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CLASSROOM LIFE: IMPLICATIONS OF "LEARNING HOW TO LEARN" IN SECONDARY AND HIGHER EDUCATION

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— Abstract—

The transformation of teaching versus the transformation of knowledge where the circumstances of the changes in human nature are obstructed by the parallel change. To respond to this situation, innovation is imposed through creative participation for incorporation into the life of the 21st century. The great challenge will consist in the transformation of our thinking, which clings to the traditional framework, where relearning and unlearning permanently implies processes of current educational complexity. Faced with this scenario, educational institutions are in the intricate situation of making changes in their structure. What is the discrepancy between the institutional framework and the knowledge society framework? What are the situations that are involved in the teaching and learning process of students and teachers? Its objective is to show the distance between the current educational postulates -learning how to learn- and the situations that are lived in the teaching and learning process in secondary and higher education. The process of self-regulation to learn represents a desirable concept but not sustained by educational practice. Although what prevails are traditional practices and exclusive educational environments that deny access to educational change in teaching and learning, only the methodological experience will allow us to understand the process of learning how to learn.

Keywords

Learning how to learn, self-regulation, autonomy, globalization, complexity, and knowledge.

The report of the "International Commission on Education for the 21st Century", assisted by the United Nations Educational, Scientific and Cultural Organization (UNESCO), coordinated by Jaques Delors, talks about the transformation of teaching in the face of the most transcendent phenomenon of all these evolutions: the knowledge revolution, our current era. In this regard, Brunner and Tedesco (2003, p. 23) state that: "knowledge took 1,750 years to double for the first time, counting from its beginnings in the Christian era; then it doubled in volume every 150 years, then every 50 years. Now it does so after five years, and it is estimated that by the year 2020 it will double every 73 days." As can be seen, knowledge moves at an uncontrollable speed. As a consequence of this phenomenon, teaching and learning are subject to a pace of transformation that, due to circumstances that are typical of changes in human nature, it is almost impossible to generate a parallel state, so we live in a challenging world that, due to the unprecedented transformations generated by globalization, pours a complex world.

Delors (1996) comments about thinking and building our common future, in which education has the mission of allowing everyone, without exception, to make all their talents and all their capacities for creation bear fruit, which implies that everyone can take responsibility for themselves and carry out their project.

Globalization is a global phenomenon that has generated the knowledge revolution, the effects on our lives respond to innovation through creative participation for incorporation into the life of the 21st century. The great challenge would consist in the transformation of our thinking, which clings to the traditional framework, denying the possibility of generating an evolution that does not keep up with the increasing speed of change and the unpredictability that characterizes this world (Mayor, 1999).

In this respect, Morín (2000) proposes interdisciplinarity to transform our ways of thinking, which imply permanent relearning and unlearning, or what we conceptually know as learning how to learn. An educational vision that leads to the modification of our pedagogical practices, because it is in the classroom where our behaviors are manifested and the ways to respond to the current educational complexity are evident (Escotet, 1992).

Faced with this scenario, educational institutions find themselves in the intricate situation of making changes in their structure, which is difficult to do because it implies the transformation of administrative and academic management. This work aims to reflect on the discrepancy between what is asked of educational institutions, within the framework of the knowledge society, and some situations experienced by teachers and students in the daily life of teaching a class.

The purpose of this work is to show the distance between the current educational postulate, learning how to learn, which involves the develop-

ment of complex cognitive processes, and the situations experienced in the process of teaching and learning in basic and higher education. For the first level, a secondary school principal's experience is taken; one of the authors of this work, to expose that the difficulties of daily life in a classroom, such as the environment of violence, learning problems, emotional problems, etc., limit the teacher to achieve this educational purpose since he or she also does not have the necessary tools to face these situations.

With this same approach, we reach the topic in higher education, starting from the existence of this distance between the educational vision of learning how to learn, but here with pedagogical practices, so we expose some learning strategies that can contribute to developing cognitive processes that support the self-management of the student.

THEORETICAL PERSPECTIVE

Today, in the field of education, we speak of self-regulation, autonomy, and learning how to learn, as processes that allow people to continue learning throughout their lives. They are concepts that represent the provision of intellectual and social tools to access continuous learning, and as a consequence, a permanent education that is generated as a strategy to face the learning needs of the 21st century. But what do we understand by these concepts? What are they for?

The concept of self-regulation was introduced by Albert Bandura in 1971 when he addressed his theory of "social learning". According to Bandura (1991) among the determining variables of self-regulated learning are those that concern the being as an individual -such as motivation, previous knowledge or learning strategies- those referred to performance, or behavioral ones such as self-observation, self-evaluation, self-reaction, and contextual ones, which correspond to the environment where self-regulation or external feedback is produced.

Brown (1978, p 77) defines self-regulation as "the conscious reflection on one's knowledge during the learning process" and specifies that it is a process that has to do with the management of cognitive resources for the control of lasting and necessary learning throughout life, through planning, monitoring, and evaluation, strategies that the individual employs to solve problems (Sáiz & Montero, 2015; Veenman, 2011). In this self-regulatory process, the use of previous knowledge is necessary for the evaluation of self-learning, as well as the definition of learning goals established by the student, which lead him to a process of constant reflection on what he wants to achieve and in how much time.

Holec (1981) defines the process of self-regulation as the ability that an individual develops to take charge of the conduct of his learning, through the

acquisition of intellectual and social tools, which facilitate the management of his learning and the generation of a growing autonomy in his academic studies. The development of the self-regulation process, such as learning goals and the use of previous knowledge, incorporated into the cognitive structure of individuals, can remain throughout life (Moreno & Martinez, 2007, p. 52), adding also the awareness of socio-affective processes (Crispin, 2011).

Finally, Moreno and Martinez (2005), underline the pedagogical effort of the teacher, necessary to guide the student to solve concrete aspects of his learning during the revision of his planning, control, and evaluation of behaviors, which will lead him to the accomplishment of a task. This pedagogical support is necessary until the student shows personal progress in his emotional and cognitive autonomy, through the observation of his ability to decide for himself, guided by his interests and needs (Sepulveda, 2003), adding the context of his ability to work in a team (Martin, 2008).

The previous conceptualization shows that living in the 21st century, the priority is for individuals to be ready to learn under the present context and the changes that are taking place, to have the capacity to use basic, modifiable, and uniform knowledge to generate more. The phrase from Abraham Lincoln is important here, *I do not think much of a man who is not wiser today than he was yesterday*, a comment that exposes the need for the ability to adapt to live new situations that the world offers and constantly transform. A person who lends himself to living these changes is a person who has learned how to learn.

Of the enunciated characteristics, we can affirm that learning how to learn is a process, that is to say; a set of learning associations chained to the human being, that is developed in a time and a space that can be infinite, whose phases lead to a specific objective, same that shows the appropriation of knowledge and competences to unfold their potential throughout their life. Then, we would assume that to learn how to learn, the teacher's role is still important and requires training and/or pedagogical updating to acquire the commitment to build, develop, and use their skills in students who have the willingness and motivation to learn in varied contextual situations.

METHODOLOGY

The present work is built under the methodology of a detailed, selective, and critical study that integrates the essential information in a unitary and overall perspective (Icart & Canela, 1994). Its purpose is to examine the published literature and place it into perspective (Ramos *et al*, 2003). The review starts from questions that guided the data collection, which was analyzed, units of analysis were established, and conclusions were drawn. The objective was to carry out a descriptive review of the literature that

would allow us to identify key elements to provide answers to new questions, as well as to identify theoretical approaches. We chose documents containing formal aspects and reviewed them: a critical reading of documents, the stages of carrying out a bibliographic review, or the elaboration of mind maps or concept maps.

LEARNING HOW TO LEARN IN A SECONDARY SCHOOL

Following Delors (1996) in his emphasis on life-long education, which implies the formation of new citizens to face the transformations of today's life in a complex world, and that the contents of the subjects have to foster the desire to learn, we are interested in mentioning the experience of a secondary school principal with teachers and students, underlining the distance that prevails between the school environment and the requirements of current teaching and learning, centered on the concept of learning how to learn.

To begin with, one of the questions that arise is how can the teacher harmonize the progress of scientific and technological development with the curricula and the knowledge needs of the students? They require several skills, such as the mastery of information and communication technologies, as well as research. In this regard, Tedesco (2011) points to the need to develop the learning how to learn competence of the teacher as a guide to learners, also their adaptation to changing attitudes and roles, and presents some questions, how to transform oneself to teach in this changing world? How to understand the culture of the 21st century? How to undertake this path?

UNESCO, through the complex thought of Edgar Morin (1999) expresses the challenge of the education of the future, learning how to learn from teachers and students, pointing out that both face a paradigm where new methods and problems are defined, generated by the diverse ways of life, which contradict the traditional approach of teaching and learning spaces. The need to transform teaching practices has generated a crisis for teachers, some because they do not have the necessary tools to face these paradigm changes and others because they resist such changes.

As a response to this vision of learning, the Mexican Educational System, guided by the philosophical thought expressed in Article 3, establishes that education is a right of Mexicans that should tend to the harmonious development of human beings; a humanist perspective that has the purpose of promoting the knowledge, skills, and competencies that children and adolescents need to reach their full realization (SEP, 2016: 39). But where does the concept of learning how to learn fit in so that the teacher acquires this new skill?

On the other hand, in basic education, the 2011 plan is presented as a design by competences, pointing out the development of these competences for life, that is to say, competences for lifelong learning, which is nothing

else than the satisfaction of current needs, as well as the way to face permanent risks of error and illusion. This framework contemplates the reading ability, the writing ability, the mastery of more than one language, as well as digital skills, pointing out the competence of learning how to learn.

Learning how to learn appears here as one more tool, of the same magnitude as digital skills or reading and writing, necessary tools to continue learning and with it the presence of lifelong learning. Then the category of learning how to learn is not seen as a different space containing its elements but joins the range of strategies to achieve this goal. So what does it mean to learn how to learn?

The basic education plan (2016, p. 39) proposes that the role of the school "is no longer to teach children and young people what they do not know, but what they need to learn how to learn." That is, a place eminently focused on learning strategies, on how to learn the content and not on the content itself. It repeatedly states that in addition to reading comprehension and written expression, it adds understanding of the natural and social world, analytical and critical reasoning, as well as creativity. Knowledge and skills are emphasized as fundamental for learning how to learn (SEP, 2016, p.40).

This plan brings as a consequence the transformation of teaching and learning and implies the construction of diverse methodologies that support the process of training, reconstruction, and updating the teacher's educational and pedagogical practice. This has not been possible, rather there is confusion and confrontation among teachers because of the lack of clarity on how to put into educational practice the educational concept of learning how to learn.

We know that today's school is no longer the only place to learn, due, among other things, to the infinite sources of information, a fact that forces the teacher to rethink education and his or her educational practice. The need for the creation of support spaces for teachers to guide them in the process of learning how to learn is fundamental. They cannot be asked to teach a process that they have not experienced themselves. In addition to this need, the teacher requires tools to deal with the context of violence inside and outside the school. Also, to know how to manage diversity, inclusion, and equity-like so many other problems you face in a classroom environment.

A FEW ISSUES IN CLASSROOM LIFE

Diversity, inclusion, and equity

A school that had the task of transmitting knowledge to a restricted population, under the principle that everyone should learn the same thing and at the same pace, now becomes a school that works with diversity, inclusion, and with equity, which transforms the way of teaching and learning. Added

to this understanding of new thinking is the influence of emotions on the process of teaching performance, where we know that they leave a lasting imprint, positive or negative, on learning achievements. So the function of the school would have to be transformed to generate spaces where to learn the appropriate methodologies. Here the teacher is included emotionally, as well as the students, to learn to think hand in hand with personal motivations. Likewise, to value what is learned together with others, the interest and motivation to learn throughout life must be fostered (Delors, 1996).

Today we talk about the methodological problem, which includes factors such as diversity, inclusion, and equity, this is a call of attention to say that the context of the classroom today acquires different connotations that involve teaching. Discourses on diversity have highlighted that difference is a value, pointing out that one does not work with special students, but with different people, therefore the school is a space of differences because in the current school students from different contexts and conditions converge to form a plural community. Particularly in secondary education, which has received this new modality of work called "working with the difference". If the students are different and the teachers are different, how can this interaction between learning and teaching be amalgamated?

The traditional school worked in one way: to learn the same thing and at the same pace, for equals, today it is understood that improving learning has to do with inclusion, to address the difference. Besides, it is also intended to set aside the memorism that tradition shaped into a methodology of learning and teaching, as a basic strategy in pedagogical practice. Now, the question is how to transform it or turn it into a useful tool for self-learning?

The fundamental premise that society is made up of diversity, where now the scope of learning is a universal right, regardless of individual characteristics, so the concept of educational inclusion has evolved in recent years, as it is often associated with students living in situations of poverty or who have special needs. Currently, a consensus has been reached among Latin American countries, expanding the concept to achieve greater access to education, in search of quality education without any discrimination, considering students with disabilities, indigenous populations, rural populations, migrants, or students who have dropped out of school.

Making a classroom inclusive has been a challenge for teachers and managers, because the differences permeate the context, the most intelligent students, students who fall behind, the passing students, the failing students; the teacher's decision on the conduct of the group, among other aspects that fall within the context of teaching practice. Regardless of emotional or cognitive development, teachers are involved in a transition from a model, in which their role was at the center of decisions, to a participatory one, in which the teacher has become the mediator of the teaching and learning

process. The topic of discussion here is whether the learning processes are enriched by this model, or whether teachers have the strategies and tools to support the development of inclusive education.

What we do know is that, on the issue of inclusion and equity, teachers are involved in the confusion generated by the transition that is taking place, primarily they are asked to evaluate students according to their performance, where no methodology allows the inclusion of all students in classroom work, because a homogeneous offer of opportunities becomes in inequality in learning. For this reason, it is understood that an equitable offer is necessary to take advantage of the richness of diversity and to transcend to a redistribution, restructuring, and change of the educational offer, but how to do it? There is no clarity about the theoretical and/or methodological support that can be provided to the teacher to accurately address this educational purpose.

As a strategy to intervene in the change in schools, the collegiate work of teachers and directors comes up, organized in the School Technical Council (CTE), a collegiate body, with a greater decision, in the technical and pedagogical environment of each school of Basic Education. It is in charge of making and executing decisions focused on reaching the maximum achievement of the students' learning. The seventh collegiate meeting, of a total of eight in the school year, was called "an inclusive school knows its students". Following this guide for collegial work, members discussed the diversity of students in their groups, asking themselves about progress in inclusion with equity in the school.

In the search for teachers to get involved in this new way of approaching learning, they presented three students from each of the groups that are at risk of not achieving the expected learning or in a situation of exclusion, to generate ways of addressing diversity from collegial participation. In this meeting, they built the strategies to address learning problems related to emotions, also for complications that students have in each subject, such as willingness to learn, or even problems of understanding the subject.

In these meetings it is reiterated that the problem of these students exceeds the capacity of attention, for example, there are children with visual impairment and the problem is not addressed, or most commonly, family emotional situations that affect their school performance, where the teacher does not have the tools to support them. In addition to the above, the teacher faces problems in which his or her actions come up against the culture of the students generated in this world of transformations, the teachers' culture and the contrast of the new educational culture, where failure and desertion in the model of inclusive education mean labeling, discrimination, and exclusion. It is now difficult to distinguish whether the failure is due to the lack of knowledge expected for a certain grade or to discriminatory causes.

Violence and delinquency

The external contexts of the school are influenced by vandalism, where violence takes place. Faced with this situation, the teacher coexists with aggressive environments, without finding the right answer to these situations, which become contexts of school culture, as well as the limitations to respond to the effects of these actions, which make a complex field. The characters with delinquent characteristics, become models of the students' lives, diminishing the motivation towards the teaching and learning process. They encourage the actions of the students with their social position and power, justified by this context of life: not bringing the materials to work, making it difficult to lead the group due to their actions; they need to mediate with the leaders to achieve the work in the classrooms.

This type of situation is only one of some that the teacher has to overcome, where even living these circumstances, the lack of commitment for the fulfillment of the learning objectives is pointed out. In the face of this diversity of situations, it is worth asking how educational models analyze school contexts to develop their work methodology.

Faced with the context of the problem of inclusion and violence, the task of learning how to learn is left to the teacher, with the necessary competencies to face these scenarios, in addition to fulfilling the educational purpose established in Article 3 of the Constitution, which refers to the harmonious development of all the faculties of the human being. Also, be prepared for the changes in the knowledge society, which requires you to acquire a greater ability to interpret the phenomena, creativity, and information management in changing environments.

The school is no longer the only place to learn, the infinite sources of information evoke circumstances that force a rethinking of compulsory education, where the development of critical thinking, analysis, logical reasoning, and argumentation, is only part of learning that facilitates the resolution of problems throughout life. While the other part is human development and socio-affective management, which are fundamental aspects of understanding and facing the changes that impact human beings emotionally and cognitively. The teacher faces a complex problem, represented by a group of individuals - the students - who synthesize the advance of the cultural change of the knowledge society, which progresses much faster than the educational culture of its context, its tools, and its pedagogical knowledge.

LEARNING HOW TO LEARN IN HIGHER SCHOOL

In the context of higher education and particularly in research training, the concept of learning how to learn has connotations such as the development

of complex cognitive processes and flexible thinking, creativity, innovation, self-regulation, aimed at the self-management development of the student, an idea increasingly reinforced in educational approaches that aim to review the present and future learning needs of university students. The question is, if in educational programs teachers have the academic structure to develop these processes or if it is assumed that students have already learned to be self-managing and it is not part of their teaching function.

This educational conception would imply sowing, first in the teachers, the conception of the meaning of continuous learning for the development of creativity and innovation, which are objectives for the development of research skills. In any educational modality, the teacher is the one who guides, in some way, the student's learning, hence the need to restructure their thought patterns, for the teaching of a class, tutoring, and directing a thesis.

Particularly in research training, the need is mentioned for a configuration of capacities to face problems of high complexity and uncertainty, even with sufficient cognitive preparation for the generation of innovative insights that make possible the discovery of alternative paths for the understanding of those problems that have a structure that is difficult to define (Abreu & De la Cruz, 2015). It is an advance to start discussing this profile of students that is related to the development of creativity, experts in research training confirm this (Moreno, 2013). The problem is that understanding conceptual meaning is not enough to know what cognitive and pedagogical tools are necessary to prepare students to face uncertainty and, above all, to lead them to insight.

While these processes are important in graduate studies, in research training they become more relevant to facilitate cognitive openness in posing research problems relevant to social needs. The development of flexibility of thought, creativity, complex thinking, and tolerance to uncertainty, represent complex processes of understanding in themselves. Both for knowledge of appropriate pedagogical practices for students and educational and research goals.

There is little research on pedagogical tools that can guide students towards the appropriation of cognitive tools for the understanding of personal learning. In this respect, it seems that too much emphasis has been placed on the need to solve complex problems and less attention has been paid to the cognitive difficulties that can prevent both teachers and students from perceiving and facing such complexity.

The teacher's review of these difficulties implies, among many other tasks, the recapitulation of his/her educational practice, the recovery and restructuring of his/her experience and knowledge to integrate them into his/her learning, to face the problems that today's society demands outside and within the school context. The educational or pedagogical practices that are complemented with technological resources to interact with students in

knowledge management must also be rethought. It is in this complex situation where questions arise in higher education, among them, the reinvention of the concept of learning itself as a continuous process, the creation of cognitive tools that require teachers and students to understand and cope with a complex reality, as well as what technological proposals, for the development of creativity.

As it is known, most of the university and postgraduate teachers do not have pedagogical training, their educational practice is a product of the experience and models learned during their professional training. Therefore, just as in basic education, there may be confusion in some concepts involving learning how to learn at this educational level, such as regulation and self-management of learning, tolerance of ambiguity, the meaning of an insight, etc., as well as in the pedagogical practices that may favor these processes.

In the case of training for research, the pedagogical practices, in many cases, are not oriented towards this purpose, but to the traditional curricular contents, of little interest for the students, abundant loads of readings in the seminars that, although they have formative intentions for research, are not always fulfilled. To address this situation, it is suggested to improve the quality of instruction, which involves the organization of learning experiences to live, outside and inside the classroom (Moreno, 2006). The perspective of the thesis direction should also be oriented as a pedagogical practice for the assessment of effective strategies for research learning (Fernández & Wainerman, 2013). There is insufficient research on pedagogical strategies to develop in the student cognitive tools that favor continuous learning. As an example of some of them, we will present three proposals to develop some cognitive processes related to learning how to learn; the first one, deals with the benefit of knowing how to elaborate inquiring questions, the second one exposes the reflexive implication of concept mapping and the third one describes the importance of learning goals.

Knowing how to elaborate inquiring questions

A recurring theme in proposals for the training of university students and, above all, in the training of researchers, is that students should have the tools to face the complexity of current problems. These cognitive tools should be conceived as a posture to educational problems, to develop creativity and self-management, as well as to use information in an educational way (Organist, Serrano, MacAnally & Lavigne, 2013). However, there is the question of whether educational contexts provide them with such tools, such as learning to question reality. Is it possible to face complexity

without questioning? Elaborating questions represents a cognitive exercise for the understanding of oneself, of others, and the social context.

To develop creativity it is necessary to encourage curiosity in the students, and for that, it is necessary to teach them to ask themselves about their interests, motivations, and academic problems. An example of the pedagogical value of the question in the classroom to develop the investigative observation of reality is presented by Plata (2011) as an option in the training of university students to contribute to education for uncertainty. Based on the ideas of Gadamer and Freire, it talks about the benefits of using the question as a tool for students to learn to think for themselves, serve as a guide to introduce them to knowledge by recognizing their interests and formulate explanatory hypotheses from their own experience. Returning to Gadamer (1999), he states that the basis of the desire to know "presupposes a knowledge that is not known, the determination not to know being what gives that first sense of openness to the question; that is why all knowledge must first pass through the question" (p.148). In this research experience, it is shown that the importance of asking questions is unknown by the students, even, it is not appreciated as a task linked to the research work, nor for their professional activity. The answer that we present, from one of the participants, gives us evidence to reflect about how in the teaching work we can give answers without questions or digested knowledge without relating them to the personal interests of the students. Organista (*et al*, 2013) when asked about what they thought, they answer "we get used to the fact that they give us everything so we don't know how to react with questions, communicate with questions to develop more interests and more knowledge. So the investigative spirit is cut off".

This expression about "everything is given to us" can not only refer to teachers but to the information, they obtain through different technological devices, which are accessible to most students, which, however, it has been observed that they are not used as a tool for a personal educational benefit (Plata, 2011, p. 18). Inquiry questions can also be generated by the student himself during the teacher's classroom presentation. It has been observed in research on the usefulness of notes and annotations for learning, students who apply summary strategies and also, self-interrogation strategies improve understanding as well as recall of information (Espino & Miras, 2013).

We consider the practice of asking questions in-class notes, has been a vivid pedagogical experience. Recently, in a graduate course, students were asked to submit a handwritten report on the suggested readings; they were not asked for a summary, but personal reflections on the readings. Two of them deliver their report and add personal questions, related the doubts with the positions of the revised theories, and also linked to their thesis research topic. Questions that are taken as part of the topics to be discussed

in class, to cover the empty learning spaces not only of this student but also of the others. In this way, the questions served as the binding link from the previous class to the present one.

Reflective involvement of concept maps

In higher education, the need to update teachers to review their pedagogical practice in the development of materials and tools, appropriate to their style and subjects to be taught, is relevant. With the technological development, several alternatives have been offered to the teacher, the incorporation of games as a learning strategy, multimedia educational materials, training from the platform, etc., Moodle (Díaz, Villalobos González-Pienda & Nuñez, 2017). In this last research, the authors highlight the role of the teacher, both in virtual and face-to-face learning, mentioning that the teacher represents a reference to support students in an important aspect for the development of student autonomy by making the student see the capabilities that he or she does not perceive of himself or herself.

From this idea, research exploring the training of pedagogical skills in teacher education is relevant because it can be incorporated previously into their professional practice. Also, such training can reveal their abilities and disabilities, which position them in experiencing the learning process as a student lives it. Reyes and Ramos (2018) present research with teachers of the seventh semester of the major in pedagogy, which aims to observe the benefit of developing concept maps to be used as a tool for learning and also as a strategy that enables a metacognitive process.

The authors show how by elaborating concept maps on the notions of didactics, mathematics, and class design, as well as the reasons they had for doing them that way, a progression takes place, both in learning and in the treatment of conceptual elaboration. The difficulty of the participants to elaborate the concept maps is highlighted; during the process of the realization of the task, they are discovering the cognitive and emotional problems that imply the restructuring of their thought, the selection of the knowledge, the organization of ideas, and the hierarchy of concepts. The reflective process is constant, so at the same time that the induction towards metacognition is observed, the progression of the professor's thought is emphasized, evolving in the sense of recognizing his problems to synthesize his knowledge, order it conceptually, etc.

The relevance of this research is the reflective involvement of the teacher, through the learning of a tool that facilitates the development of their thinking, breaking fixed structures of how to present knowledge. Also, this process, which leads to metacognition, experiences the process of learning that you can later transfer with your students.

Learning goals and formative evaluation

The design of learning goals, centered on the development of competence and mastery of the task, represents one of the components of the process of self-regulation of learning and has been addressed in current research, both in its theoretical postulates and pedagogical interventions (Valle, Rodríguez, Núñez, González-Pienda & Rosario, 2007). Goal setting is a complex activity, which involves a cognitive reordering to prioritize interests and to recognize the motivations that lead to their realization. Since Sternberg's theory of thinking styles (1999), this cognitive activity is represented in hierarchical thinking, manifested in the planning of their mental processes, according to their personal goals, academic or non-academic, it is also a thought that enhances the development of creativity.

Some empirical works have shown that hierarchical thinking contributes to the development of metacognitive consciousness (Valadez & Moreno, 2017). In this regard, a pedagogical intervention is carried out with graduate students, to observe if the recognition of their thinking style can be a metacognitive tool that facilitates the detection of problems in their thesis research progress. The results show that the scarce development of hierarchical thinking negatively affects the decision of the research topic (Valadez, 2016). Taking into account these results, it is proposed that the recognition of thinking styles can initiate a self-management process in students, particularly, the development of hierarchical thinking, which can exercise the definition of goals oriented to personal interests.

The relationship between learning goals and assessment focuses on considering a formative assessment process in the sense that assessment becomes an opportunity to support learning by promoting self-regulation. This type of assessment encourages students to decide their own learning goals, taking into account their context and needs, including their style of thinking, to enjoy their learning. Thus, evaluation is a recapitulation on the fulfillment of that goal, an activity that also favors the metacognition and error recognition as part of their learning (Alvarez, 2008).

CONCLUSIONS

As mentioned throughout this work, the concept of learning represents a desirable concept, unsupported by educational practice. Although basic and higher education has different referents, what prevails in both are traditional practices and educational environments that do not favor a change in the perception of teaching. The social complexity, shown in students in the basic education classrooms, has surpassed the teacher and the school structure. Educational research that includes context is required to know the charac-

teristics of the school and to provide alternatives and pedagogical support to teachers to initiate a change in the perception of learning.

It would be desirable that teachers, both at the basic and higher levels, experience a change in thinking to learn how to learn. If this does not happen, it is difficult for them to transfer it to their students, and the distance between the concept and the pedagogical practice will be present, especially in higher education, and postgraduate courses, which aim at the self-management development of students for innovation and creativity, which require changes in educational practice.

The pedagogical proposals presented show the importance of the pedagogical design of a class to teach thinking; also that the activity of reading is not enough for its comprehension, even in abundant quantities. It is necessary to use strategies, such as scaffolding, for students to build their learning and develop their cognitive tools.

Learning how to learn implies effort, disposition, and interest of the teacher and the student, for the permanent reflexive activity, not only on the knowledge but on oneself and the relationship with others. It is a task and research topic to know the distance between this concept and the daily life of the educational and personal environment.

REFERENCES

Alvarez, I. M (2008). Evaluar para contribuir a la autorregulación del aprendizaje. *Electronic Journal of Research in Educational Psychology 7*(3), 1696-2095.

Abreu, L. F., y De la Cruz, G. (2015). Crisis en la calidad del posgrado ¿Evaluación de la obviedad, o evaluación de procesos para impulsar la innovación en la sociedad del conocimiento? *Perfiles educativos, 37*(147), 162-182.

Bandura, A. (1971). Analysis of modeling processes. In A. Bandura (Ed.), *Psychological modeling*: Conflicting theories. Chicago: Aldine-Atherton.

Brown, A. L. (1978). Knowing when, where, and how to remember: A problem of metacognition. En R. Glaser (Ed.), *Advances in Instructional Psychology* (Vol.1, pp.77-165). New York: Halsted Press.

Brunner, J. (1998). *Globalización Cultural y Posmodernidad. Chile*: FCE.

Brunner, J. y Tedesco, C. (2003). *Las nuevas tecnologías y el futuro de la educación*. Buenos Aires. IIPE UNESCO.

Crispín, B. (2011).*Aprendizaje autónomo: orientaciones para la docencia*. México: Universidad Iberoamericana.

Departamento de Educación del Gobierno Vasco. (2012). *Competencia para Aprender a Aprender.* Recuperado desde: http://ediagnostikoak.net/edweb/ cas/materiales-informativos/ ED_marko_teorikoak/ Aprender_a_ aprender.pdf

Delors, J. (1996). *La educación encierra un tesoro*. París: Santillana-UNESCO.

Diaz, A., Villalobos, M.V., González-Pienda, J.A. y Nuñez (2017). Impacto de un entrenamiento en aprendizaje autorregulado en estudiantes universitarios. *Perfiles educativos, 39*(157), 87-104.

Escotet, M. (1992). *Aprender para el futuro*. Madrid: Alianza

Espino, S., Y Miras, M. (2013). El proceso de anotación y uso posterior de los apuntes para el aprendizaje. *Revista Mexicana de Investigación Educativa, 18*(159), 1257-1280.

Fernández, L. y Wainerman, C. (2013).La dirección de tesis de posgrado: ¿una práctica pedagógica? *Perfiles educativos, 37*(148), 156-171.

Ferrater- Mora, J. (2009). *Diccionario de filosofía*. Barcelona: Editorial Ariel.

Gadamer, Hans-Georg (1999), *Verdad y método*. Salamanca, Ediciones Sígueme.

Holec, H. (1981). *Autonomy in Foreign Language Learning*: Oxford University Press.

Icart Isern, M. T., & Canela Soler, J. (1994). *El artículo de revisión. Enfermería clínica. 4*(4), 180- 184.

Martín, E. (2008). *Aprender a aprender: una competencia básica entre las básicas*. Madrid: Universidad autónoma de Madrid.

Mayor J. (1995). *Aprender a aprender y aprender a pensar*. Madrid, Editorial Síntesis.

Moreno, R.; Martínez, R. (2007). Aprendizaje autónomo. Desarrollo de una definición Acta Comportamentalia: *Revista Latina de Análisis de Comportamiento, vol. 15,* núm. 1, pp. 51- 62 Universidad Veracruzana. Veracruz, México.

Moreno, M.G. (2006). *Formación para la investigación*. Guadalajara, México: Universidad de Guadalajara.

Moreno, M. G. (2013). Retos actuales de la formación de investigadores en educación en México. En M. G. Moreno y M. Valadez, *Miradas analíticas sobre la educación superior.* Guadalajara, México: Universidad de Guadalajara, 415-424.

Organista- Sandoval, J. Serrano-Santoyo, A. MacAnall, L. y Lavigne (2013). Apropiación y usos educativos del celular por estudiantes docentes universitarios. *Revista electrónica de Investigación Educativa 15*(3) ,138-156.

Morín, E. (2000). *Los siete saberes necesarios para la educación del futuro*. UNESCO - IESALC, Ediciones Faces/UCV. Caracas

Plata, M. E. (2011). Procesos de indagación a partir de la pregunta. Una experiencia de formación en investigación. *Praxis & Saber 2*(3) ,139-171.

Ramos, M. H., Ramos, M. F., & Romero, E. (2003). Cómo escribir un artículo de revisión. Revista de postgrado de la VIa Catedra de Medicina (126), Disponible en http://med.unne.edu.ar/revista/revista126/como_esc_articulo.htm. [Consultado ocho de octubre de 2019].

Reyes- Santander, P.A., y Ramos-Rodriguez, E. (2018). Mapas Conceptuales en la educación matemática en nivel universitario. *Revista electrónica de Investigación Educativa 20*(2), 25-36.

Reimers, F. (2016). *Teaching and Learning for the Twenty First Century*. Cambridge: Harvard Education Press.

Sternberg, R.J. (1999). *Estilos de Pensamiento*. Barcelona, España.

Sáiz, M.C. & Montero, E. (2015). *Metacognition, Self-regulation and Assessment in ProblemSolving Processes at University*. En A. PeñaAyala (Ed.), Metacognition: Fundaments, Applications, and Trends (pp.1-27). doi 10.1007/978-3-319- 11062-2-5.

SEP (2016). *Educar para la libertad y la creatividad*. México: SEP.

SEP (2016).*Modelo educativo 2016*. Mexico: SEP.

Sepúlveda R. (2003). Autonomía moral: Una posibilidad para el desarrollo humano desde la ética de la responsabilidad solidaria. *Revista de Psicología, vol. 12*, núm. 1, 2003, pp. 27-35 Universidad de Chile Santiago, Chile.

Tedesco, J. (2011). Los desafíos de la educación básica en el siglo XXI. *Revista Iberoamericana de Educación, 55*(1), 31-47. Recuperado de http://rieoei.org/rie_contenedor. php?numero=rie55

Valadez, M. (2016). Indicios para gestionar el aprendizaje personal identificando los estilos de pensamiento. En M. Valadez, M. G. Moreno y C.E.

Vivero, *Avances y perspectivas de la investigación educativa y de género*. Guadalajara, México: Universidad de Guadalajara, 107-117.

Valadez, M.; Moreno, M.G. y Romero, M.A. (2017). Transiciones en la formación de posgrado. Recuperación de la experiencia y acercamiento conceptual desde tres enfoques. En V. Ortiz y A. Ponce, *Diversas miradas sobre el posgrado y la investigación educativa en Latinoamérica.* Guadalajara, México: Universidad de Guadalajara.

Valle, A., Rodríguez,.S. Nuñez, J.C., González-Pienda, J.A. y Rosario, P. (2007) Metas académicas y estrategias de aprendizaje en estudiantes univesitarios. *Revista Semestral du Associação Brasileira de Psicología Escolar 11*(1),31-40.

Veenman, M. (2011). Learning to Self-Monitor and Self-Regulate. En R. E. Mayer y P. A. Alexander (Eds.), *Handbook of Research on Learning and Instruction* (pp. 197-218). New York and London: Routledge.

UNESCO (2017). *Replantear la Educación ¿Hacia un bien común mundial?* Paris. UNESCO.