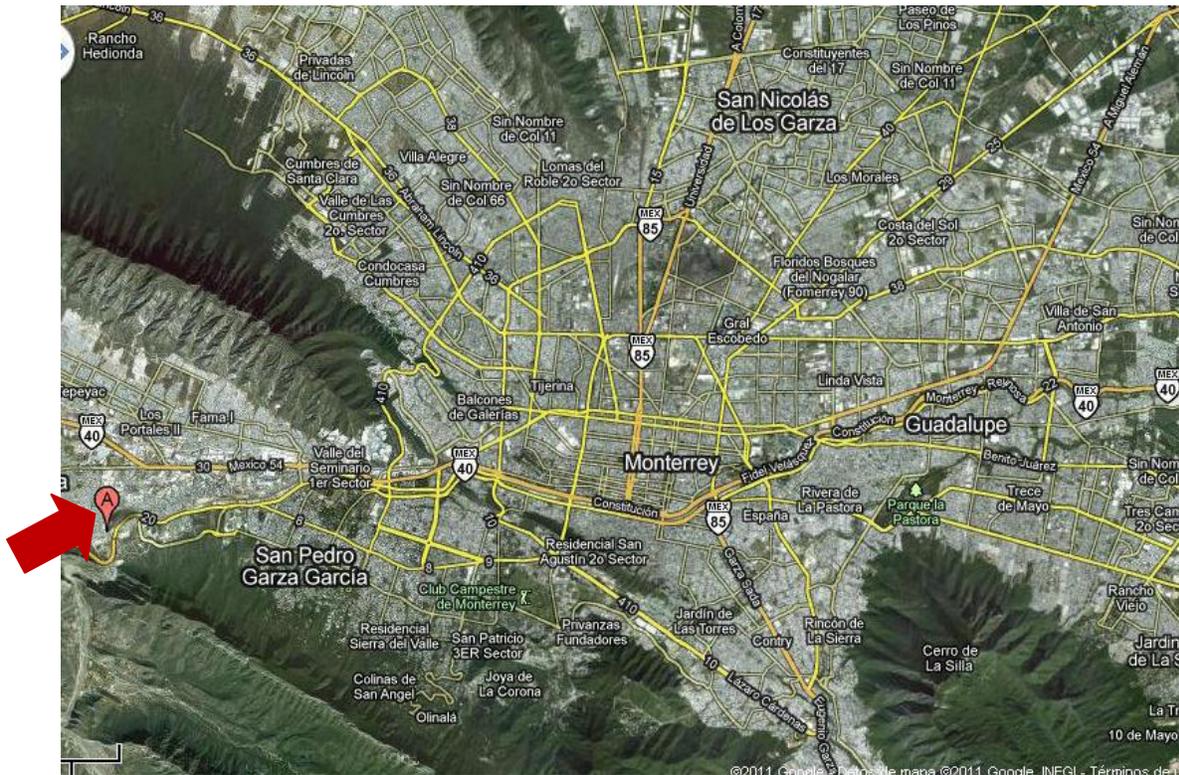
CEDIM educational model considers an approach based on four curricular lines in its academic program:

- Innovation
- Technology
- Humanities
- Business

CEDIM pedagogical base is the significant learning, and its main tool is Learning per Projects (APP, in Spanish). These two features made CEDIM become in an institution that breaks higher education pedagogical paradigm in Mexico. All the foregoing represented a criterion to select CEDIM as an institution presenting an innovative learning environment.

New educational model is applied completely on basic year, covering the first two semesters of the academic program, as well as third and fourth semesters of all academic programs. It is planned to cover 100% of all the semesters in the next 3 years.

1.3 Location of the institution presenting an innovative learning environment.



CEDIM's campus is located near mountains, at the Western area of Monterrey city (**point A**)

It is composed of wide spaces favoring creativity, promoting intellectual development and significant learning; at the same time they promote socialization among academic community. Such socialization is mainly performed at campus heart, which additionally is a versatile space transformed in lounge, gallery, meeting point or conference venue.



CEDIM: Center for Studies Design at Monterrey, Mexico. An educational institution presenting an innovative learning environment

1.4 School population participating in the new educational model and socio-demographic feature per academic areas: age, social stratum, gender, geographical origin and nationality.

CEDIM student profile is from 17 to 25 years old young, dominated by females, being 70% from totality of students. Most of the 65% belongs to middle-high class socioeconomic level; remaining 35% is divided by 20% of high class and 15% of middle-middle class. Students' total population is of 899 young. 53% of the students are from Nuevo Leon; a 16% comes from adjoining states, Tamaulipas and Coahuila; 11% from Durango, Chihuahua, Sonora and California; a 10% from entities like Veracruz, Oaxaca, Chiapas, Tabasco, Campeche and Michoacán; the rest is from Central part of Mexico. Foreign students who participate in the International Interchange Program represent 1% from total population.

Section 2.- Patterns and characteristics of an innovative learning environment.

2.1 Strategic context.

Through a qualitative evaluation visit, it was possible to prove that CEDIM educational model represents a paradigm rupture of higher educational models in the Mexican national context. Before mentioning characteristics of the evaluated institution it is important to refer to methodological process used to effectuate such evaluation.

A nature qualitative exploration exercise was carried out in order to have access to phenomenon place and to interact directly with its performers. This exercise was applied during times required by OECD. Data collection instruments were the following:

1. CEDIM facilities observation;
2. Non participant observation in some class sessions;
3. In-depth pre-arranged interviews with different institution performers, and
4. Focus groups with different performers thereof.

Next, I briefly indicate the **qualitative evaluation process**:

A preparatory meeting was held at CEDIM facilities. Its main purpose was to establish evaluation visit agenda that would be followed in the next days. From CEDIM, attendees to such meeting were Eduardo Carranza, Architect, and Fernando Rubio Garza Dueñas, support personnel, and a server. It was indicated how time and way were going to be applied during qualitative evaluation visit.

Data collection instruments:

- Different complete class sessions video film.
- In-depth pre-arranged interviews with professors.
- In-depth pre-arranged interviews with students.
- In-depth pre-arranged interviews with institution executives.
- Focus group with institution executives.
- Focus group with CEDIM students.
- Focus group with CEDIM professors.
- Electronic communication with stakeholders – businessmen- who have a relationship with the institution to carry out educational projects bonded with community enterprises.
- Closing meeting and in-depth pre-arranged interview with Fernando Rubio Garza Dueñas, CEDIM executive.

To see more about evidence and methods used on this case, please click the next link: <http://ideeleon.sytes.net>

Once mentioned the process by which information was collected so as to effectuate this evaluating study, CEDIM strategic context is to be carried out.

CEDIM educational model shows **four curricular lines** in its academic programs:

- Innovation (research)
- Technology
- Humanities
- Business

Likewise, education model has - as a base- significant learning, and as a didactic tool, learning per projects.

CEDIM mission and values.

CEDIM declares as a **mission**, to form professionals who, through their creativity, generate life quality and economic development for the community.

Values accepted by CEDIM are: work team, agility, innovation, excellence, plurality and commitment.

2.2 Cooperative learning relations.

“...we have agreements with local enterprises and they propose the projects that we have to develop with the students...”

(Institution Executives, CEDIM)

“...we have strong relationships with private and public enterprises. Both of them help us to create the educational projects which are the basis of learning process. And those projects are accomplished by the students and are the main elements to get accreditation of the course...”

(Institution Executives, CEDIM)

CEDIM educational model implies a direct relation with enterprises and institutions that contributes in the education process through projects' proposals that must be developed by studies. These projects become the center of attention in which semiannual subjects converge and are focused on problem and solution project.

Likewise, it involves cooperative learning through didactic techniques which look for student's learning by resolving a problem and submitting specific projects. Problem and solution becomes the binomial that opens and closes the activity, in a parenthesis where unprecedented prominence from student is claimed at the moment of analyzing and resolving a problem. From here, it can be derived the marked commitment that student must assume through all educational activity.

CEDIM didactic strategy represents a unique instructional model in which students plan, develop and evaluate projects applied in real world. This technique requests to redefine the role performed by the two protagonists of education act: professor and student. This comes from the need to terminate the student developed passivity when proposing him to break with paradigm and to meet knowledge by a guided research.

Professor becomes a counselor, a learning facilitator. Generally, projects are developed in coordination with companies of the region that cooperates through request of any of their own nature products development project. Moreover, institution executives indicate there are projects that have been submitted to public organisations like city councils and different governmental entities.

During data collection stage, it was observed how students perform their collaborative class work and established a continuous, significant and active process of individual and group development promotion.

Likewise, interaction and negotiation processes were verified between the members of different learning groups who develop specific projects. CEDIM model provokes that students participating in it are mutually affected by interchanging ideas, expectations, goals and objectives; it provokes they focus on educational model toward project achievement which represents a social knowledge construction satisfying needs and interests of enterprises or institutions that requires it, as well as those from students who finally make those projects theirs. Both students and executives expressed that motivation generated from development of these projects makes students leave behind differences and forget about the time spent in the institution developing projects.

2.3 Learning orientation (Staffing).

“...I’m as a facilitator in the class...they organize themselves for making their projects, I only supervise their work...”

(Faculty staff, CEDIM)

“...it’s different; the projects needed by the companies become the reason for working altogether...”

(Faculty staff, CEDIM)

With CEDIM educational model, professors become learning counselors carrying out consulting or tutorship for their own students. Professors take projects proposed by external agents (enterprises and public or private institutions), and such projects are presented to the students as main objective of current period class (4-month period).

Students are organized to carry projects out; professor suggests bibliography options to be used and allows students being organized for developing projects.

Once they are coordinated, professor's function is to supervise projects, as well as the students' collaborative learning process.

Section 3. - Nature and learning quality.

3.1 Students in learning center.

"...this kind of learning is new for me, one developed concrete projects that are related to the business market..."

(Student, CEDIM)

"...working together gives to us self-confidence to achieve our compromises with the enterprise which require the project..."

(Student, CEDIM)

"...the students become leaders on developing their projects, they have a great responsibility and to compete among them..."

(Faculty staff, CEDIM)

During data collection time, it was possible to verify that CEDIM instructional model centers its attention on students learning and brakes traditional educational paradigm that is focused on teaching and not on learning.

The student is the one taking over the projects derived from real world problems; it is organized in groups; he plans, designs, develops and evaluates such projects.

This model provokes students be committed to solve the problems proposed in the project, because it makes them to retain mainly knowledge and abilities. By this process, students use higher nature mental skills instead of memorizing data in isolated contexts without full connection with social reality.

3.2 Learning process.

CEDIM utilizes **Project Based Learning (PBL)** – in Spanish means *Aprendizaje Por Proyectos (APP)* -. This model promotes that the student participation become the learning tool. In this model the students plan, implement and evaluate concrete projects becoming from the world of business.

The **PBL** is based upon the self-knowledge of the students and it was inspired on the constructivist school of Vygotsky, Bruner, Piaget and Dewey. This model of learning comprises the development of interdisciplinary activities of long range doing by students themselves (Blank, 1997; 1998; Harwell, 1997).

The **PBL** has three major steps. These are the following:

- a) Project design which consist in having a plan to bring about the project chosen.
- b) Collaborative work which implied group- working together for optimizing the process and outcomes.
- c) The evaluation phase has four dimensions:
 - a. The project evaluation done by the professor;
 - b. the peer evaluation carried out by the students themselves;
 - c. the self-evaluation realized by the student her/himself; and
 - d. the external evaluation applied by an external agency with responsibility on project proposals.

According to conversations effectuated with professors and institution executives, as well as to the analysis done to the videos, CEDIM learning process has an order established by the institution itself.

Once external agents have designed which the proposed projects to be developed by a students' group are, it is deduced that steps followed by CEDIM to learning process, are the next:

1. **Presentation of project to be developed.** Once the case is presented, students must have clear specifications of the project, of the problem, of project characteristics and of its purpose itself.
2. **Problem definition.** Students must have defined which the problem to be resolved is, and in this way, to become a project that will serve as final product in which the other subjects of 4-month period concur.
3. **Brainstorm.** Once the problem is identified, group is organized in teams so as to achieve agreements about what it is needed to know so as to find its solution and to develop the project.
4. **Classification of ideas.** After brainstorm, such ideas must be classified and prioritized to define which the fundamental ideas that solve the problem are.
5. **Formulation of learning objectives.** Students and professor, together, determine learning objectives, based on project characteristics.
6. **Research.** It implies to face real life, enterprises, institutions, to get back to classroom and to create probable scenes, to look for in printing bibliography, in electronic sources, to make a comprehensive reading of such information, to extract key concepts and main ideas, and finally, to construe collected material. From this point on, students create an action plan.
7. **Group organization to develop the project.** This stage is characterized by action. Students are organized to develop the project at time agreed, and they are guided by a professors group of current 4-month period subjects.
8. **Presentation and results discussion.** Finally, students present their projects to professors and apply different types of evaluation from them: self-evaluation, evaluation and co-evaluation. Enterprises and public or private institutions attend results' presentations and evaluate them as well.

3.3 Evaluation.

Based on personal interviews and focus groups applied to professors and students, four different types of evaluation of students' academic achievement are identified:

- d) Evaluation in charge of professor.- It is the measure effectuated by the professor regarding project execution. It is made through qualitative and quantitative methods.
- e) Self-evaluation.- Student personal perception, concerning his performance in carrying out the project, as well as his own measure with respect to student objectives scope fixed by himself and the group he belongs to when project started.
- f) Co-evaluation.- General appreciation his classmates have about groups he worked with for the project. In this evaluation, it is very important the attitude kept by student during his team work.
- g) Evaluation from enterprises and public or private institution proposed projects to be carried out.- Perception from enterprises and public or private institutions regarding profitability from presented project.

In summary, we can observe students' performance is evaluated from different angles, and this allows having a 360° evaluation about their academic achievement. This evaluation scope is not normally applied in Mexican universities since a traditional teaching model, the professor is the only one evaluating students, and generally it is through exams, either written or oral.

“...the way how it's measured our educational competence is so different from the large majority of other schools, it's more fair and unbiased and we have the great opportunity of saying our opinion...”

(Student, CEDIM)

Students declared their pleasure and approval for being evaluated under this scope and they request to continue applying it during the rest of their university studies.

They mention that even though at the beginning there was a lot of confusion between them, specially with co-evaluation, once evaluation is done, they agreed with the way of evaluating, and in general with all the scope.

Another point in favor carried out in this scope is that metacognition is reached, meaning, student's conscience of how he learned to learn through a problem solved for a project.

Students showed their satisfaction and incentive to the fact they know now how to learn in a different way and this is reflected in their own self-evaluations, as well as in the one professor effectuates.

It is necessary to comment that during deep interviews, students' attitude regarding evaluation theme was not negative, on the contrary, their comments were reflexive and showed a positive acceptance to evaluation scope applied by this institution.

Section 4.- Impact and effectiveness of the institution (CEDIM) that presents an innovative learning environment.

Both impact and effectiveness of CEDIM instructional model can be seen from main performers' perspective:

- a) Students;
- b) Professors, and
- c) Enterprises and public or private institutions' executives.

4.1 Satisfaction generated by CEDIM instructional model to the students.

"...is it very exciting being working with real projects because that is the way it is at work..."

(Student, CEDIM)

"...with this model we can learn how to do team work in a better way..."

(Student, CEDIM)

“...it is another and different way of learning; it is different and much better...”

(Student, CEDIM)

“...I wish all the schools may have this way of learning...”

(Student, CEDIM)

According to reasoning derived from interviews and focus groups, impact and effectiveness of CEDIM instructional model can be deduced thru the following points:

1. It creates a favorable work habits by assigning functions, team work, responsibility and co-responsibility;
2. It develops self-control skills and discipline that lead to student to his independence and knowledge;
3. It makes students reflect about learning strategy and not only the content;
4. By using CEDIM instructional model, students' interest for learning is increased by virtue of attraction or incentive provoked by dissonance or problem stress. Students are committed and research more deeply when personal interest is involved in research result;
5. It makes learning be more significant to real world;
6. It promotes a higher order thought since instructional model requires applying a critical and creative thought. Students collect significant information to resolve the problem and evaluate information credibility and validity. When problem development reaches an acceptable conclusion, by effectuating tests which support decisions made, students attain a high cognitive yield. In this model, professor's duty is to promote this kind of knowledge;
7. It promotes metacognition, learning how to learn. CEDIM instructional model promote metacognition and self-regulated learning as students create strategies so as to define the problem, collect information, analyze data, construct hypothesis and test them. Additionally, they share and compare these strategies with those from other classmates and tutors;

8. It shows authenticity. CEDIM's goal, through instructional model, is that students learn from real world situations; therefore, it evaluates learning, by preferring those showing comprehension and not vain repetition;
9. It promotes knowledge social construction;
10. It promotes collaborative learning; and
11. It promotes values like solidarity, creativity, honesty, team work, earnestness and cooperation, among others.

4.2 Faculty's satisfaction.

"...it is very satisfactory to see how students organize themselves to do collaborative work; this is different to traditional schools..."

(Faculty staff, CEDIM)

"...it is very interesting how I can transcend thru this way of teaching...the students get very motivated and they develop real projects...I can transcend with them as well..."

(Faculty staff, CEDIM)

During interviews and focus groups applied to CEDIM professors, it could be seen a great professional satisfaction, since students motivation encourages professors to continue working with the same instructional model. Moreover, students' work and effort are reflected in projects presented by students before enterprises and public or private institutions, and make projects importance theirs in their life and in labor and social life. Professors are conscious that their work and effort are leaving a mark in academic development and labor future of the students; they know that through the method, they are going beyond not only as professionals, but, rather, as educators.

4.3 Satisfaction of enterprises and public or private institutions' executives.

"...students develop very appropriate competences, educational and professional; so that, when they get to the labor market they become very competitive... they are very creative..."

(Administrator of a company that has an agreement with CEDIM)

“...I think the projects that are developed can be applied to the world of industry...”

(Administrator of a company that has an agreement with CEDIM)

“...I like to suggest projects because they do it nicely and their results are very interesting...”

(Administrator of a company that has an agreement with CEDIM)

It was possible to establish communication by email with two stakeholders – businessmen- who work for same number of enterprises that have a direct academic relation with the institution. They express their satisfaction when proposing projects developed by CEDIM students, since they show a display of creativity at the moment of designing them; likewise, they mention positive and proactive attitudes expressed by students during their performance. Both businessmen answered categorically and affirmatively when they were asked if they would hire CEDIM graduates, if necessary.

Section 5.- Final comments.

One of the strongest critiques done to educational systems in general is the dissociation that exists between the school and real life. Ivan Illich expressed his concerns about the “*divorce*” between the school and society. Other authors like Althouser; Parsons; Freire; Gramscis; Giroux; Bordieaux; Perrenaud, among others, pointed out that schools as reproducers of social circumstances. Some of the results of this social reproduction act are that students develop low critical skills, are not very creative and self centered, therefore students are educated to be part of a system that need weak people to keep with the oppressive and dominant social paradigm. The result of these critiques can be proved and shown in traditional education which is the type mainly applied in higher education in Mexico and Latin America.

CEDIM instructional model represents a rupture with Mexican and Latin American pedagogical paradigm; a practical pedagogical experience organized to research and to resolve real life problems. It is a curriculum organizer, as well as a teaching strategy, two complementary processes.

It shows three main features making it regionally unique:

1. It makes students be committed as responsible of a problem;
2. It organizes the curriculum around holistic problems that generate significant and integrated learning in the students; and
3. It creates a learning environment in which professors encourage students to think and to guide them during their research, which allows them to reach deeper levels of comprehension.

CEDIM instructional model builds up its curriculum that provides genuine experiences which promote active learning, support knowledge construction and constitute naturally school learning to real life, by integrating at the same time, different disciplines among themselves. The problem is the curriculum organizer center; it attracts and keeps students' interest because of their need to solve it, leading them to analyze different perspectives. Students achieve to be committed solutions' makers that identify the origin of a problem, and determine the necessary conditions to reach a good result; they always look content and comprehension in such a way they end leading their own learning.

CEDIM's educational model is very helpful to develop the four basic educational competencies that are mentioned by Delors (1996): learn to be, learn to work, learn to learn and learn to entrepreneur. Education must be an essential element to promote global and personal development: mind and body, intelligence, sensitiveness, aesthetic sense, self responsibility and spirituality. The main purpose of education is to promote the freedom of thought, feelings and imagination; therefore, they can achieve their talents and be architects of their own destiny. According to Delors (1996) these four competences- or pillars- are involved in to professional education. The main goal is to teach students how to be practice their own knowledge and adapt education to the labor world. Thru this learning it is implied the active learning every student must develop by himself.

All mentioned before is done by CEDIM educational model thru students are integrally educated. The pedagogical achievements of CEDIM also break with traditional education paradigm because they build competences for life as well as to work.

And finally and transcendently, CEDIM's pedagogical model disintegrates the "*bubble*" in which school is enclosed and returns it to society by developing projects that solve problems from social and educational community.

Pedagogical models like CEDIM's cannot be applied in private institutions, intelligence and collaborating work are elements of thoughts and action those belong to humanity and PBL can be reproduced and applied in every institution (public or private) worldwide with no exception. I have no doubts that CEDIM is, nationally and internationally, an educational institution that presents an innovative learning environment.

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