2012

LEAPS TOWARDS LEARNING: THE JOURNEY OF AN INNOVATIVE METHODOLOGY IN EDUCATION

LEAPS TOWARDS LEARNING: THE JOURNEY OF AN INNOVATIVE METHODOLOGY IN EDUCATION

Contributions of Educational Technology to the innovation of pedagogical practices from the perspective of an Integral Education

Sandra Regina Rezende Garcia
Anita Lilian Zuppo Abed
Tufi Machado Soares
Silvia de Araujo Donnini

Instituto MindGroup

Presentation

The MindGroup Institute, accomplishing its mission of producing knowledge, has the honor to present this article of four celebrated professionals that collaborated to produce a valuable work about the heels of learning.

The analyzed material was extracted from three years of research involving 13.500 students, 10.100 parents and 2.100 teachers. This work crowns a cycle of exploratory studies about the evolution of learning stimulated by a weekly class to cognitive, social, emotional and ethical development of the students – Mind Lab Project

The studies indicate an increase in proficiency in Math, Portuguese, Natural Science and a positive development on the percentage of students classified on the levels of appropriate and advanced learning, according to the interpretation of the proficiency scale of SAEB.

In summary: leaps towards learning is a real possibility.

LEAPS TOWARDS LEARNING: THE JOURNEY OF AN INNOVATIVE METHODOLOGY IN EDUCATION

INDEX

SUMMARY 11

INTRODUCTION 13

JUSTIFICATION 15

THEORETICAL RATIONALE 17

MIND LAB METHODOLOGY 27

PREVIOUS RESEARCH 31

THE STUDY IN BRAZIL - 2011 36

CONTRIBUTIONS OF THESE RESULTS IN RELATION TO SCHOOLS' MANAGEMENT 47

STUDIES 2009/2010/2011 50

DEEPENING THE STUDIES... 51

FINAL CONSIDERATIONS 53

REFERENCES 57

ANNEX 1 59

ANNEX 2 61

ANNEX 3; 4 65

ANNEX 5; 6 66

ANNEX 7; 8 67

ANNEX 9; 10 68

Leaps towards Learning: The Journey of an Innovative Methodology in Education

Contributions of Educational Technology to the innovation of pedagogical practices from the perspective of an Integral Education

Sandra Regina Rezende Garcia – Masters in Psychology, Pedagogue, Psychomotrician, Graduated in an International Course on Structural Cognitive Modifiability and Instrumental Enrichment, Head of Pedagogy of Mind Lab Brazil

Anita Lilian Zuppo Abed – Masters in Psychology, Psychologist, Psychopedagogist for Mind Lab Brazil

Tufi Machado Soares – Doctor in Electrical Engineering by PUC-RJ. Tenured Professor – Juiz de Fora Federal University.

Silvia de Araujo Donnini – Bachelor of Arts and Postgraduate in School Management. Assists several cities in the state of São Paulo. Director of the Pedagogical Management Area in the Department of Education in the city of Sorocaba. Member of Mind Group's Technical Board.

Summary

In 2011, the Mind Group Institute sponsored a study with Year 5 students from 145 public and private, schools, in order to broaden and deepen the results obtained in the two previous studies (2009 and 2010) concerning the impact on proficiency levels in several subject areas after three months using Mind Lab's Methodology. The Assessment Tools were based on INADE's (Institute of Evaluation and Educational Development) Item Response Theory (IRT) and developed from their References for Year 5 and the skills prioritized in the "Resource Management" Course from Mind Lab. In 2009, the results showed a 100% increase on average levels of proficiency for Mathematics and 20% for Portuguese, more than what had been expected for the period. The results in 2010 also confirmed the positive impact of the Methodology beyond what it had been expected for the period for Mathematics (184%), Portuguese (478%) and Natural Sciences (162%). In 2010, as in 2009, there was a significant decrease in the number of students rated "Below Basic" and "Basic" and an increase in the number of students rated "Adequate" and "Ad-

vanced" in the three subject areas assessed using the SAEB (Evaluation System of Basic Education) scale. The results obtained from a questionnaire filled in by students – an improved version of 2009's questionnaire – showed that everyone involved, especially students, recognize the benefits of the Methodology in improving their social relationships and emotional skills. Parents and teachers took part in 2010's research and teachers noticed how the use of the Methodology helped them to improve their self-esteem, to believe in the modifiability of students and to expand their internal resources to deal with conflicts in the classroom. In 2011, we increased the number of participants (145 schools, 8988 students, 7625 relatives and 1568 teachers) and elaborated more detailed tools which allowed us to expand the collection of data related to the participants' perception of the value of the Methodology (students and parents) and effect on pedagogical actions (teachers). We intended to close this cycle of studies by deepening our awareness about the implications of the Methodology in teachers' practices, the increase in students' proficiency levels and the development of their cognitive, social, emotional and ethical skills. Our results highlighted the positive impact of the Methodology upon the chosen subject areas, as well as the individual's perception of their own development, especially by students. With a substantially expanded sample, students' proficiency increased beyond what was expected for the period in Portuguese, Mathematics and Natural Sciences and, once again, there was a decrease in the number of students rated at "Below Basic" + "Basic" and an increase in the number of students rated as "Adequate" + "Advanced" levels (about 10%). Our research confirmed a trend towards a greater appreciation by students and family members regarding their perception of the impact of the Project in the development of cognitive, emotional, social and ethical skills. As for the teachers, the great majority of them reported a perception of the Project's importance to their pedagogical practices regarding the expansion of their internal resources to deal with conflicts, improvement of their self-esteem as a teacher and their belief in students' modifiability. More importantly, teachers realize the positive impact of the Methodology on their personal development. At the end of this cycle of studies, we have new perspectives regarding the objectives and the methodology of the piece of research which will be carried out by Mind Lab in 2012. In order to advance from an exploratory research to an inferential one, there will be a comparative research in public schools to assess proficiency levels in three subject areas for Year 5 students who take part in the Project and others who do not. We will provide improved questionnaires to expand our data regarding the participants' perception (students and parents) in relation to the development of skills. As for teachers, we want to know more about the effect of the mediation criteria proposed by Feuerstein to their pedagogical practices.

In private schools, the exploratory research will involve Year 9 students in order to identify the benefits of the Methodology in relation to the skills appointed by ENEM (High School National Exam), as well as understanding the potential impact in skill development which can assist students in assimilating specific Mathematical content. We also hope to intensify data collection regarding pedagogical practices, since the available data suggests that teachers notice an

interrelationship between the benefit of Methodology to the development of their pedagogical practices and the "leaps towards learning", indicated by the increase in their students' proficiency levels.

Introduction

In the second semester of 2006, an innovative teaching methodology arrived in Brazil. It uses thinking games, meta-cognitive methods and intentional mediating actions to promote the development of cognitive, emotional, social and ethical skills.

In 2008, Mind Lab (or Mentelnovadora as it became known in Brazil) was organized as a co-curricular proposal and it was part of the curriculum of several schools; initially in private schools in São Paulo. The original program was adapted in order to comply with the structure of Brazilian schools and relevant adjustments were made whenever necessary. In addition to those adjustments, we listed the prioritized skills for each one of the games, in order to clarify the intentionality of each course (applied in one academic semester) and to show that the games were appropriate for each age group and that they would help students to develop cognitive, social, emotional and ethical skills related to their year group. Some adjustments were also made to timescales, but the most important change refers to the person applying the Methodology: school teachers rather than Mind Lab staff. Thus, an extensive program of ongoing training for teachers was designed and implemented and it entails a 24-hour Initial Training and 2-hour monthly supervisions during the whole process of the Project's implementation in the school.

This change in the application of the Methodology raised the question which guided the first study, in 2009: Would the Methodology have the same impact observed in previous studies (Gendelman, 1999 and Green, 2004 apud Abed and Garcia, 2009) in students' proficiency in Language and Mathematics? Would a Project implemented in schools with a weekly session taught by students' own teacher and under the supervision of Mind Lab Brazil's staff be able to promote the development of students' skills as well as it does in the original format?

In order to collect data which could provide answers to these questions, a Research Project was elaborated following the model of a study conducted by Donald Green (2004 apud Abed and Garcia, 2009) at Yale University: a comparison of proficiency levels in Portuguese and Mathematics before and after three months using Mind Lab's Project. Year 5 was chosen in order to enable a counterpoint with assessment systems used in Brazil, such as Prova Brasil and the SAEB scale. We chose to carry out an exploratory study rather than use a "control group" and an "experimental group" since we have already had enough evidence to support our belief in the development of thinking skills in students who take part in the Project.

The study carried out in 2009 (Abed and Garcia, 2009) significantly confirmed the increase in students' proficiency levels beyond what was expected for three months. Inevitably, new questions emerged: Would these results be replicated in a new study? Would this increase in proficiency levels remain? Would this positive impact be observed in other subject areas such as Natural Sciences? What would be the students' perception about the value of the Methodology and its contribution? How about their relatives and teachers? Would teachers value the role of the Project in their teaching practices?

These questions motivated the study carried out in 2010 (Abed and Garcia, 2010), and its results further confirmed the impact of the Methodology in the student's proficiency levels; but the impact was more significant than the previous results had shown. Furthermore, Portuguese was the subject area with the biggest increase instead of Mathematics; the opposite of what was verified in 2009. The answers provided by students and parents through the questionnaires showed a positive perception of the Methodology's role in the development of thinking skills. The answers provided by teachers showed that they noticed an improvement in their teaching practices.

These results raised new issues which were addressed in the 2011 study that we are now presenting: What will be the increase in students' proficiency in different subject areas? Will we obtain the same results? How do teachers perceive the value of the Project? According to teachers, does the ongoing training provided by Mind Lab contribute to better reflections and pedagogical actions in the classroom?

We chose to repeat once more the scheme used in previous researches: In August 2011, Year 5 students were assessed in Portuguese, Mathematics and Natural Sciences. After three months studying Mind Lab's "Resource Management" Course, students were evaluated again in those three subject areas. The difference between their results was compared with the expected development for the period according to the SAEB scale. Furthermore, students, parents and teachers answered questionnaires designed to gather data about their perception of the Methodology's value to their lives.

Justification

As a matter of fact, society has changed drastically in the last century. However, schools still seem to be taking slow steps towards transforming their roles and functions since they are not clearly defined anymore.

After all, what is the social function of this institution which is so vital to us and our culture? How can we place schools into this new global scenario, which calls for changes, new and modern ways of raising our children for a future that is so uncertain? As an institution responsible for the "great blessing of mankind" – knowledge – how can we complement and integrate, at the same time, knowledge which has been previously developed with the formation of a new generation who is capable of expanding human knowledge exponentially?

> While the reality of social, economic and cultural changes are more accelerated, the school often continues anchored in the former role of transmitting information and knowledge. We are a very special generation of educators: in our personal history, we were "clients" of the so-called traditional school, which considered the student as someone "without light" (from Latin alumnu = no light) and the teacher as the one who "illuminates", who owns and "professes" the knowledge to be acquired by another who would then become "illuminated". Even though we are "children of those times", we are a generation of educators eager to transform the educational space in the direction of human formation, the integral development of not only students, but ourselves, collaborating with the construction of a better and fairer world (Garcia & Abed, 2010: 12).

This arduous (but at the same time rewarding) task requires from us, educators, a huge internal disposition to live transformations, to abandon or modify old practices in favor of the unknown which brings worries and insecurities, but also discoveries and achievements. Obviously, the teacher makes the difference!

Many theoretical and practical projects and initiatives appear every day in an attempt to provide answers to these demands. Theoretical constructions multiply themselves; explaining, questioning and proposing new pathways for Education in the 21st century. New teaching programs and extra and co-curricular projects come to light and offer resources to help teachers to actualize this "new education" in a classroom environment.

Accelerated digital and technological progress, which increase actual distances while approaching people virtually, questions the place and role of the teacher: Internet tools allow access to information and provide training programs

and courses with the “click” of a button; anytime and anywhere. This situation begs the question: Is the teaching profession on borrowed time?

Due to the easy access of information, one thing is certain: transmitting information is no longer the main function of the School, as it once was. Information is now public and not a privilege for a selected few. However, this bombardment of information caused by the Internet has created another demand which schools must respond to: it is necessary to teach the next generations to select, evaluate, manage and construct knowledge. “Forming critical citizens” is no longer a philosophical goal; it is a concrete, urgent and essential reality.

Thus, the social role of the educator is not only recovered but even more pronounced than before because schools transform our children and young people into learners. According to Alicia Fernandez (1990), a learner is the one who, in the triangulation of the teaching-learning process, takes the place of the one who learns and establishes links with the teacher and the knowledge. According to the author, “Everything starts in the triangulation of the first glance” (Fernandez, 1990:28). This beautiful phrase teaches us that the teacher’s passion for knowledge awakens, in the student, the interest and willingness to direct their eyes to the object of knowledge and that creates a learning situation.

Therefore, we can say that the implementation of Mind Lab’s Methodology in schools not only creates space and time within the curriculum to focus on skill development and educate students, but it is also a mediating resource to develop this new position: the teacher of the 21st century.

> Research and many other actions should be taken to deepen the understanding of this new place that teaching has acquired and to offer guidance and support to the teacher in their path. More than being involved in the process, we believe that it is essential that the teacher creates links with the proposal, i.e., understands the value of the educational project as an instrument of mediation which gives strength and opens possibilities for the teacher to take their place as teacher-mediator (Garcia & Abed, 2010: 12).

Thus, the main focus of this third study, which ends the current cycle of studies sponsored by Mind Lab in partnership with INADE, is to give voice to this new teacher and seek evidences to support our belief that “teachers make the difference” and to help us to understand how these professionals are being developed in order to occupy an important place in the society of the third millennium.

Theoretical Rationale

> *"Every educational action is based upon the concepts of human beings, knowledge, intelligence, education and learning"* (Garcia & Abed, 2009:39).

In the course of Education, research which guided the pedagogical work were conceived and based upon theoretical approaches and philosophical, methodological, epistemological and gnoseological principles (Gamboa, 1997). The theoretical concepts that underlie Mind Lab's Methodology were exposed and discussed in the previous studies (Garcia and Abed, 2009, 2010). We will revisit briefly some of the main premises and the theoretical support.

Historically, the main currents that influenced schools' formation were: innatism, environmentalism and interactionism. The Methodology chosen by Mind Lab is based on the interactionist approach in which human beings are seen, dialectically, as the ones who construct and are constructed by and through their interactions. As a result, we consider both aspects regarding the individual (innatism) and their environment (environmentalism), giving special emphasis to the history of interactions between the individual and their surroundings in the formation of human beings and their learning.

> (...) by including the history of interrelationships, a third factor is added and it modifies both the form of thinking about the individual (no longer genetically determined), and the environment, which also changes when relating to individuals. Thus, interactionism exceeds the a priori of previous concepts, bringing a dialectical dimension of both the individual and the environment, mutually constituent and constituted trough and within relationships (Garcia & Abed, 2009: 40).

Generally we can say that the "traditional school" is historically anchored to a vision that prioritizes the transmission of information and considers learning as the mere storage of acquired information. With the arrival of the "3rd current" (interactionism), there was the need to search for theoretical developments and practices that could exceed the unilateral, fragmented and partial view of Men, Society, School, Learning, Teaching.

In this journey, Education felt the need to strengthen pedagogical practices focused on training teachers to be mediators of the interactions experienced by students in school and the development of intelligences, in order to provide qualitative 'leaps towards learning' and equal conditions, promoting equality and democratization in Education. In our understanding, there have been many theoretical advances regarding the comprehension of the processes involving

human learning. However, these advances often do not reach the pedagogical practice, which is still permeated by theoretical and practical references that are frequently meaningless to the teacher who is the main protagonist of the educational action at school. Teachers end up reproducing what they experienced as students which were teaching practices based on ideas that were significant to that historical moment (normally based on innatism or environmentalism), but are not relevant to our current needs.

Today, as we enter the twenty-first century, society has changed and its needs are different. It is essential to transform the classroom's practice so that it can handle these new demands and look upon this new understanding about learning and teaching. It is necessary to consider proposals in which the teachers try out, experience and construct meanings; firstly to themselves so that when they notice their own transformation they can change their teaching practices. Going through the experience of being mediated in his/her learning process, teachers notice the difference and the importance of meaningful and intentional learning through the interventions of an "other" who is interested in what he/she learns.

Mind Lab's Methodology is theoretically supported by contributions from other authors whose works are relevant to the understanding of human development, teaching and learning processes, the school's role and the importance of the learning space. We will briefly address some of these authors' contributions.

Jean Piaget, a Swiss scholar, sought to understand the structure of human thought, from infancy to adulthood. He was not interested if an answer was right or wrong; he was actually interested in understanding the logic behind the reasoning used.

To Piaget (1970), human beings develop their cognitive structures in the course of their interactions with objects of knowledge and through two dialectically complementary and integrated processes: assimilation: use of structures that the individual already possesses, and accommodation: transformation of these structures and / or creation of new structures depending on the demands. Because of this idea, his theory became known as "constructivism."

By studying the characteristics of logic and the development of cognitive structures, Piaget postulated four stages which are well-defined and have their own characteristics: Sensory motor, Preoperational, Concrete Operational and Formal Operational. At each stage, the quality of interaction is characterized by the features present in the individual's cognitive structures. Each stage simultaneously contains the previous one and prepares for the subsequent staged. The ages of the individuals in each stage vary depending on the quantity and quality of their interactions with the environment, but the sequence for the construction of mental structures is invariable (Richmond, 1987).

An important pedagogical implication of this approach is that both learning and thinking development involve the student's participation. Knowledge is not only transmitted orally: it must be constructed and reconstructed by the student. Piaget said that, for children to know and build their knowledge of the world, they should "try" it out with objects: their actions support their knowledge about these objects, which are organized by their minds and then act on reality. Students must be active; they are not a vessel that can be filled in with facts.

According to Wadsworth (1993), Piaget claims that, in order to learn, children must have an internal cognitive structure that enables the assimilation and / or accommodation required so as to incorporate knowledge. If Piaget emphasizes active learning in appropriate environments, we can say that in-school experiences should be planned to allow these processes to occur. Students need to explore, manipulate, experiment and question to seek answers for and by themselves.

Piaget was concerned with researching and describing the genesis of logical structures of thought: how can human beings develop logical thinking? Although this has not been the main focus of his research, for Piaget, cognitive development accompanies all other aspects regarding human development – emotional, social and moral.

The influence of culture and interpersonal communication in child development has been intensely studied by Lev Vygotsky (1896-1934), a Soviet psychologist who is considered the founder of Socio-historical Psychology. Vygotsky (1998) said that higher psychological functions are developed historically, within certain cultural groups, and individually, through social interactions with important people in children's lives; especially their parents, but also other adults.

Through their interactions, children learn the elements of their culture, including speech patterns, written language and other symbolic knowledge from which children derive meanings and construct their knowledge. This key premise of Vygotskian psychology is often referred to as cultural mediation. The expertise acquired by children through these interactions also represents knowledge that is shared by a culture. This process is known as internalization.

The main idea of this theory refers to social interaction and how it plays a key role in the development of cognition. The Zone of Proximal Development, or ZPD, is the difference between what a student can do with or without help: children follow the example of an adult and, gradually, develop the ability to perform certain tasks without help or assistance. Vygotsky (1998) believes that the role of the Education is to provide children with experiences which act in their ZPD, encouraging and improving their individual learning and the development of higher psychological functions.

If, on the one hand, Piaget brings us important contributions related to the development of human's cognitive structures and, on the other hand, Vygotsky enlightens us about the cultural and social aspects involved in the development

of cognition and higher psychological functions, Howard Gardner, an American Psychologist, widens our reflections when he questions the traditional definition of intelligence. Historically, the concept of intelligence was associated with the development of logical thinking and an innatist notion of "intelligence quotient" (IQ) which resulted in the development of several "intelligence tests" and caused students to be the only ones blamed for their academic failure. Gardner developed the Multiple Intelligences Theory that revolutionized all research related to intelligence and education worldwide.

Gardner (2000) defines intelligence as the ability to solve problems. Human beings face different problems and demands and for that reason different intelligences are activated, stimulated and developed. In his research, Gardner initially defined seven intelligences and clarified that they do not deplete the range of human potentials: Logical-Mathematical, Verbal-Linguistic, Musical-Rhythmic, Visual-Spatial, Bodily-Kinesthetic, Intrapersonal and Interpersonal.

According to Gardner, all human beings are born with the full spectrum of intelligences, initially with more or less potential. However, these intelligences will be more or less developed depending on the history of their personal interactions. According to Gardner, people are born with different talents but how these talents will develop depends on their socio-cultural environment.

The implications of this approach to Education are significant. If what drives people to develop their capacities is the education that they receive and the opportunities they are given, it is the school's responsibility to stimulate all students' potential abilities when content is being taught. If there are multiple ways of learning, there should be multiple ways of organizing the educational scenario, a wide variety of languages and mediating resources should be used by teachers in order to ensure that all intelligences were included and developed. That way they can prepare individuals to be more complete human beings, capable of dealing with all kinds of problems.

Therefore, what students learn at school should not be "confined within school walls." David Perkins, from Harvard University, is an important researcher about "transfer of learning." He uses this term to refer to the application of knowledge from one context (school, for example) to other situations and experiences which are different from the ones in which the original learning has occurred.

In his research, the author analyzes several types of transfer not only at theoretical level, but also in its practical applications, emphasizing the importance of understanding in which areas the transference of knowledge takes place. According to Perkins (1981), the "Near Transfer" refers to implementing knowledge gained through one experience to another, very similar experience (e.g. a quiz given on a recently studied topic where the teacher poses questions based on examples presented beforehand) whereas "Far Transfer" refers to implementing knowledge in what seem

to be significantly different fields or situations (e.g. applying something you have studied in a concrete situation from everyday life).

According to Meier and Garcia (2007), Professor Meier Ben-Hur, PhD in Educational Psychology, establishes two levels of transfer: by analogy and by scheme. Regarding the analogy, the "new" is similar to the previous; the transfer is linear and tasks are solved using the same process. On the other hand, transfer by scheme is when the individual learns not from the similarities, but from the variations and the contact with different structures which allows the learner to extract a concept that can both integrate and join concepts or tasks.

According to Meier and Garcia (2007), Ben-Hur points out some guidelines to help teachers to instigate meaningful transfers from students. Firstly, it is necessary "to wait for an answer": that is not always an easy task for teachers who are always eager to teach. Teachers must accept the silence which follows a question, allow different students to answer, listen carefully, manage debates and integrate the different speeches (including their own). It is important to give more value to the process ("Why do you think that?" "How did you get to that answer?") than the response (Excellent answer!). It is important to lead students to apply principles constructed in other contexts and situations, helping them to construct and create examples for their application. In other words, achieve what Feuerstein calls "transcendence."

Reuven Feuerstein is an psychologist and professor who developed theories related to learning and learning difficulties which expand knowledge and techniques regarding fundamental aspects of an individual's capacity to "learn how to learn." Feuerstein has been one of the most successful researchers in Mediated Learning. According to Garcia (2004), Feuerstein proposes that human beings learn more efficiently when the learning process is mediated. The mediator helps the learner to interpret the stimulus and give meaning to the experiences, contributing to the learner's development of knowledge and cognitive functions. Feuerstein's work is based upon a basic principle: "every human being is modifiable."

To Feuerstein (1980), the processes of logical thinking, learning and problem solving are supported by a range of cognitive functions. Intelligence is conceived as a set of basic cognitive functions that emerge from the child's innate activities, from their learning history, from their attitudes to relationships and from their own motivations. Cognition regards the processes by which an individual receives (input), prepares and communicates (output) information in order to adapt him/herself.

Feuerstein states that intelligence can be modified through mediated interventions: mediated learning creates a bridge or connection between a child's world and the outside world. This mediation is carried out by a human mediator: teacher, colleague, parents ... Thus, in schools, mediated learning is an intentional educational process in which the

teachers provide students with tools to help them build knowledge and establish links between several fields of knowledge and human experience. In other words, they perform “transcendences” (or transferences).

Feuerstein has established 12 criteria of mediated learning experience (MLE): these aspects must be part of the interventions for them to be called mediation. There are several aspects of the mediator’s intervention that must be observed to make this interposition more efficient. Meier and Garcia (2007) present and explore the criteria of MLE aimed at the teaching practice and propose a 13th criterion: creating bonds. Below we present a brief summary.

1 – Intentionality and reciprocity

Intentionality and reciprocity are the main conditions for longer lasting learning or an interaction. Teachers must have the intention to teach: they must be clear about “what” they intend to achieve “ and “to whom”; that will guide the teacher’s “how”. It is the teacher’s responsibility to act systematically and in a planned way; observing the needs or objectives of the educational proposal. The greater the clarity of objectives and assertiveness of the teacher-mediator’s actions, the greater the motivation and engagement of the mediated individual (the student).

2 – Meaning

It is important that learning situations are relevant and interesting. Meaning creates a new dimension to the act of learning, leading to an active and emotional involvement with a task. Most of all, students must learn to find meaning in what they do, both for the task itself and for its importance and purpose.

3 – Transcendence

Mediators should be concerned to address not only immediate needs, but also the broader goals. Transcendence means that students learn to seek and relate meanings, develop strategies that can be used in new situations and achieve a certain level of generalization that allows them to establish rules and principles that collaborate in the appropriation and development of knowledge about the reality that surrounds them and in different dimensions of the human experience.

4 – Competence

The feeling of competence is directly related to motivation: children often do not learn or demonstrate their potential because they do not believe in themselves or because they feel underestimated. It is necessary to consider the importance of the teacher’s performance when organizing tasks that are appropriate to students’ capacity, allowing them to succeed in their efforts. In the classroom environment, this means that the teacher has to be careful when

preparing and selecting activities, as well as handing in materials which are suitable to students' age, interests and abilities.

5 – Regulation and behavior control

This regulation of behavior is related to the teacher's ability to show students that they need to adapt their behavior: regulation and planning as opposed to impulse, i.e., when an individual gives an answer without thinking it through. In that sense, we expect to lead students to reflexive thought. It is the mediator's job to keep his/her commitment in mind and teach students what to do, when, how and why.

6 – Sharing

Generally, sharing refers to teacher-student and student-student interaction. The mediation proposed by Feuerstein stimulates relationships between people and giving them the chance to create common experiences while they construct knowledge because they establish relationships between individuals and also knowledge.

7 – Individuation and psychological differentiation

It is important not only to promote socialization but also to raise consciousness of an individual's own individuality. The mediator should aim to lead the student into accepting the fact that he/she is a singular and differentiated person. The student must understand that he/she is an active learning participant who is able to think independently from peers and teachers.

8 – Goal Planning

"Planning" requires elaborated thought processes which go beyond students' immediate responses. The MLE (Mediated Learning Experience) is an option to help individuals to direct their attention to the achievement of future goals; in the short and long terms. The mediator's role is to inspire students to establish goals and make efforts to achieve them, therefore encouraging perseverance, patience and commitment.

9 – Looking for the new and the complex

It is very important that the teacher helps the student to look for what is different in this task when we compare it with the previous one. That way, the mediator stimulates intellectual curiosity, originality, creativity and divergent thinking. This creates the need to plan their own activities and experiences and discuss them with their peers.

10 – Awareness of Modifiability

Through self-assessment, it is possible to help students to realize that they are able to produce and process information and to become aware of their potential and their difficulties. That way, students will discover what should be modified. From that moment on, the organization of their cognitive processes, mechanisms of internalization, self-control and regulation will be their responsibility.

11 – Choosing the positive alternative

When people choose a pessimistic path, they make no effort; they do not work and they are not focused on achieving their objectives: inertia paralyzes them. Thus, when we choose the positive alternative we also choose the path with the greatest chance of success. This must not be confused with "the hope that something good will happen", which is a waiting game, i.e., the individual makes no effort to achieve the goal. Choosing the positive alternative means to recognize the best ways to achieve our objective and to make an effort to ensure that the desired result is achieved.

12 – Sense of belonging

A sense of belonging is influenced by cultural environment: being part of a group, a nation, a religion can give the individual an inner strength to fight for their ideals. On the other hand, this same sense of belonging enables us to gain our freedom: someone who is very self-centered does not realize the importance of other points of view. In order for these individuals to grow and reflect upon other points of view, they need a "vertical dimension" in their life, which allows them to transcend their immediate needs to create a life project that integrates both personal and social dimensions:

13 –Creating bonds

Sandra Garcia and Marcos Meier (2007) proposed a 13th criterion: the development of a teacher-student relationship. For Garcia and Meier, a good bond is the first and necessary condition, without which no other criteria will be effective. Human learning involves, first and foremost, a relationship.

Dialogue is essential to create a bond between teacher and student and there is no dialogue without humility; self-sufficiency is incompatible with dialogue. The teacher must know that he/she is as "human" as the others and that he/she can perform meaningful exchanges with their students. Without abdicating their role as teacher, he/she must create bonds based upon mutual respect and regard to individual differences and encourage students to grow, based on the awareness that they are modifiable.

The issue of personal positioning and critical awareness in Education has been widely studied by Paulo Freire (1921-1997), a Brazilian educator and philosopher who is known for his work in Popular Education. For Freire (1970), a critical

reflection upon teaching practices is essential, without which theory becomes “blah blah blah” and practice becomes activism. Freire also emphasizes the ideological and political character of any pedagogical relationship. Therefore, teachers must be aware of the ideology that underlies their practice in order to transform it.

Freire says that there are no educators without learners; teaching is not merely transference of knowledge or content. Education is seen as an interaction where creative individuals give form, style and soul to “undecided and accommodated bodies” – i.e., knowledge. Teaching and learning happen in a way in which the person teaching also learns. Firstly because teachers need to constantly revisit knowledge they already have; secondly because by observing their learner, they discover uncertainties, successes and mistakes, that help them rework their own knowledge and expand it.

Thus, teachers must remain humble, open and permanently available to rethink their thinking, constantly reviewing their positions. They should also allow themselves to get involved and follow students’ curiosity and the different paths they tread. However, the fact that “teaching also teaches the teacher” does not mean that teachers do not need to prepare themselves for the task. On the contrary, their duty is increased due to the recognition of their ethical, political and professional responsibility.

Paulo Freire’s main contributions to Education were in the literacy field, Popular Education and the function of the school in an individual’s political formation. Freire questioned what he called “banking education” which is based upon mechanical and meaningless repetition, and grounded on the principle that there is no neutral education. Freire was one of the pioneers in the view that Education is a political act; an approach which is now widely studied in academic circles.

The theoretical contributions from the aforementioned authors highlight the school’s importance in setting up meaningful learning spaces which collaborate with the active construction of knowledge by students, promoting a relationship between different subjects so that knowledge is not be treated as an isolated element, but as a network of meanings which restore the links between subject areas, school and life.

How did these authors influence Mind Lab’s Methodology? Let us draw attention to some of their contributions...

Based on Piaget’s ideas we perceive the student not as a mere receiver of information and knowledge, but as an active constructor of their cognitive structures through their interactions with the environment. Thus, our sessions are organized to promote interactions and set challenges and imbalances that cause students to construct these structures. The Thinking Games, the session’s flow, the meta-cognitive methods… every element which is part of our Project perceives students as active individuals in the construction of their knowledge.

Vygotsky's work, on the other hand, strengthens the role of language, cultural integration and the mediation of social groups in an individual´s intelligence development. These aspects of the teaching and learning process are widely explored in Mind Lab's Methodology. The games promote Zones of Proximal Development in which students solve problems autonomously and, at the same time, they are constantly exposed to new situations which are located in the "Potential" zone and therefore boost their development. During sessions, students play with their classmates, in pairs or in groups of four and that promotes the "mediation in pairs "in addition to the teacher's constant mediation.

Inspired by Perkins, during Mind Lab's sessions the teacher promotes intentional mediations to foment knowledge transfer: "Near Transfer" (from one game to another) and the "Far Transfer" (from the game to real life).

Feuerstein's Theory of Cognitive Modifiability contributes significantly to the project, since it shows the importance of the teacher as a mediator between knowledge and learners. Mind Lab's sessions allow teachers to be mediators between students' inner world and the real world. The mediation criteria also offer clear references for their pedagogical practices.

During sessions, students play at least twice and sometimes even more. The first game takes place immediately after learning the rules; after studying strategies and Meta-cognitive Methods, students play again. Throughout the session, especially while students play, the teacher walks between them and "mediates learning" using "mediation questions".

Our Project is based on the continuous assignment of meaning to experiences as well as the promotion of transcendences, i.e., reflections beyond here and now which were developed through the games: two mediation criteria which are essential to learning.

Based upon Gardner's assumptions, Mind Lab's Methodology understands the importance of using several intelligences simultaneously, so that all students can relate to the topics they find more appealing according to their personal intelligence profile. Perhaps this is why students with learning difficulties can demonstrate, through games, abilities that were not observed in formal teaching and assessment methods.

Finally, we can say that Paulo Freire's contributions can be seen across the whole Methodology as it is based on raising awareness and strengthening skills in order to develop a critical and ethical position towards life. The situations set by the thinking games place the teacher as the students' partner on their route to new discoveries and the construction of knowledge.

We understand that the game opens up a privileged space for the development of a teacher-student bond, since the teacher positions himself/herself in conditions of equality and proximity with their students. Teachers get to know their students better because the game reveals the "complete being" and enables alternative solutions for different situations.

Thus, the Mind Lab Methodology recognizes the essential role of the teacher-mediator, as well as the fact that all educators need to invest in their ongoing training, not only from a theoretical point of view, but especially to critically revisit their teaching practices. Our pedagogical team works in partnership with teachers in this path.

Mind Lab's Methodology

Mind Lab is a subject included in the school curriculum, with a 50-minute weekly session taught by the school´s teacher, under the supervision of Mind Lab's pedagogical team. It is "a curriculum-pedagogical proposal for the development of cognitive, social, emotional and ethical skills through thinking games, with emphasis on meaningful learning and the role of the teacher-mediator."

Thus, Mind Lab's Methodology aims to create space and time in the school curriculum, focusing on the development of cognitive, emotional, social and ethical abilities and significantly contributing to students' formation. Its main objectives are the enhancement of students' mental operations and cognitive functions, based on the Theory of Cognitive Modifiability and the understanding of teachers' crucial role in this process.

We can say that the Project is part of a broader "Educational Program"; an educational technology that provides innovations in teaching practices not only during Mind Lab's lessons, but in general, because it "touches" and transforms the teacher (both professionally and personally), as shown by this third study. This educational technology has several objectives:

– To present and explore educational resources that can contribute to the pedagogical practice of the teacher-mediator;

– To promote a process of initial and ongoing training with the school's teaching staff in order to develop meditating pedagogical practices to construct knowledge and to form individuals (teachers and students);

– To organize meaningful learning experiences and environments for students and teachers;

– To promote the development of the specific skills needed to understand concepts and contents in the school's curriculum, guided by National Curricular Parameters and Guidelines;

– To develop the ability to "learn how to learn", encouraging reflexive processes and awareness (meta-cognition);

– To broaden the ability to establish links between different school subjects and to transfer meanings, transcending them for their personal life and social relationships;

– To encourage the development of basic abilities of autonomous and critical thinking;

– To develop and strengthen cognitive, emotional, social and ethical abilities;

– To construct meta-cognitive methods and strategies with students to help them to deal with many different situations and modern life challenges;

– To explore, alongside students, the construction of new learning from past experiences, reflecting upon their implication and applicability in several subject areas and in everyday life.

– To help in the formation of attitudes and essential values to life in society and to promote the peace culture;

– To respect human diversity, promoting self-awareness, self-esteem and respect for others;

– To strengthen the emotional maturation at each stage of children's and adolescents' development, helping them to deal with their personal growth process;

– To develop and strengthen cognitive, emotional, social and ethical abilities;

– To prepare young people for the Job Market through the development of fundamental skills such as: decision-making, acting under pressure, teamwork, dealing with information, resource management, planning, etc.

Mind Lab is based on three main pillars: Thinking Games, Meta-cognitive Methods and the Teacher- Mediator. Thinking games are used in the classroom, with the aim of organizing concrete and intense experiences. Games and game-playing experiences "simulate" reality and everyday situations and the classroom experiences are used to sustain the construction and expansion of students' internal resources – strategies and meta-cognitive methods – which were initially studied

to help them to play better. Through intentional actions, the teacher-mediator promotes learning transferences that go beyond the "here and now" of the game to other subjects, other contexts and other aspects of human experience.

> Learning built during the lessons is explored by the teacher-mediator, intentionally, so students establish possible transcendences, i.e. taking learning beyond the immediate experience. Finally, there is an emphasis on exercises and recording data in the Student's Book in order to systematize, consolidate and promote authorship in relation to the topic studied (Garcia & Abed, 2010: 20).

At the methodology's heart are our "Methods", defined as meta-cognitive resources, organizers of thought and action, which help to raise awareness and to deal more effectively with everyday situations which are simulated during the game. Each method is intentionally named using a metaphor as that is a linguistic resource that facilitates polysemy, i.e. the attribution of meaning and transposition "beyond the here and now" (Abed, 2002, 2004). For example, the Stoplight Method refers to a stoplight, which organizes the traffic for vehicles and pedestrians, settling times to "stop", "watch out" and "walk". Likewise, the Stoplight Method helps people to organize themselves internally when they are facing problems, so as not to harm themselves by impulsive responses or get stuck when they need to consider and reflect upon an aspect before responding.

The teacher-mediator explores, intentionally, what was learned during sessions so that students can establish possible transcendences, i.e., extending their learning beyond the immediate experience. In order for this to happen, we deepen theoretical aspects of the teacher's intentional actions to stimulate the advancement of the student's learning in different areas – cognitive, emotional, social and ethical through an initial and then the ongoing training sessions. All teachers receive a book called "Mediação da Aprendizagem" (Mediated Learning) as theoretical support for their practice and it can (and should) be replicated in other classes outside the Project. Finally, there is an emphasis on the exercises and record-keeping in the Student's Book, in order to consolidate, organize and promote authorship in relation to the contents studied.

Mind Lab sessions are taught by the school's teachers who attend an Initial Training, before starting and then they meet monthly for supervisions throughout the implementation of the Project. Teachers receive a "Teacher´s Guide" including:

– Lesson's subject and description;

– Session's objectives and skills prioritized by the teacher's pedagogical actions;

– Concepts, methods and strategies which were introduced / explored in the sessions;

– Preparations and accessories needed;

– Step-by-step description of sessions;

– Suggestions for the teacher's mediation during contextualization, game playing and the reflection upon students' experience, promoting meaningful transcendences;

– Guidelines on how to use the Student's Book, focusing on systemization and record-keeping as an important part of the learning process, in which students assign personal meanings and assume authorship for their own thoughts.

Schools receive a "School Kit" including a "Game Library" with enough sets of all games used in the methodology for students to play during sessions. Touchable games and game boards are used in Early Education, Elementary School and Middle Schools. For High School, however, digital resources are used and the courses are given in tablets.

There are a number of materials especially designed to aid teachers, such as playing mats and giant pieces from several games used in Early Education, for example. Mind Lab's website offers other forms of support and is a space for the Mind Group community to exchange experiences and thoughts. The "Theoretical Collection" and some educational software are frequently being developed to complement and expand teaching resources offered to schools.

Students have their own "Student's Kit" with the textbooks that will be used in the academic year, according to the Project's curriculum. Students also get one of Mind Lab's thinking games in their kit. For each Grade there is a different "Kit's Game", which is part of the curriculum for that academic year and it aims to promote game-playing in extracurricular environments, improving the relationship between children and teenagers with their family. That way, learning acquired in school exceeds its walls and has a positive impact not only in the students' daily life but also in their parents', siblings', cousins', friends' etc. A "Booklet", focusing on the integration of students and their families into the methodology completes the Student's Kit. Teachers also receive a folder with these materials so they can use them to support the preparation of lessons and to guide teacher's actions regarding the proposed activities for students. In addition, after each year of partnership between the school and Mind Lab, the teaching staff receives a new volume from the "Theoretical Collection," in order to broaden and deepen their theoretical and practical training.

We also organize systematic training events for teachers to promote fraternization and to include the entire Mind Lab community, e.g.: Symposia, The Mind Olympics, and Pedagogical Meetings, amongst others.

Previous Research

In articles regarding the study carried out in 2009, Garcia and Abed (2009) mentioned Danny Gendelman's research (Northumbria University – England, 1999), which showed the impact of Mind Lab's Meta-cognitive Methods and how they help to improve learning, and Donald Green's research (Yale University – USA, 2004), which used Maths and Language tests to compare the performance of students who played thinking games with and without Mind Lab's mediation and methodology.

What guided this first cycle of studies in 2009 was the fact that, in Brazil, Mind Lab's Methodology is applied in a co-curricular way, i.e., it is a subject included in the school curriculum and taught by a school teacher. The 2009 study sought to answer this question: under these conditions, i.e., with the Project being implemented by school teachers with Mind Lab staff's supervision, would we observe the same impact on students' proficiency?

> Thus, driven by these questions, Mind Lab Brazil's pedagogical staff developed, in 2009, a study involving 10 public and private schools, with approximately 1000 students, using similar methodological procedures from Yale's research. The results confirmed the positive impact of the methodology used for three months by the school teachers. Students' proficiency improvement was better than what was expected for the period: 100% for Maths and about 20% for Portuguese (Garcia & Abed, 2010:22).

Since this first study, Mind Lab Brazil was interested in gathering information about the individuals' perception regarding the Methodology's contribution to the development of their abilities to deal with situations such as defeat and victory, their academic performance, their interpersonal relationships and teamwork. The results obtained from students' questionnaires in 2009 raised new issues which guided second study (Garcia & Abed, 2010:22):

- Was the number of individuals sufficient to prove the effectiveness of the methodology in the development of skills? If repeated with more individuals, would we get the same results? Would the proportional increment in proficiency, which was higher in Mathematics than in Portuguese, be the same?
- Could proficiency increase also occur in other areas? In what proportion?
- Do family members realize the benefits of methodology for the development of cognitive, emotional, social and ethical skills? How?

– Do teachers, when experiencing the methodology in their formation process, notice significant changes in their life and actions?

– Do teachers notice any impact to their teaching practice when applying the Methodology? How?

Thus, the study conducted in 2010 expanded the number of schools (51: 28 private and 23 public) and students (3212), it involved parents (2552) and teachers (556) and another subject area (Natural Sciences) was added. The research's format remained the same:

– Tests in three subject areas (Maths, Portuguese and Natural Sciences) using tools developed by INADE in partnership with Mind Lab Brazil, based upon the "IRT", Item Response Theory. One test applied in August (before students start the Project's sessions) and in November (after three months using the Project and studying the "Resource Management" Course for Grade 5.

– There were questionnaires related to all dimensions (cognitive, emotional, social and ethical), aiming to gather information about students', parents' and teachers' perceptions regarding the contribution of Mind Lab's Methodology;

– There was also a questionnaire for teachers including specific issues related to their teaching practices.

After three months of the project's implementation, the results confirmed an increase in the average proficiency that went beyond the expected for the period. However, it was observed, on this occasion, a much higher increase in Portuguese (478%), whereas in Natural Sciences and Mathematics the increase was between 160 and 185%.

When we compared the results from students in public and private schools, some aspects called our attention:

– The starting point on public schools is significantly lower in the three subject areas.

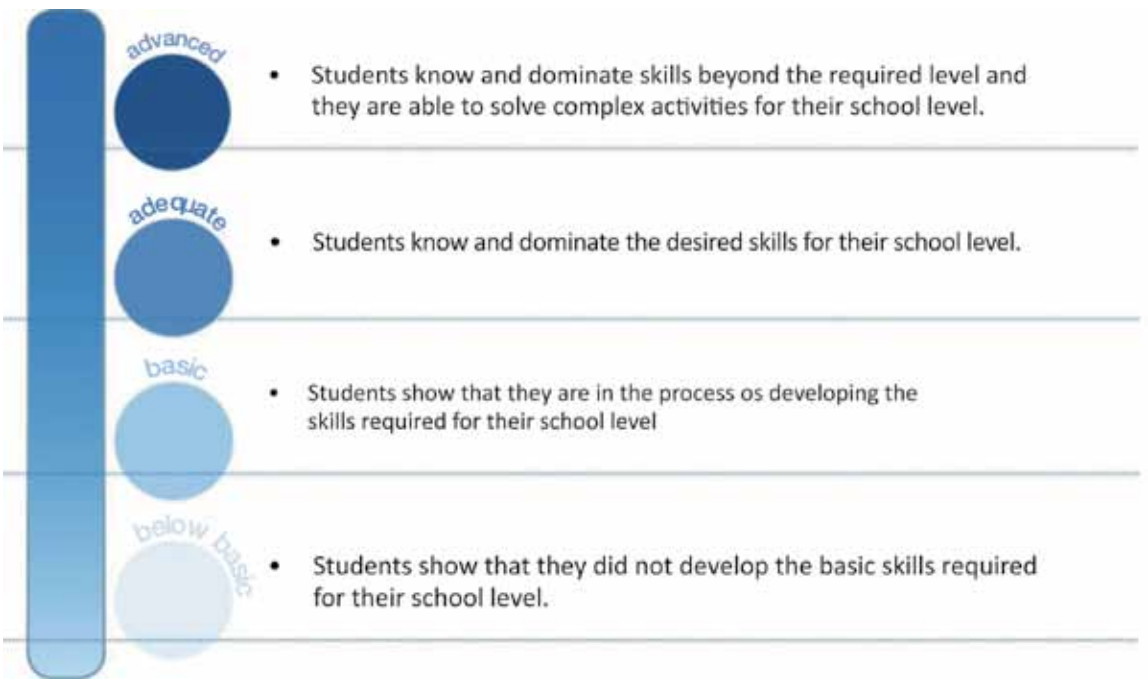
– The difference in proficiency between the first and the second test is higher in public schools.

– In Portuguese, the difference between the two tests were close to average (21.7), slightly higher in public schools (23.5) than in private schools (20.4).

– In Natural Sciences and Mathematics, the progress in public schools was significantly higher: about 2.5 times higher in Mathematics (19.3 versus 7.6) and approximately 4.3 times higher in Natural Sciences (19.7 versus 4.6) (Garcia & Abed, 2010: 26).

Regarding students' proficiency levels shown by the SAEB scale, it was once again verified that there was a decrease in the levels of students rated at "Below Basic" and "Basic", concomitant with the increase in the number of students rated at "Adequate" and "Advanced", confirming the results obtained in 2009.

Figure 1: Characterization of Learning Levels



When analyzing the relative position of students in these levels, there was a greater uniformity of the final results in the three subject areas (around 50%). The initial percentage was higher for “Below Basic” and “Basic” levels (71.9% in Pt, 60.7% in Maths and 58.2% in NS) than for “Adequate” and “Advanced” levels (28.2% in Pt, 39.3% in Maths and 41.8% in NS). After three months of the Project’s implementation, there was an increase in the percentage of students rated at “Adequate” and “Advanced” levels which was slightly superior to 50% in the three subject areas (52% in Pt, 50.5%, and in Maths and 51.5% in NS).

At first sight, we could raise the hypothesis that the significant difference verified in Portuguese could be related to the high percentage of students rated at “Below Basic” and “Basic” (71.9%). But this hypothesis cannot be confirmed when we compare the results obtained in 2009, in which the starting point in Portuguese (72%) was practically the same as 2010.

> What could explain such a significant in language proficiency in 2010? We have witnessed the great effort from Educational authorities in Brazil, in the search for projects that can contribute to the improvement of reading and writing, which are understood as the main aspects of any academic learning. The application of Mind Lab’s methodology could be seen then as one of these tools used by schools to improve the teaching of Portuguese.
> In this sense we have noticed, in the Mind Lab project as a whole, several features related to language development: increasing vocabulary and communication processes; presentation and systematization of concepts and notions in a concrete and meaningful way in the game context; promoting reflections, both oral and written, and encouraging reasoning, amongst others (Garcia & Abed, 2010: 29).

Questionnaires given to teachers, parents and students were used to assess their perceptions regarding Mind Lab’s importance to cognitive, emotional, social and ethical dimensions and they contained more detailed proposals in relation to the skills developed through the Project’s sessions. The results show that the individuals involved recognize Mind Lab’s contribution to the development of their skills. It is noteworthy that students were those who most recognized the session’s value in their development in all four dimensions.

> We have noticed that the results from adults – teachers and parents – were quite close to each other (parents slightly lower than teachers) and in all dimensions, students were the ones who more strongly recognized the contribution of the Project in the development of their abilities. This is an interesting finding, since they are the main target of the Project's pedagogical actions (Garcia & Abed, 2010: 32).

The answers given by teachers in relation to their teaching practice showed that they recognize Mind Lab's contribution to "promote their self-esteem and their belief in students'modifiability, as well believing in their personal choice of becoming a teacher " and the "expansion of their internal resources to deal with conflicts in the classroom". These data indicate that we are on the right route when we highlight and emphasize the importance of the teacher in the development of consistent and meaningful teaching and learning processes.

> Researches on Education show, more and more, the teacher's importance for students' learning. (…) We believe that the use of the Mind Lab's methodology in the school curriculum adds significant value to the development of students' skills and contributes greatly to teachers ' pedagogical practice, since the methodology instrumentalizes the teacher, develops internal tools and proposes situations where mediation is recurrent. (Garcia & Abed, 2010: 38).

The results from these two early studies encouraged another study in 2011, with the development of more accurate tools to gather information regarding teacher's perception of the Project's influence in their teaching practice, and, when we consider everyone involved (teachers, students and their families), their perception regarding the development of cognitive, emotional, social and ethical skills; as well as a significant increase in the number of participants (schools, students, family and teachers), using the same research methods to assess Portuguese, Mathematics and Natural Sciences.

The Study in Brazil – 2011

The evaluation of the effectiveness of an educational project is generally quite complex and it involves several studies and different stages. When we consider a project like ours which aims to make cognitive, emotional, social and ethical learning processes dynamic, this complexity comes from the interactions with other educational processes, other projects and programs with which our Project may even be competing against. For the most part, the Project's effectiveness depends on teachers' acceptance: not only those directly responsible for its implementation but also the other teachers.

In the specific case of Mind Lab's Methodology, its effectiveness has been studied since its implantation in 2009 through the analysis of the observed increase in cognitive proficiency after three months implementing the Methodology for Grade 5 students. For that, an assessment tool (test) is applied at the beginning of the project, typically in late August, and then another test after three months of effective work with students, typically in late November. To measure cognitive proficiencies we used models of the Item Response Theory, which allows us to compare our results and, also, to compare these results with large-scale assessments carried out by INEP (National Institute for Teaching and Research), and reported in the SAEB national scale.

Chart I – Number of Participating Schools

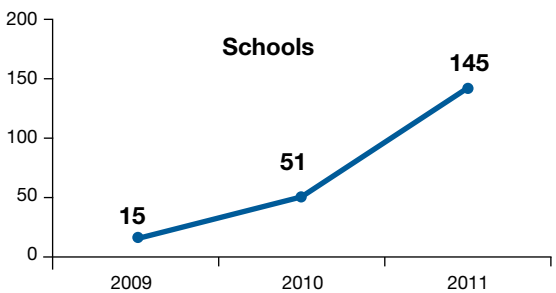


Table I – Number of Individuals

Groups	2009	2010	2011
Students	1377	3212	8988
Parents	0	2552	7625
Teachers	0	556	1568

Our aim is to analyze the effectiveness of Mind Lab's Methodology according to the following aspects:

- We only analyze the increase in proficiency taking into account the "expected" increase, i.e., the average estimated proficiency increase for Brazilian students over three academic months, according to the SAEB scale and taking into account the increase between Grades 5 and 9;
- The effects are measured only for the three-month period for Grade 5 disregarding the fact that teachers and students might have previous experience with the program in other Grades or earlier participations..

It was necessary to outline these aspects for two important technical reasons: firstly because there is not a national reference for proficiency increase for all Grades and secondly, the limited number participating schools until 2011 (see chart I). Evidently, the investment in more comprehensive studies only becomes viable after we achieve a critical number of participating schools, but also after exploratory studies indicate the project's substantial effect, which was actually observed in the studies conducted until now.

Recently, the longitudinal study of GERES (Franco et al, 2008) assessed the increase of cognitive proficiency from Grade 2 to Grade 5 in Mathematics and Portuguese in students from public and private schools in five Brazilian cities. Based on these results, there was an average increase of 15 points in the proficiency levels for Portuguese from the end of Grade 4 until the end of Grade 5. Private schools showed an increase of around of 12 points. Based on this result, the estimated average increase for Portuguese is around 5 points per trimester according to the SAEB scale. Likewise, we have estimated an average increase of around of 7 points for Mathematics.

In this context, the results obtained in 2011 (Chart II) show that the project increases the development of cognitive skills in the three subjects tested, confirming the results from previous studies (see Table II).

Chart II – Average proficiency for the two test applications

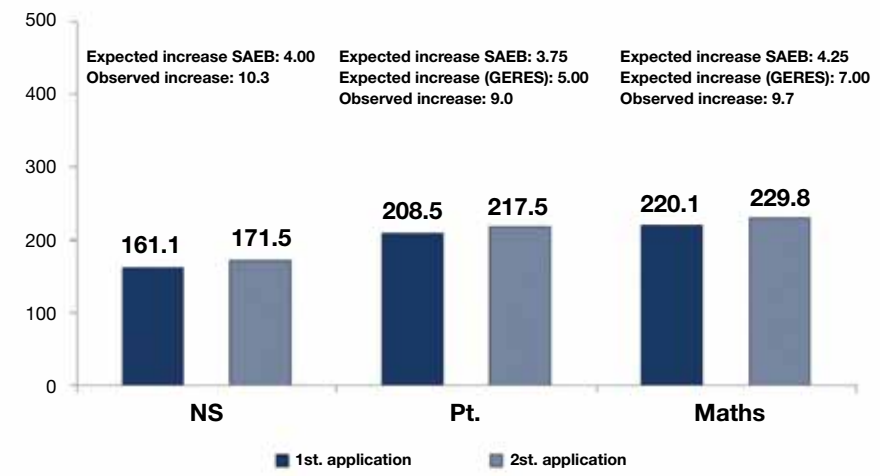


Table II – Average proficiency 2009/2010/2011

Subject Area	1st Test			2nd Test			Difference		
	2009	2010	2011	2009	2010	2011	2009	2010	2011
NS	-	176,2	161,1	-	186,7	171,5	-	10,5	10,3
Pt.	209,0	209,4	208,5	213,5	231,1	217,5	4,5	21,7	9,0
Maths	231,4	232,2	220,1	239,9	244,3	229,8	8,5	12,1	9,7

On the other hand, besides an increase in the average proficiency which was higher than expected, we also observed a positive increase in the percentage of students placed at Appropriate and Advanced levels, according to the SAEB scale (see Table III).

Table III – Number of students according to the Levels of Learning

Subject Area	Application	Below Basic	Basic	Adequate	Advanced	Adequate + Advanced
NS	1.ª	35,0%	39,3%	16,8%	8,9%	25,7%
	2.ª	27,9%	35,7%	23,6%	12,7%	36,4%
Pt.	1.ª	23,0%	53,1%	21,0%	2,9%	23,9%
	2.ª	23,3%	38,8%	27,1%	10,8%	37,8%
Maths	1.ª	42,7%	28,7%	25,8%	2,8%	28,6%
	2.ª	35,6%	27,6%	30,8%	6,0%	36,8%

Mind Lab's Methodology seeks not only to develop cognitive abilities, but also emotional, social and ethical skills. In this sense, the evaluation of the Project's effectiveness also involves the assessment of the observed increase for these non-cognitive characteristics.

Table IV: Participant's perception related to the Project's contribution to the development of cognitive skills.

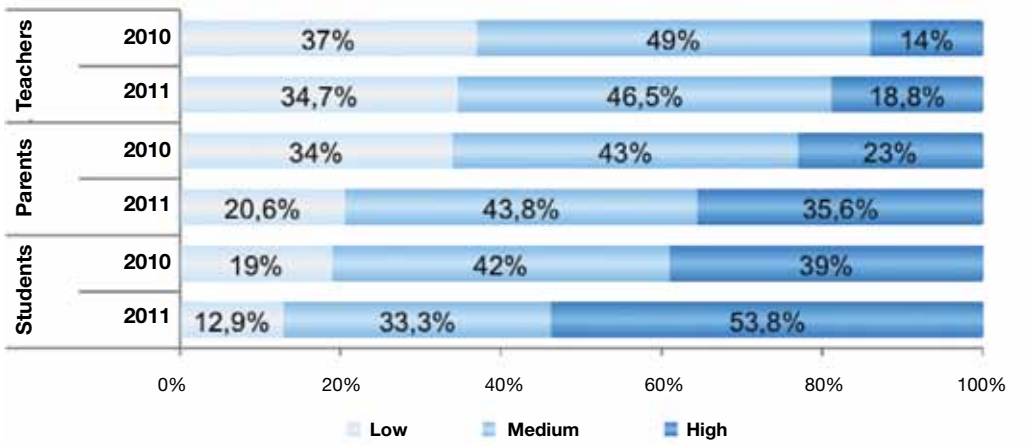


Table V: Participant's perception related to the Project's contribution to the development of emotional skills.

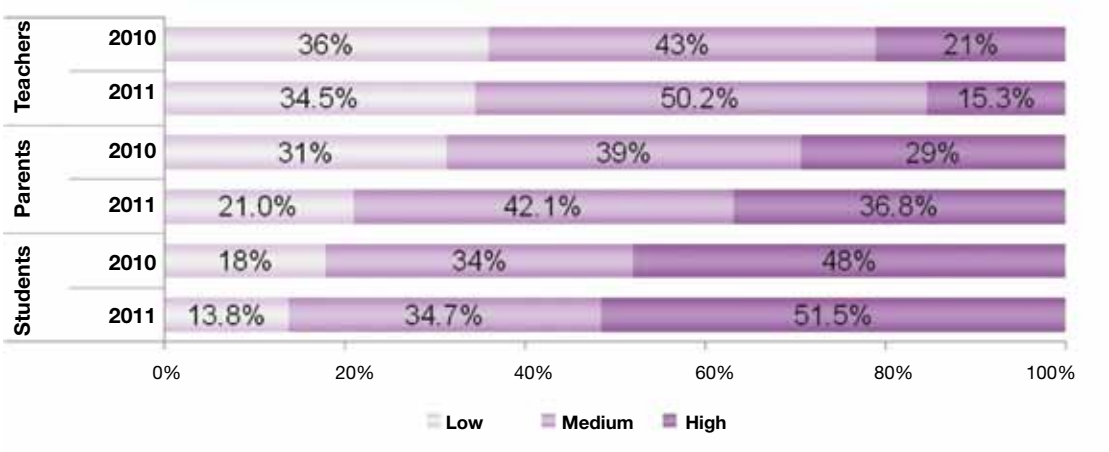


Table VI: Participant's perception related to the Project's contribution to the development of social skills.

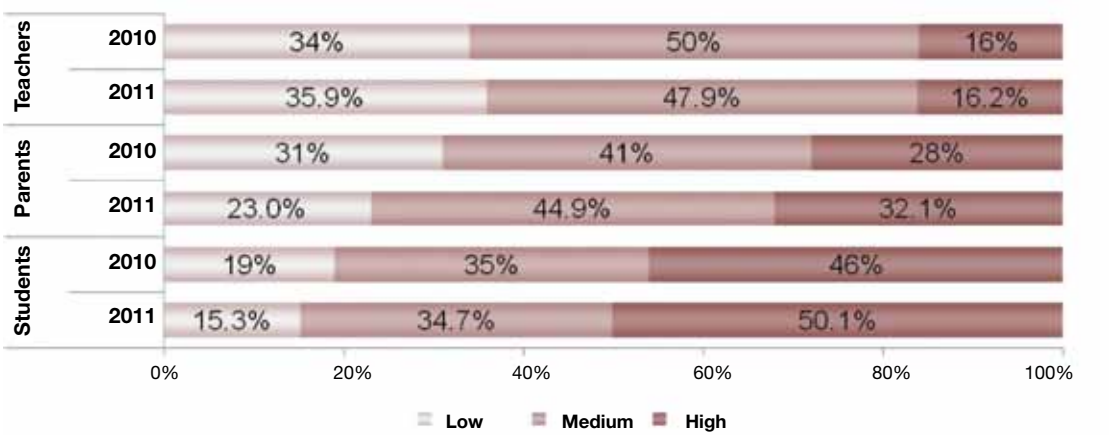
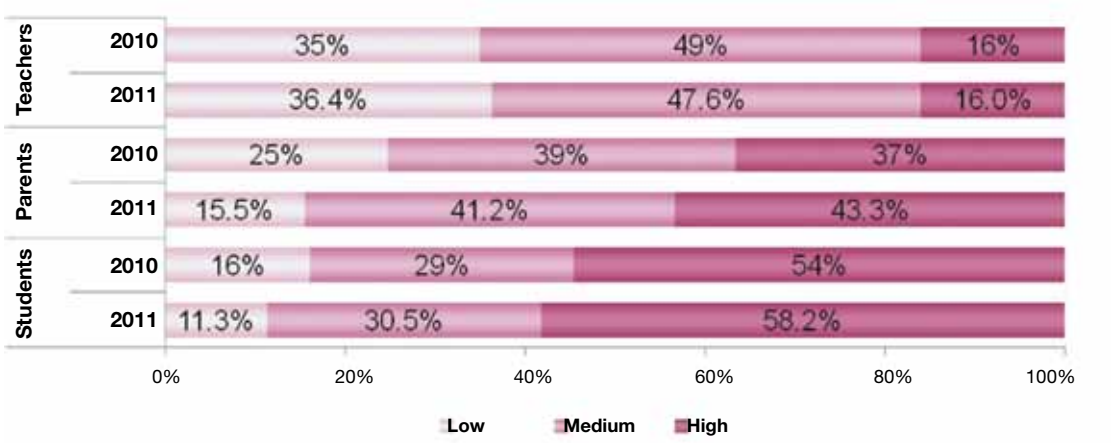


Table VII: Participant's perception related to the Project's contribution to the development of ethical skills.



It is important to highlight the fact that the items which added greatest value, as indicated by the participants, in the cognitive, emotional and social dimensions have remained the same as the 2010 study, which makes us reflect upon the importance of the School in developing these skills in their students:

Figure 2: Greatest added value in the cognitive dimension

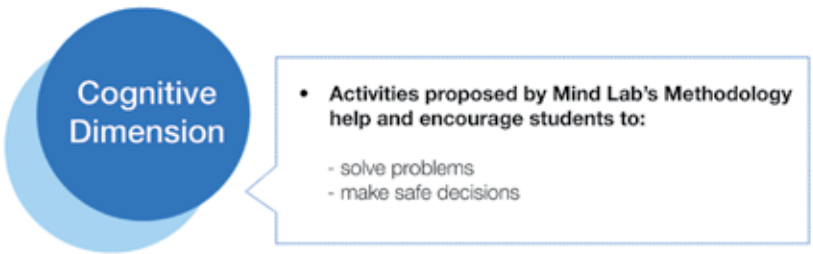
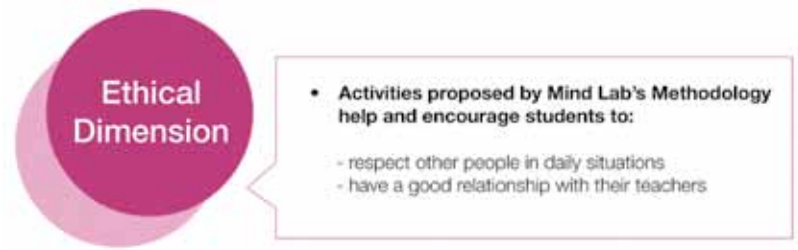


Figure 3: Greatest added in the emotional dimension

Figure 4: Greatest added value in the social dimension

Regarding the ethical dimension, the results have changed. In 2010, the most influential aspects were related to "acting for the common good" and "having a good relationship with their peers" (Garcia & Abed, 2010: 32). In 2011, the change seems to be moving towards what we might call "relationship ethics" in everyday life as the aspects mentioned were the appreciation of people who are part of our daily lives and the relationship with teachers; the adults who are directly responsible for the "relationship ethics" established within the classroom environment

Figure 5: Greatest added value in the ethical dimension



In these studies, the social and emotional variables were assessed from what parents, students and teachers have observed or what they "felt". This perception is important and the results show that the individuals understand the project as an effective way of improving these variables – the majority of teachers, for example, stated that the project had a medium or high impact on all social and emotional variables.

However, although this perception is important because it can be an indicator of adherence to the Methodology, there is a subjectivity inherent to its nature and, because of that, the evaluation of Mind Lab's effectiveness should be extended to a context in which not only proficiency is evaluated, but also in emotional and social variables can be measured beyond the individuals' perception.

The construction of these measures is undoubtedly an important challenge, but it is possible within the existent psychometric theories and techniques. It is generally assumed – and national and international studies show – that emotional variables are strongly associated with cognitive variables. Thus, besides the importance that the development of emotional variables would have per se, it could also enable favorable conditions for a more substantial learning in the future, showing the long-term effect of the Project on cognitive proficiency.

Another relevant aspect, noticed by teachers, relates to the impact of the Methodology upon themselves, as professionals, both in terms of improving their teaching practice and in the interpersonal relationships between teachers (an aspect which had not been investigated in 2010). We can observe very close results, in 2011, in these two variables. That could indicate a possible interrelationship between teaching practice and the viability, by the School's management team, of providing spaces and exchanges between teachers during the Initial and Ongoing Trainings provided by Mind Lab.

Table VIII: Teachers' Perception regarding the contribution of the Project to their teaching practices

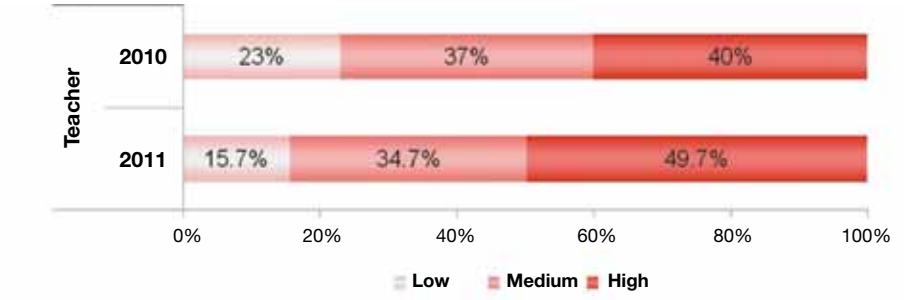
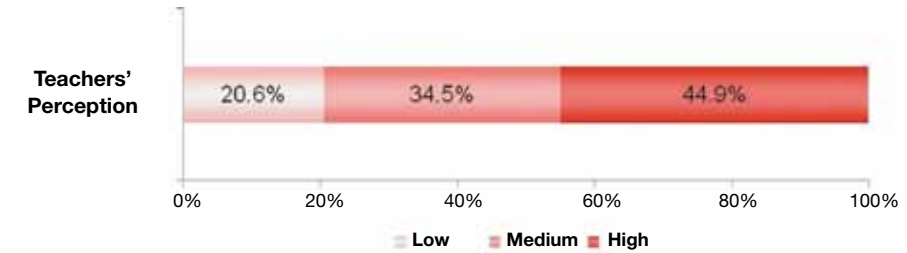
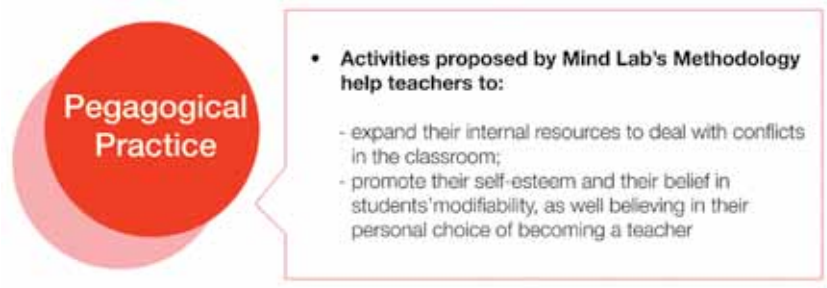


Table IX: Teachers' Perception regarding the contribution of the Project to their interpersonal relationships.



The greatest added value to teachers' "Pedagogical Practice" remained the same in comparison with 2010 which suggests that the Project is very successful in developing these skills in teachers.

Figure 6: Greatest added value to teachers' Pedagogical Practice



Regarding the "Interaction between Teachers," the greatest add value relates to teacher's need to share their classroom experiences with their colleagues, as well as investing in the expansion of their theoretical bases about teaching and learning to support their practice.

Figure 7: Greatest added value to teachers' interaction

In 2011 we have included, in the questionnaires addressed to teachers, some of the issues related to their personal development. The result was quite significant: for the great majority of teachers, Mind Lab's Methodology has had an impact on their personal development, especially regarding communication and conflict management – essential aspects for the educational action.

Table X: Teachers' Perception regarding the Project's contribution to their the personal development

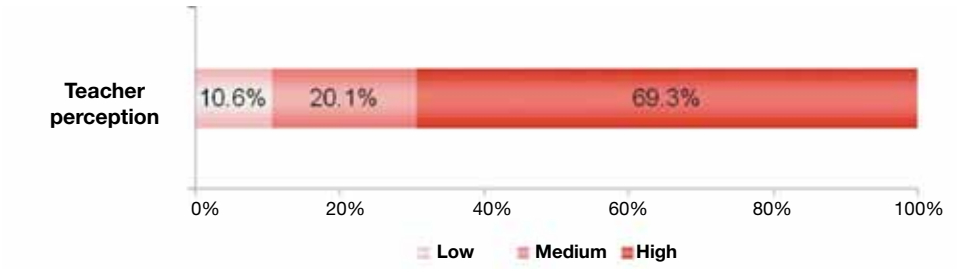
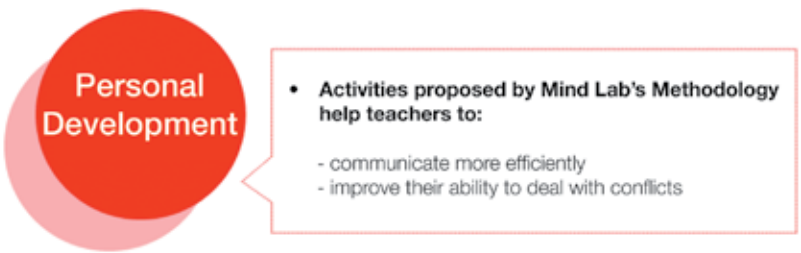


Figure 8: Greatest added value to teachers' Personal Development



In summary, most teachers reported the positive impacts of Mind Lab's Methodology upon their personal and professional skills. This kind of effect should affect the cognitive proficiencies of students in the long term, but an immediate indicator of this perception is an improvement in the schools' atmosphere and teachers' motivation.

To conclude the presentation of these results, it is important to present some data regarding the profile of students, parents and teachers (appendices 3-10). We can observe a strong similarity between the profiles in 2010 and 2011 (except for the parents' schooling level).

Table XI: Profile of students, relatives and teachers

		2010	2011
Students	Balanced boy- girl ratio.	51,0% – 49,0%	49,8% – 50,2%
	Majority of students with no discrepancy between their age and the academic year in which they are enrolled	91,1%	86,8%
Parents	Majority of parents who finished high school or higher education	51,3% – 20,0%	27,7% – 29,8%
	Balanced ratio between the presence or absence of reading habits declared by parents	56,6% – 43,4%	46,2% – 53,8%
Teachers	Overwhelming majority of women	95,9%	94,3%
	Preponderance of the age group 30 to 49 years old.	69,5%	69,3%
	Preponderance of higher education, with most teachers graduating in Pedagogy	87,4% – 56,9%	88,0% – 64,8%
	Balanced ratio of professionals with and without post- graduation	47,8% – 52,2%	52,1% – 47,2%

Contributions of these results in relation to Schools' management

"Guidelines" can be understood as directions or guiding paths and, therefore, they need to be transformed into goals, strategies and actions that can be monitored so that the results make sense, produce knowledge, enable deep reflections which will contribute to the improvement of management processes which are inseparable from the efficiency and effectiveness of a system.

The Brazilian Law Project nº 8035/2010 proposes the approval of the National Education Plan (NEP) from 2011 to 2020, and its 2nd Article establishes the following guidelines::

"I – eradication of illiteracy;

II – universalization of school attendance;

III – overcoming of educational inequalities;

IV – improving the quality of education;

V – training for work life;

VI – promotion of socio-environmental sustainability;

VII – humanistic, scientific and technological development in the country;

VIII – establishment of a target for public resource investment in education which is proportional to the Gross Domestic Product (GDP);

IX – appreciation of professionals in education; and

X – dissemination of these principles: equity, respect to diversity and a democratic management of education. (...) "

"Improving the quality of Education ", one of the guidelines from this Law Project, gives scope to debate a complex phenomenon that involves multiple dimensions, and that cannot be perceived only by a recognition of variety and minimum quantities of inputs considered essential to the teaching and learning development process. It is worth adding the concept of Social Quality of Education based on four pillars: Access, Permanency, Learning and Conclusion of Basic Education, which, according to the constitutional amendment number 59, is mandatory from the age of four to seventeen.

It is noteworthy that the Social Quality of Education deals with a set of elements and socioeconomic and cultural dimensions that surround the lives and expectations of families and students regarding their education. Thus, it is essential to implement intersectoral public policies in education focused on the common good, with adequate funding, social recognition and appreciation of all professionals in education. Another important aspect relates to the curriculum, which should guarantee meaningful and contextualized learning, based on cognitive, social, ethical and emotional dimensions for all children and adolescents.

Thus, it is necessary to highlight the relationships between the improvement of education's quality as a 2011-2020 NEP guideline, the social quality of education and the democratic management of education. According to Jamil Curry (2012), in school of MEC (Ministry of Education) management:

> The democratic management of education is, at the same time, according to our Constitution (art. 37): transparency and impartiality, autonomy and participation, leadership and collective work, representativeness and competence. Aimed at a decision process based on participation and public deliberation, the democratic management expresses a desire for individuals' growth as citizens and society's growth as a democratic society. Thus, the

> democratic management is the management of a concrete administration. Why concrete? Because concrete (cum crescere, from Latin 'to grow with') is the one who is born with and grows with the other. This parental character is the horizon of a new citizenship in our country, in our educational systems and in our schools. The school is declared as a space to construct democracy, respecting the specific character of the school as a place of teaching / learning..

It is necessary to understand the relationships between the "Social Quality of Education" and the democratic management of classrooms, the School Units, Networks and Systems of Education in a scheme of cooperation among federal entities as an alignment among the NEP guidelines, the national curriculum guidelines, the intercity plans, state and local education plans, the political pedagogical projects of School Units and the teaching plans for every teacher in every Brazilian classroom.

Thus, studies, performance indicators, measurements and proficiency scales to monitor the progression of students' learning and institutional and large scale assessments should be meaningful firstly for the school team as a whole: teachers, support staff , parents, managers (principals, coordinators and counselors), school's council and, above all, for students.

Thereby, it is necessary to reflect upon various dimensions in a systematic way, contributing to a conscious process of collective construction of annual work plans for the School Units so that, according to their results, it is possible for them to set their own goals and challenges: the school needs to assume itself as an institution able to outline its guidelines, its ways to ensure the social quality of education for all students, focusing on their learning and seeking innovative teaching practices that develop cognitive, social, ethical and emotional skills and abilities.

In this sense, the results of this cycle of studies involving different School Units from different cities provide evidences that allow a consistent and thoughtful dialogue about the School's processes regarding the aspect of planning and focus, session and quality management, social and cultural aspects that make up this context and implications of these factors.

In our view, Mind Lab's Methodology, as an Educational Technology, allows us to gather teachers and the management team around concrete facts and evidence in order to cause a continuous coming and going in the re-planning and revisiting, promoting a new gaze on the process that is or has been established to the implementation of established guidelines: national, municipal, local and the actual School Unit itself. It brings evidences of leaps towards learning for the abilities of all individuals involved in the process: managers, teachers, students, families...

Studies – 2009/2010/2011

To better understand and provide an overview of the cycle of studies which ends now, we present a summary of their objectives, methodological procedures and results.

Objectives

- Study the impact of Mind Lab's Methodology upon the levels of proficiency in Grade 5 students in different subject areas after three academic months
- Obtain data and information about the perceptions of the individuals involved – students, teachers and families – regarding the Methodology's contribution to the development of cognitive, emotional, social and ethical skills.
- For teachers (as well as what was mentioned above), to collect data and information about their perception regarding the benefits of the Project to their teaching practice and their personal and professional development

Methodological Procedures

- Partnership with INADE
- Application of proficiency tests in three subject areas (at the beginning and at the end of the 2nd academic semester)
- Assessment tools derived from the IRT (Item Response Theory)
- Questionnaires designed to map individuals' perception of the Methodology
- Items prepared by an interlacement between the skills shown in INADE's References and the prioritized skills in "Resource Management" (Grade 5 – Course 2)
- Comparison between proficiency levels in both tests
- Quantitative and qualitative analysis of the results obtained in the assessments (reference – SAEB scale) and questionnaires

Results

- Increase in the proficiency levels in the three subject areas (Portuguese, Mathematics and Natural Sciences) which was higher than the expected for the period (according to the SAEB scale)

- Significant decrease in the number of students placed at “Below Basic” and “Basic”, accompanied by the increase in the number of students rated as “Adequate” and “Advanced” in the three subject areas assessed (taking as reference the SAEB scale).
- Students, families and teachers recognize the benefits of the Methodology in their social relationships and in the development of emotional, cognitive and ethical skills.
- Most often cited items by the participants: problem solving, decision making, interpersonal relationships, conflict management, self-confidence and self-assessment.
- Most often cited items by teachers regarding their teaching practice: self-esteem, career choice, belief in the modifiability of students and expansion of their internal resources to deal with conflicts in the classroom.

Deepening the studies...

Recognizing the importance of the continuous production of knowledge, the Mind Group Institute will sponsor two pieces of research in 2012:

- One with an inferential character and comparative methodology through pairing for Grade 5 in Public Schools;
- Another with an exploratory character for Grade 9 in Public and Private Schools.

The results of the 2009/2010/2011 cycle indicate that the average increase in the performance for Mind Lab students is higher than expected for the three subject areas and we can also notice the perception of the Methodology’s benefits in skills development.

Furthermore, data suggests an interrelationship between teacher’s perception of the Methodology’s benefits to the development of their pedagogical practices and the “leaps towards learning”, indicated by the proficiency level of their students. In this sense, it is necessary to deepen the pieces of research related to the improvement of teachers’ pedagogical practices.

Thus, the objectives of the Grade 5 Study are:

- Advance our research from the scope of exploratory studies towards inferential studies, in order to assess the effectiveness of Mind Lab’s on students’ leaps towards learning and in the pedagogical improvement.

- Broaden the exploratory study about individuals' perception regarding skill development.
- Produce data and information about the impacts of the Methodology to cause "leaps towards learning", through comparative analysis among School Units applying the Methodology and others that do not.
- Produce data and information about students' proficiency in Portuguese and Mathematics, using the comparison of the proficiency averages in relation to national averages.
- Collect information about the students', parents', teachers' and school managers' perceptions about the benefits for Schools (with and without the Methodology) in the integral development of students and teachers.
- Improve data exploration about the impacts of the Methodology as a Program of innovative teaching practices, to the improvement of teacher's actions towards a mediating practice, taking the mediation proposed by Reuven Feuerstein as references.

For Grade 9, the Study aims to gather information about possible impacts of Mind Lab's methodology in the 'leaps towards learning' for students of this age group as well as in teachers pedagogical improvement, as teaching staff is composed mainly by specialist teachers. We seek to understand if Mind Lab's Methodology can contribute to teachers' continuing education process and their relationship with the leaps towards learning. The objectives of the study are:

- Produce data and information about the impacts of the Methodology to cause "leaps towards learning."
- Produce data and information about students' proficiency in Portuguese and Mathematics, using the comparison of the proficiency averages in relation to national averages.
- Obtain data about the impact of the Methodology in the development of ENEM (High School National Exam) skills.
- Collect information about the students', parents', teachers' and school managers' perceptions about the benefits for Schools in the integral development of students and teachers.
- Improve data exploration about the impacts of the Methodology as a Program of innovative teaching practices, to the improvement of teacher's actions towards a mediating practice, taking the mediation proposed by Reuven Feuerstein as references.

Final Considerations

> *"The loveliness that I speak of, the dream I fight for and for whose realization I prepare myself constantly, require in me, in my social experience, another quality: the courage to fight alongside the courage to LOVE!"* (Paulo Freire)

The closing of a cycle of exploratory studies like this leads to a pause for reflection upon the past, upon the process that was created, and upon the future, for the exploration of new ways, new studies, new achievements and constructions... to close a cycle consequently implies in the opening of a new age, new actions, new stage ... a rite of passage.

"Passage" is a very appropriate term to describe our historical moment. There is no doubt that we live in an era of "transitions": changes have never been so fast and so dramatic – in societies, environments, knowledge and men...

> Historically, we are making the transition from Modernity to Post-Modernity and we are in a transition which is sometimes easy, sometimes difficult to recognize. I don´t want to cause controversy with those who consider that we are only living a Modernity crisis because I think there are enough signs that we are crossing an era. However, I believe that these crossings do not occur in the same way throughout human history and that the transition to post-modernity has a characteristic ambiguity because of its deconstructive character. In very simple and direct terms, Post-modernity is a deconstruction of the Modernity, and not an opposition (...) which gives place to new experiences and different ways of thinking (Zajdsznajder, 1999: 15).

It is not a simple or an easy task to perform a "rite of passage": designing new realities, developing new ways of being in the world, of structuring thought, of organizing relationships and everything else that may be involved in the "abandonment" of a structure and the creation of a new order. Gail Sheehy (1988) created a very beautiful analogy with the growth of a crustacean: human beings develop by dropping and forming protective shells. According to the author, changes occur due to an internal pressure, an internal need to expand towards the outside. During these changes we are exposed and vulnerable (we suffer and hurt), but we are effervescent and embryonic, in full creation and acquisition of a new stage of consciousness. Finally we build a new shell, wider, more comfortable, more mature, that will give us relative balance ... Until a moment in which it is necessary to grow again! And it all begins once more ... As these passages involve change, loss and mourning, they cause anxiety and distress, fantasies, and defenses. Some pain is inherent to the process; one cannot avoid it. "It would be surprising if we did not experience some pain (...) but the

willingness to go through each passage is equivalent to the disposition to live abundantly. If we do not change, we do not grow…if we are not growing, we are not really living". (Sheehy, 1988: 482)

We can say that Education is also experiencing some sort of "passage", seeking to transform itself in order to accompany and construct the "new ages". Destroyed and rebuilt every day in this "new era", it is essential to open up to new things, change paradigms, learn to live together and respect differences. Knowledge production has never been so fruitful. The access to the objects of knowledge has never been as democratic as it is today: through the Internet and the digital inclusion, soon enough we all could, potentially, get in touch with any knowledge produced in a global scale. We must create an ethic of peace and tolerance, since the technological development puts all of us in direct contact (Morin, 2000).

> *Since it will offer means never before available for circulation and storage of information and for communication, the next century will subjugate education to a heavy obligation that may seem, at first glance, almost contradictory. Education must transmit, massively and effectively, increasing knowledge and evolutionary know-how, adapted to the cognitive civilization because they are the skills of the future. Simultaneously, it should find and mark the references that prevent people from becoming submerged in the waves of more or less ephemeral information that invade the public and private spaces and instead lead them to guide themselves to projects of individual and collective development. It is Education's responsibility to provide, somehow, the maps of a complex and constantly agitated world and, at the same time, the compass that allows us to navigate through it* (Delors, 1994 – bold added)
>
> .

To provide maps and the compass...The available paths and the best way to guide yourself through them... It is a beautiful mission for Education, but ... How can we put it into practice? Mind Lab's Methodology offers a potential "treasure map" and a possible "compass" capable of providing a safe journey. A map to which treasure? The treasure of skills development, in its most varied dimensions, through Thinking Games and Meta-cognitive Methods. How about the compass? The compass is the teacher –with their actions she/he mediates in order to promote the construction of knowledge and the integral development of students... and themselves... and society...

Our Studies indicate that a subjective, personal adherence, from the teacher to the Methodology is an important element for the success of its implementation. We believe that the individuals' perception in relation to the learning context in which they are included causes leaps towards learning and impacts positively on students' proficiency and in the development of their cognitive, emotional, social and ethical skills – inside and outside the classroom. We also have

elements to affirm that Mind Lab affects the teachers' pedagogical practice as they find resources to help the educator to make this passage that is so difficult and at the same time so rich: to exceed the role of a "lesson giver" and construct their role a "mediator".

As with any construction, the transformation of Education involves a process, a walk, steps and more steps, sometimes moderate and slow, sometimes faster and vigorous, seeking happiness and the essence of a more integrate human being who is more ethical and an active builder of a more just and egalitarian society. We only can run if we can leap – it is necessary to get off the ground. Fly. A flight towards something that we can already foresee as a possibility. To leap we must have systematic actions, we must have some certainty of the stability of the route – we cannot risk leaping into soft ground. We must be secure; notice the firm ground in front of us.

To construct a solid ground, we need to have, with us, people who are on the classroom floor everyday; those who live and construct the ground. We need to leave the discourse behind and go to practice. The discourse must be covered in actions; materialized in actions. School is life; life is the essence of school. Knowledge and affections should always be present as they are interlaced in the role of the educator. Between "form" and "content", between "subjectivity" and "objectivity," the teaching-learning process is constituted as integration and a constant exchange between the construction of ourselves and the world. This is what gives meaning to learning and allows students to actually embody (put into their body, in their entrails) the objects of knowledge.

We know that it is only possible for a teaching project to be effective in a school when there is pedagogical complicity of its teaching staff. This complicity can only happen if the teaching staff has the opportunity not only to share ideas, but to experience, together, achievements and concerns. In this sense, data indicate that this Methodology favors this space for cooperation and collaboration amongst educators, contributing to the implementation of what is planned and to the establishment of new goals.

Planning is the mediating element between the teacher's desires and their practice. We believe that the teacher's material and the ongoing training offered by Mind Lab are the "daily planning" that provides security and offers a safe ground that allows the teacher to "leap" and put into practice the theoretical research that supports them in their pedagogical choices. Theory and practice together, integrated, in an eternal movement of coming and going between "doing" and "reflecting upon what you are doing".

In our perception, teachers like the Methodology so much because it motivates them; because they see, in a concrete way, that what was only in their desires and dreams, or in theories and abstractions, can become a reality. And we believe that "you can only motivate if you are motivated." Therefore, in order to have motivated students, we must,

above all, “find reasons” for learning in ourselves, the educators. “We only enchant when we are enchanted” (Mário Sérgio Cortella).

We finish this cycle of studies with the certainty that we are on the right track and that we can “make the difference” to build a society with greater equality and social justice.

References

ABED, Anita. “Metáfora: um caminho psicopedagógico em Educação”. In: **Revista Construção Psicopedagógica**. São Paulo: Instituto Sedes Sapientiae, ano XII, nº 9, 2004. Available at HYPERLINK “http://www.recriar-se.com.br”www.recriar-se.com.br.

_____: **Recursos metafóricos no processo ensino-aprendizagem:** um estudo de caso. São Paulo: Universidade São Marcos. Programa de pós-graduação em Psicologia. Dissertação de Mestrado, 2002.

BRASIL: **Lei de Diretrizes e Bases da Educação Nacional** – Lei N. 9.3.94/96

_____: **Projeto de Lei nº 8035/2010** que propõe a aprovação do Plano Nacional da Educação (PNE) 2011-2020

Cortela, Mario Sérgio. **Pensamentos**. Available at: “http://pensador.uol.com.br/pensamentos_de_mario_sergio_cortella/18/”http://pensador.uol.com.br/pensamentos_de_mario_sergio_cortella/18/. Accessed April 2012.

CURY, Carlos. “http://escoladegestores.mec.gov.br/site/8-biblioteca/pdf/jamilcury.pdf” \t “_blank”**O Direito à Educação:** Um campo de atuação do gestor - MEC. Available at: escoladegestores.mec.“http://gov.br/site/8-biblioteca/pdf/” \t “_blank”gov.br/site/8-biblioteca/pdf/jamilcury.pdf. Accessed April 2012.

DELORS, Jacques. **Relatório da terceira sessão da Comissão**, Paris, 12-15 January 1994. Available at: HYPERLINK “http://4pilares.net/text-cont/delors-pilares.htm” \l “Relatório para a UNESCO”http://4pilares.net/text-cont/delors-pilares.htm#Relatório para a UNESCO. Accessed: 11.04.12.

FERNANDEZ, Alícia. **A Inteligência Aprisionada**. Porto Alegre: Artes Médicas, 1990.

FEUERSTEIN, Reuven. **Instrumental enrichment**. Illinois, USA: Scott, Feresman and Company, 1980.

FREIRE, Paulo. **Pedagogia do Oprimido**. Rio de Janeiro: Paz e Terra, 1970.

FRANCO, C. BROOKE, N. & ALVES, F. Estudo Longitudinal sobre a qualidade e equidade no ensino fundamental brasileiro: GERES 2005. **Ensaio: Aval. Pol. Públ. Educ**., Rio de Janeiro, v. 16, n. 61, p. 625-638, oct/dec, 2008.

GAMBOA, Silvio. **Epistemologia da pesquisa em educação**. Estruturas lógicas e tendências metodológicas. Tese de Doutorado. Universidade Estadual de Campinas. Campinas, 1987.

GARDNER, Howard. **Inteligências Múltiplas:** Teoria na Prática. Porto Alegre: Artes Médicas, 2000.

GARCIA, Sandra & ABED, Anita. **Impacto do desenvolvimento de habilidades por meio da aplicação da Metodologia do**

Projeto MenteInovadora: um estudo em alunos de 5º ano do Ensino Fundamental. Mind Lab Brasil & INADE, 2009. Available at: “http://www.mindlab-brasil.com.br”www.mindlab-brasil.com.br.

_____. **A Metodologia do Projeto MenteInovadora no desenvolvimento de habilidades em alunos de 5º ano do Ensino Fundamental**: o professor faz a diferença nas demandas do século XXI, Mind Lab Brasil & INADE, 2010. Available at: “http://www.mindlab-brasil.com.br”www.mindlab-brasil.com.br.

GARCIA, Sandra. **Um estudo do termo mediação na teoria da modificabilidade cognitiva estrutural de Feuerstein à luz da abordagem sócio-histórica de Vygotsky**. São Paulo: Universidade São Marcos. Dissertação de Mestrado, 2004.

MEIER, Marcos & GARCIA, Sandra. **Mediação da aprendizagem**: contribuições de Feuerstein e de Vygotsky. Curitiba: Edição do autor, 2007.

MIND LAB BRASIL. **Habilidades priorizadas por ano de escolaridade**. São Paulo, 2011.

MORIN, Edgar. **Os sete saberes necessários à educação do futuro**. São Paulo: Cortez; Brasília, DF: UNESCO, 2000

PIAGET, Jean. **O nascimento da inteligência na criança**. Rio de Janeiro: Zahar, 1970.

PERKINS, David. **The Mind’s Best Work**. Harvard University Press, 1981

RICHMOND, P.G. **Piaget, teoria e prática**. São Paulo: Ibrasa, 1987.

SHEEHY, G. **Passagens**: crises previsíveis da vida adulta. Rio de Janeiro: Francisco Alves, 1988.

UNESCO. **Quality education, equity and sustainable development:** a holistic vision through UNESCO’s four World Education Conferences 2008-2009.

VYGOTSKY, Lev. **A formação social da mente**. São Paulo: Martins Fontes, 1998.

WADSWORTH, Barry J. **Inteligência e afetividade da criança na teoria de Piaget**. São Paulo: Pioneira, 1993.

ZAJDSZNAJDER, Luciano. **Ética, estratégia e comunicação na passagem da modernidade à pós-modernidade**. Rio de Janeiro: Editora FGV, 1999.

Annex 1: Extract from the curriculum of Mind Lab's Course -'Resource Management'

Game	Session's objectives	Skills prioritized
Rush Hour	• Define the notion of "problem" • Highlight the importance of the Detective and the Trial-and-error Methods to solve problems	• Understand and clearly define the problem • Elaborate relevant questions • Use logical reasoning strategies. • Act based on planning
Blokus	• Develop the concept of "resource " • Discuss resource management • Promote creativity when using resources • Develop space organizing skills • Present game strategies and reflect upon their use in real life.	• Understand the importance of planning and management when resources are limited. • Is consciously oriented in space and occupies favorable positions • Understand a problem • Make decisions showing flexibility and versatility • Show critical and conscious reasoning
Pylos	• Reflect upon different kinds of resources • Highlight the importance of saving the available resources • Explore game strategies • Enable the understanding of internal and external resource management	• Use several sources of information simultaneously when planning actions. • Show space-time orientation. • Use logical-hypothetical reasoning • Use resources in a planned way

Cartagena	• Reflect upon collection, accumulation and conservation of resources • Explore game strategies	• Identify different sources of information in order to use resources in a planned manner • Maintain a controlled and non-impulsive attitude • Establish secondary objectives as the way to achieving the primary objective. • Show exploratory attitudes, looking for data in a systematic and orderly manner to develop long-term planning. • Develop strategies and verify hypothesis, going beyond the immediate impressions • Anticipate possible difficulties of the process considering varieties of information
Octi	• Develop concepts of versatility and flexibility of resources • Develop concepts of resource and quantity of resources available • Highlight the need to allocate resources efficiently	• Use vocabulary and concepts adequately • Orientate themselves efficiently in space in order to dominate board dimensions and different possibilities of moves • Manage long-term resources • Develop strategies to draw-up and verify hypotheses • Examine a situation in a systematic and detailed manner • Execute planned actions and develop flexibility to change decisions when facing new circumstances

Annex 2: Extract from INADE's references for Grade 5

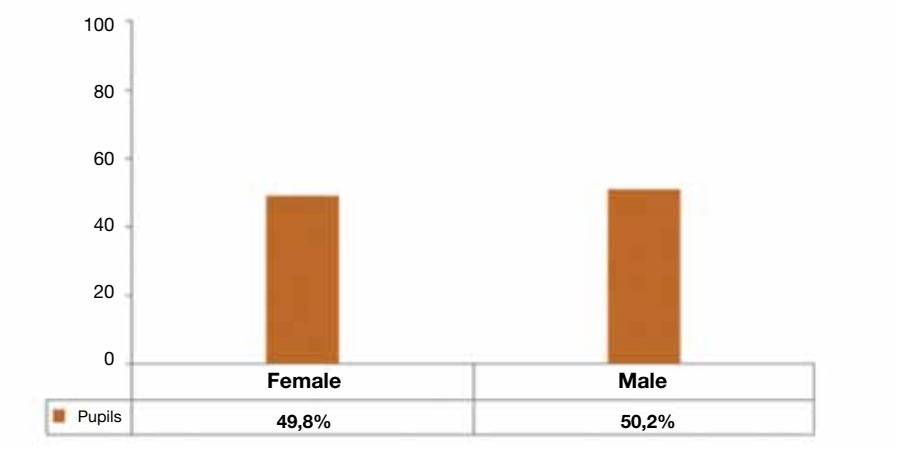
Portuguese
Block 1: Reading Procedures D1 – Find explicit information in a text D2 – Infer an implicit information from a text D3 – Identify the text's main idea D4 – Establish, within the text, the logical relationship between the facts and opinions shown D5 – Infer the meaning of words and expressions, considering a specific context D6 – Identify the communicative intention of opinion texts
Block 2: Implications of the support, gender and or the enunciator when comprehending a text D7 – Establish relationships between written information and information extracted from graphs, illustrations and the interlocutory situation D10 – Identify the descriptive discourse used in the characterization of characters
Block 3: Relationship between texts D12 – Compare information of two different articles about the same subject D13 – Compare different versions of the same story D14 – Compare the graphic representation of dialogues in narrative texts and comics
Block 4: Coherence and Cohesion in Texts D15 – Establish the cause / consequence relationship between elements of a text D16 – Notice the temporal sequence in narrative texts, identifying its linguistic characteristics D17 – Identify mechanisms for the articulation of words in a sentence
Block 5: Relationship between Expressive Resources and Effects of Meaning D19 – Establish relationships between visual and phonic resources, images and the meaning of texts

Mathematics
Block 1: Numbers and operations D1 – Recognize the meaning of natural, cardinal, ordinal or code numbers D3 – Organize numbers in ascending or descending order D4 – Identify the location of natural numbers in a number line D5 – Solve problems with natural numbers, involving different meanings of addition or subtraction: add, change an initial state (positive or negative), compare and make changes (positive or negative) D7 – Solve problems with natural numbers, involving different meanings of multiplication (repeated addition, the idea of proportionality, rectangular and combinatorial configuration) or division (sharing and measuring) D16 – Identify the defining characteristics of a group and the attributes of its elements
Block 2: Space and Shape D17 – Identify the location / movement of objects in maps, sketches and other graphic representations D18 – Identify common properties and differences between polyhedral and round figures, relating three-dimensional figures with their planning D19 – Identify common properties and differences between two-dimensional figures by the number of sides
Block 3: Quantities and Measures D25 – Establish relationships between starting and finishing times and / or duration of an event
Block 4: Data Processing D30 – Read information and data from tables D31 – Read information and data from graphs (particularly bar graphs) D32 – Solve problems in which data is presented through tables and graphs D33 – Solve problems involving probabilities D34 – Solve problems involving estimations

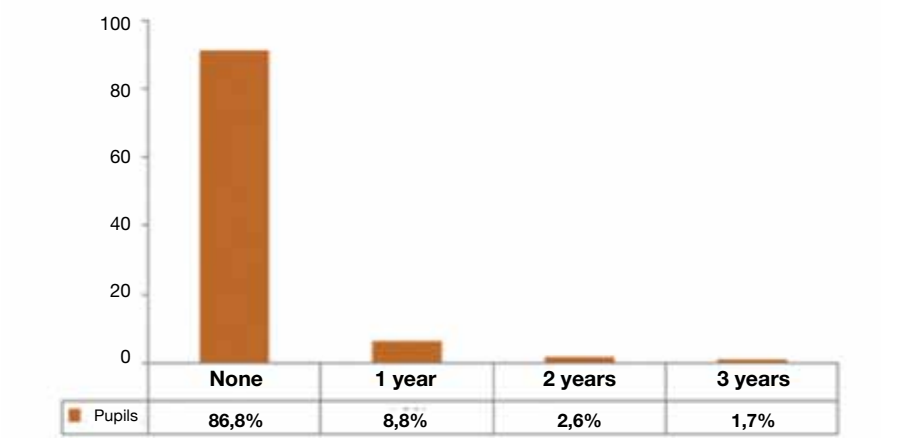
Natural Sciences
Block 1: Earth and Universe D1 – Understand the human effort in the search for explanations for the origin of the universe and the characteristics of stars are part of it, through knowledge of existing theories about the structure of the cosmos. D2 – Relate the cyclic day-night phenomena and the seasons with the movements of the Earth's rotation and translation. D4 – Relate the translational motion of the Moon with the lunar phases and its influences on the tides and the behavior of some animals. D5 – Understand the occurrence of natural phenomena like earthquakes, seaquakes, tsunamis, volcanoes, winds, storms, lightning and thunders, improving the understanding of or planet's dynamics.
Block 2 : Life and Environment D6 – Identify the minimum conditions necessary for the occurrence of life forms, as currently conceived, in the universe. D9 – Understand the development and reproduction of different living things allowing the determination of common and distinctive characteristics amongst the groups to which they belong. D10 – Identify similarities and differences in the most distinguished Brazilian ecosystems recognizing the typical flora and fauna of these regions. D11 – Understand dependency relationships between the various living things and the components of the environment by identifying what causes imbalances in these relationships. D15 – Recognize the potential interaction of the senses with the environment, as a way of expanding the possibilities of human perceptions and experiences with nature. D16 – Understand and appreciate the importance of the water cycle, its preservation and rational use, as well as its link with biodiversity.

Block 3: Humans and Health
D17 – Understand the modifications of habits, behavior and the human body in different stages of life by promoting the understanding of human development.
D 18 – Compare the changes in the behavior and body of humans beings with other animals in order to establish similarities and differences.
D22 – Understand the importance of nutrition and physical activity for the development and maintenance of a healthy life.
D23 – Understand the definition of health proposed by the World Health Organization (WHO) as the physical, psychological and social well-being, seeing health as a whole and not only as the absence of a disease.
D24 – Relate to cultural, social, economic, educational and affective aspects with the manifestation of Psychosomatics diseases, disturbing health and human relationships, in contemporary society.
D25 – Relate lack of personal and environmental hygiene to the acquisition of infectious and parasitic diseases promoting the prevention of diseases.
D26 – Relate the immune system with prophylaxis and treatment of disease, promoting awareness of the importance of information in combating diseases.
D27 – Understand the importance of vaccination for the prophylaxis of infectious diseases, promoting the recognition and importance of vaccination campaigns.
D28 – Identify basic local and global sewerage conditions, relating them to the preservation of health.
Block 4: Technology and Society
D31 – Differentiate between craft and industrial processes of object and food production, the raw material used, the steps of the process and the types of energy used during production
D32 – Differentiate recycling, reuse and reduction of objects produced by human action, stimulating sustainable development.
D34 – Identify major forms of pollution and other harms to the environment resulting from human actions that involve technological advancement.
D35 – Understand the definition and implementation of sustainable development, applying it in several everyday situations.
D36-Relate scientific-technological s with land occupation and socio-environmental imbalances, determining the causes and consequences of indiscriminate. Scientific-technological developments.

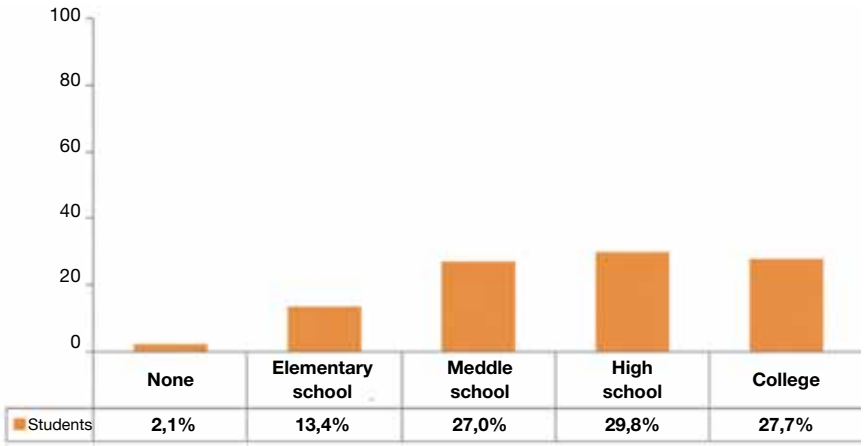
Annex 3: Students' gender



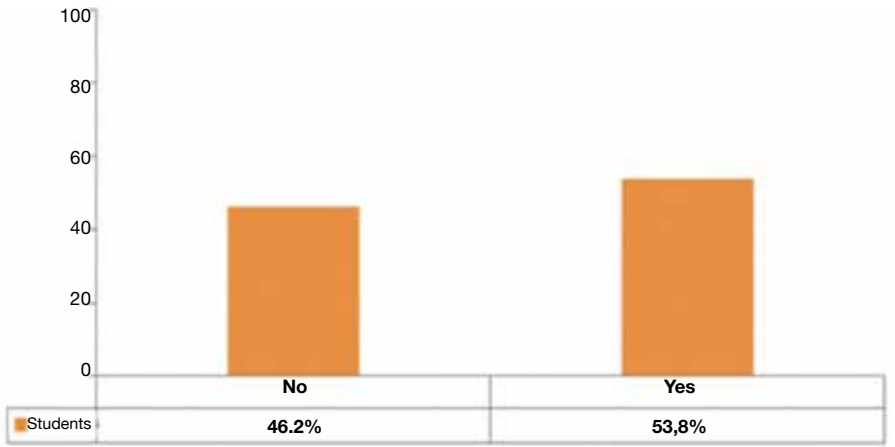
Annex 4: Year group discrepancy



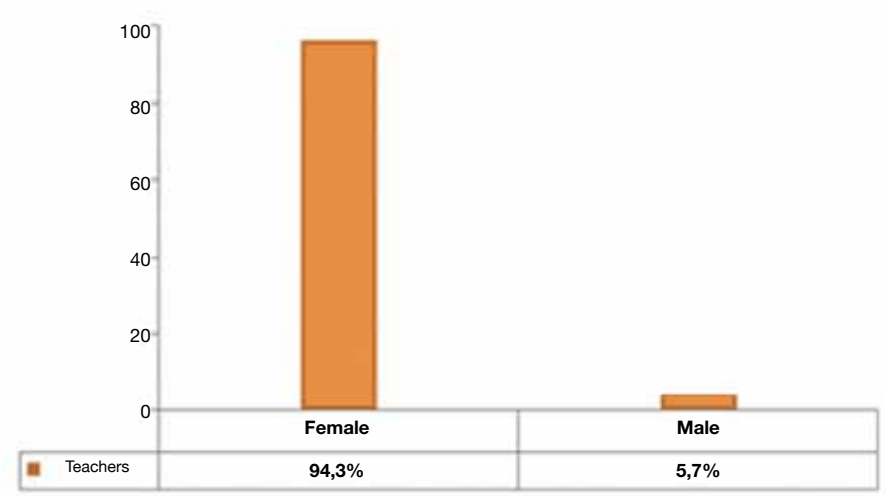
Annex 5: Parents' Schooling level



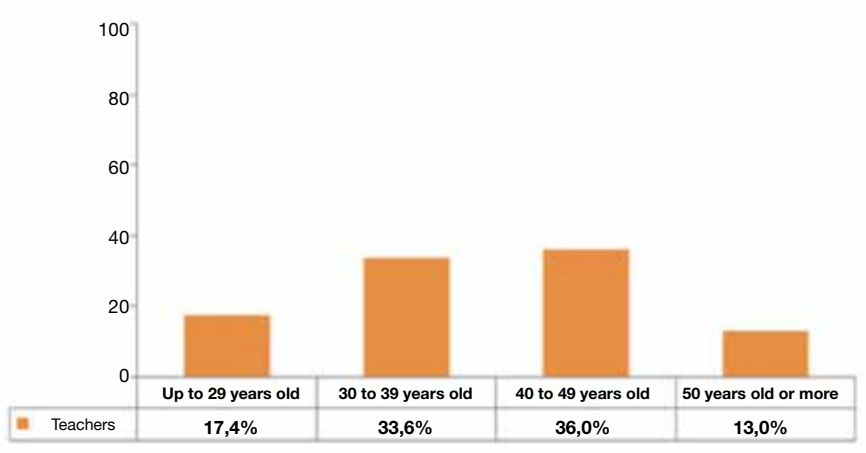
Annex 6: Parents reading habits



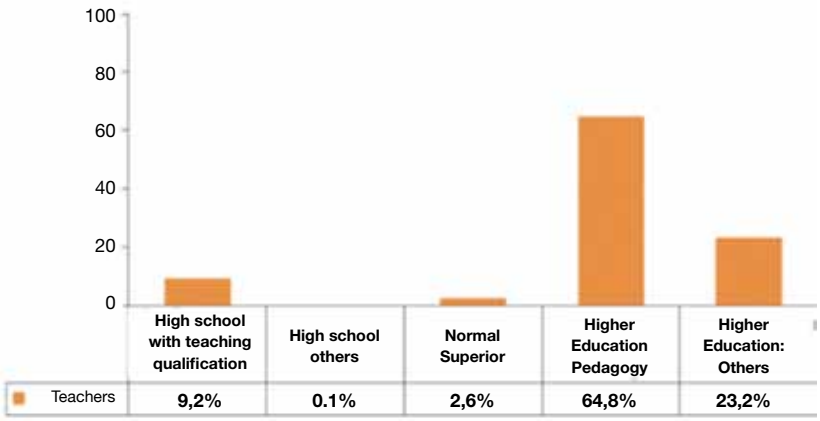
Annex 7: Teachers' gender



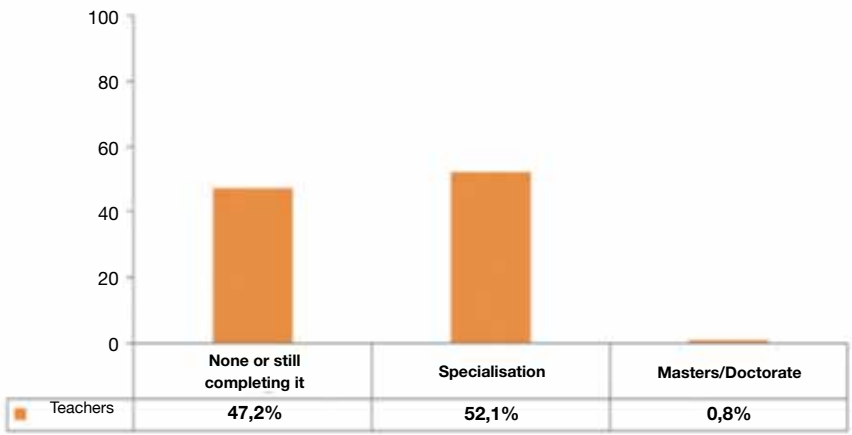
Annex 8: Teachers' age groups



Annex: 9 Teachers' formation



Annex 10: Teachers' post-graduation level




Instituto
MindGroup