

**THE ACHIEVEMENT OF LEARNING IN MATHEMATICS: PENDING SUBJECT
ON THE AGENDA OF EDUCATIONAL POLICIES IN MEXICO, FOR HIGHER
SECONDARY EDUCATION**

**A CONQUISTA DA APRENDIZAGEM EM MATEMÁTICA: MATÉRIA PENDENTE NA
AGENDA DE POLÍTICAS EDUCACIONAIS DO MÉXICO, PARA O ENSINO
SECUNDÁRIO SUPERIOR**

**EL LOGRO DEL APRENDIZAJE EN MATEMÁTICAS: ASIGNATURA PENDIENTE
EN LA AGENDA DE LAS POLÍTICAS EDUCATIVAS EN MÉXICO, PARA LA
EDUCACIÓN MEDIA SUPERIOR**

Cecilia Osuna LEVER¹

ABSTRACT: In this article we do a reflection on the main educational reforms of recent years in Mexico, briefly describing which and how many have been, culminating with the recent 2019 Educational Reform. We point out, the fact that little information exists on the impact that the implementation of the reforms in the country has had, commenting on some of the published reports that analyze the previous 2013 Educational Reform. Derived from this, it is explained what an educational policy is and how in Mexico, at the moment, there is no official document about the educational policy for the current six-year term and based on the new reform, and a brief analysis is presented on non-achievement in mathematics in higher secondary education. Consigning the urgency of designing educational policies that address, among others, the problem of low academic performance at this educational level.

KEYWORDS: Educational reforms. Educational policies. Academic achievement in mathematics. Higher secondary education.

RESUMO: *Realiza-se uma reflexão sobre as principais reformas educacionais dos últimos anos no México, descrevendo sucintamente quais e quantas foram culminando com a recente Reforma Educacional de 2019. Registra-se o fato de que existem poucas informações sobre o impacto que teve a implementação das reformas no país, comentando alguns dos relatórios publicados que analisam a Reforma Educacional 201 feita anteriormente. A partir disso, explica-se o que é uma política educacional e como, no México, no momento, não existe documento oficial sobre política educacional para a atual gestão de seis anos e que tenha como base a nova reforma, realiza-se também uma breve análise que apresenta o insucesso em matemática no ensino médio. Consignando a urgência de se traçar políticas educacionais que abordem, entre outros, o problema do baixo desempenho acadêmico neste nível educacional.*

PALAVRAS-CHAVE: *Reformas educacionais. Políticas educacionais. Desempenho acadêmico em matemática. Educação secundária superior.*

¹CETYS Universidad, México. Profesora. Doctora en ciencias educativas. Universidad Autónoma de Baja California Instituto de Investigación y Desarrollo Educativo. ORCID: <https://orcid.org/0000-0002-7480-5341>. E-mail: cecilia.osuna@cetys.mx

RESUMEN: *Se aborda una reflexión sobre las principales reformas educativas de los últimos años en México, describiendo brevemente cuáles y cuántas han sido, culminando con la reciente Reforma Educativa 2019. Se consigna el hecho de la poca información que existe sobre el impacto que han tenido la implementación de las reformas en el país, comentando algunos de los reportes publicados que analizan la anterior Reforma Educativa 2013. Derivado de esto, se explica lo que es una política educativa y cómo en México al momento, no se cuenta con ningún documento oficial sobre la política educativa para el sexenio en turno y que tenga como base la nueva reforma y, se presenta un breve análisis sobre el no logro académico en matemáticas en educación media superior. É urgente que as políticas educacionais sejam projetadas para abordar, entre outras coisas, o problema do baixo desempenho acadêmico neste nível educacional.*

PALABRAS CLAVE: *Reformas educativas. Políticas educativas. Conquista acadêmica em matemática. Ensino secundário superior.*

Introduction

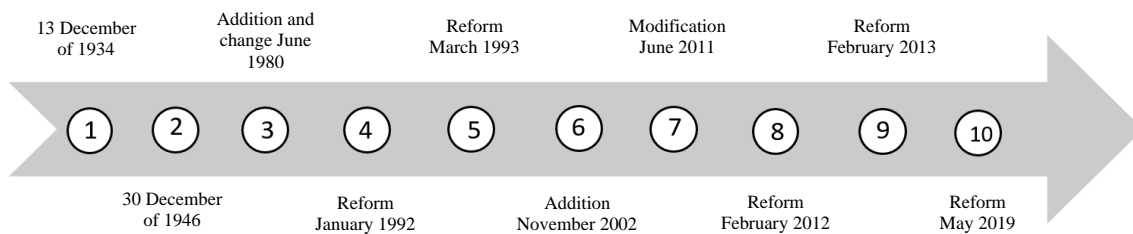
The Mexican educational system is one of the largest in Latin America, considering that it serves more than thirty-six million students at its different educational levels (National Institute for Educational Evaluation (INEE, 2018a). In compulsory education (basic and higher secondary) more than thirty million students are enrolled, of which approximately 75% are attended in pre-school, elementary and high school, with the remainder in higher secondary education (undergraduate) (INEE, 2018b). More than five million students are enrolled at the Higher Education level (undergraduate and graduate), however, despite this high level of student recruitment, in terms of school assistance, there is a high rate of educational failure and persistence of great differences between the federated entities that constitute the country.

For example, Chihuahua, Chiapas and Oaxaca, are the states where fewer school-age children attend school. At the secondary level, Chiapas and Michoacán are more than 9 percentage points below the states with the highest frequency and, at the level of Higher Education, Michoacán, Chiapas, Guanajuato, Oaxaca, Aguascalientes and Durango have frequency levels below 70%. This leads us to the differential efforts of States to expand attendance at this educational level (INEE, 2018b) and, in turn, reflects an issue regarding the real scope of students in the Mexican educational system that requires urgent attention, in addition to many others which we will describe below.

In Mexico, some institutional efforts have been made to improve educational quality and service delivery. So much so that, in recent years, there have been several reforms,

changes and amendments to Article 3 of the Constitution, which establishes the right to education. To date, there are ten reforms and amendments, as shown in Figure 1.

Figure 1 – Reforms and amendments to the third constitutional article in Mexico



Source: Devised by the authors based in Trujillo (2015)

Describing in detail each of the modifications or reforms to such a constitutional rule exceeds the intended scope of this work, for this reason, we will only describe some changes that impacted, above all, the higher secondary educational level (SEM), as it is the educational level of greatest interest for this article. For example, in terms of curriculum planning, in 2003 a change proposal was made for Bachelor's degrees and, in 2004, another for Technological Bachelor's degrees. These were minor changes. Subsequently and, for this same educational level, in 2008, the *Integral Reform for Higher Secondary Education* (known as RIEMS) was promoted, the same that established the creation of the Bachelor's Educational System that unified all the subsystems of Bachelor's, among other things, by incorporating the competency model into school curricula. At the SEM level this was a substantial reform.

However, in terms of structural reforms, one of the most significant was that of 2012, when the mandatory nature of higher secondary education was elevated to constitutional status (DOF, 2012). This marked a step forward, since, previously in Mexico, only the previous level (secondary education) was required, as the maximum level of compulsory studies. This change in the constitutional rule constituted the eighth reform since 1934. Also in 2012 and in the curriculum update plan, the *Curriculum Reform of Normal Education* was promoted (SEP, 2012), focused primarily on the incorporation of information and communication technologies, as tools didactic and pedagogical skills in the teaching curriculum, as well as knowledge of English as part of teaching skills, with the purpose of forming teachers capable of responding to the demands that were inevitable at this time.

In the following year, in 2013, the ninth constitutional reform called *2013 Educational Reform* was enacted, one of the most important of which is recorded, due to the large number

of changes that contemplated and impacted the entire mandatory National Educational System (SEM). For example, it was added to the constitutional text that education in Mexico should be of “quality”, the Professional Teaching Service was set up to regulate and evaluate the admission and promotion of teaching professionals and was created the National Institute for Educational Evaluation (INEE), with objective of creating evaluative mechanisms to monitor the quality, performance and results of the national educational system in pre-school, elementary, secondary and higher secondary education. Similarly, management autonomy for schools was included and full-time schools were created, among other aspects (DOF, 2013). In the words of Martínez and Navarro (2018, p. 25, our translation) “this reform drew attention due to the fact that, for a long period, it was not possible to carry out a change of such magnitude in the educational system” and this differed because it was a major reform (PERAZA; BETANCOURT, 2018). Since, as never before, significant changes have been incorporated into the constitutional rule.

However, this reform was short-lived, since in December 2018 there was a change in the federal executive power and, in May 2019, the new government, by conduction of the Union Congress, enacted what would be the tenth structural reform in article three. It approved the initiative for the total revocation of the *2013 Educational Reform*, articles 3, 31 and 73 were modified in our Constitution, thus disappearing the newly created INEE, which was replaced by the National Center for the Revaluation of Teaching and Continuous Improvement of Education. The evaluation of the teaching profession was also eliminated and some specific curricular contents were included, namely: strengthening mathematics teaching, reading and writing, literacy, sexual and reproductive education, civility, values, culture, art, music, sports, environment, among other changes in the Law. These curricular innovations were designed to start from the next school year 2020-2021. Likewise, the mandatory character of Higher Education has been elevated to the constitutional category, although the right to promote it or not be left to the States, according to the educational capacity installed in each one of them, so that, in reality, this requirement is not yet applicable.

As you can see, there have been several educational reforms. According to Trujillo (2015), each of the changes in the constitution reflects the ideological positions of power groups, which is why, in Mexico, there was no continuity or coherence between such reforms, since in recent years there has been no partisan alternation in educational power national. With respect to this, Rhoads, Saenz and Carducci (2005), indicate the relevance of coherent and pertinent educational reforms. The main reason for this is that they are associated with the generation of opportunities and appropriate educational environments to obtain more and

better learning, indispensable conditions to have a more just and equal society, as well as an educational system that meets the needs of all groups. social.

That is why well-planned and implemented structural reforms can be highly beneficial for a country. However, in most of the cases listed above, the reforms were not planned or implemented properly. In Mexico, regrettably, there is no continuity in educational policy and there is no preference for sustaining actions that can positively impact educational improvement, regardless of partisan interests.

The evaluation of educational reforms

In Mexico, there is little knowledge about the evaluation of systematic results regarding the implementation of most reforms and their impact on the National Educational System (SEM). The period with the most information was related to the *2013 Educational Reform*. For example, in 2018 the now defunct INEE, proposed a series of seminars with experts, to discuss and evaluate the progress and challenges of such reform, addressing the main elements that have been derived of it, such as teacher evaluation, school by school, educational attention to disadvantaged populations, the new educational model, INEE within the scope of Education Reform, governance dilemmas of the educational system, challenges in teacher formation (INEE, 2018c). These seminars, although valuable, did not generate a document that evidenced the systematic assessment of the different topics that the reform addressed, as well as specific suggestions for improvement, since the real impact of such an effort is unknown.

On the other hand, the Higher Audit of the Federation of the Chamber of Deputies (GOVERNO DO MÉXICO, 2017), published an extensive document with a more comprehensive assessment of the *2013 Educational Reform*, whose general conclusion was as follows:

The results of the evaluation show that although the Federal Government conceptualized the public problem, highlighting the persistence of low quality in basic education in the medium-term planning documents, it did not identify some of its causal factors; In addition, it lacked a precise and complete quantification of the main associated variables, since it did not have parameters, nor a diagnosis that would allow quantitatively measuring the magnitude of the public problem in the SEN, nor in its components. This suggests that the public intervention had insufficient support to justify its design (p. 477, our translation).

That is, the Government had some idea of the main educational issues, but did not consider the causes that originated them and the variables associated with such problems, since, with respect to the authors of such document, they did not have enough elements to justify the planning of mentioned reform and, therefore, the appropriate parameters to assess its impact or specific indicators to identify the achievements and progress of its implementation.

The evaluation mentioned earlier focused on several themes, but with respect to the behavior of the three main indicators related to school performance: educational achievement, terminal efficiency and school dropout (topics of interest in this article), the analysis of the Chamber of Deputies pointed out that, in the achievement educational, the results of the national PLANEA tests of 2015, 2017 and 2018, there was no perceived improvement in the students' level of learning. As for school dropout and terminal effectiveness, no clear progress was demonstrated during the period of implementation of the education reform, and yet, the authors mention, that in some years there were trends contrary to expectations. They conclude by recommending that:

The SEP, in coordination with the INEE, designs and implements a methodology to establish comprehensive evaluation models that articulate the components, processes and results of the SEN, in order to generate useful information for the decision-making of federal and local educational authorities, aimed at improving the quality of educational services (GOBIERNO DE MÉXICO, 2017, p. 481, our translation).

The previous comment reveals that there were no adequate mechanisms to carry out a comprehensive assessment of the results of the implementation of such a reform and, therefore, few elements to support decision-making. Although they point out that the expected results were projected to reach ten years after the implementation of such reform. It is also unknown whether at any time the recommendations described above have been taken into account.

Another document that the Senate of the Republic promoted in 2018 (MARTÍNEZ; NAVARRO 2018), addresses an analysis of the 2013 Educational Reform, entitled: Educational Reform and the review: notes and reflections for the elaboration of an educational agenda 2018-2020. It evaluated several of the aspects involved in the reform, but focusing on the problem of academic achievement (theme of interest in this article), Vergara and Hevia (2018), point out in such a compilation that students from the National Educational System continue to present low results in Language and Communication, Mathematics and other areas, as well as fundamental deficiencies in the key learning of the official curriculum, which

did not allow future learning. They conclude that, in the reform in question, it was not “clear what kind of specific alternatives this reform offers to a fundamental problem of educational quality and equity: the learning deficit” (p. 47, our translation).

In this theme, the authors carried out an analysis in different federative entities and concluded that the new educational model derived from such reform “has few answers and strategies to reduce the learning deficit” (VERGARA; HEVIA, 2018, p. 60, our translation), besides it indicates that school performance in our country is deficient, widespread and has been suffering for decades (VERGARA; HEVIA, 2018). A relevant fact is that no significant differences were found in students attending private schools compared to public schools, thus generalizing the problem without any obvious distinctions.

As it is possible to observe, these evaluations of results of the *2013 Educational Reform* reflect that the educational problems persist (HERNÁNDEZ, 2018) and although some authors point criticisms or suggestions for the decision making (MIRANDA, 2018) and other authors emphasize some benefits of reform (CABRERA, 2018; PERAZA; BETANCOURT, 2018), there is no evidence that such suggestions have been taken into account, nor have sufficient arguments been found to say that the educational quality of the National Educational System (SEN) has increased as a result of such Implementation.

In this context and in view of the persistence of educational problems, the new federal government opted to totally invalidate all elements and proposals related to *2013 Educational Reform*, and promulgated (as already described in the introduction to this text) the *new 2019 Educational Reform*. However, there are twelve months of promulgation at the moment, and no official documents that indicate how compliance with this new reform will be assessed, nor do we have precise educational indicators or targets to evaluate teachers in the service or even to promote its updating. Nor do we have strategies to mitigate the educational deficit or to increase achievement in school learning, there are no guidelines in the context of curriculum evaluation to recruit educational plans and programs in their content, in order to adapt them to the current world context characterized by multiple scientific and technological advances. In other words, there is little knowledge about the development or implementation of the new *2019 Educational Reform*, nor is there any educational policy that derives from it.

Thus, after ten reforms to article three of the Constitution plus other amendments described above, the SEN continues to have deficiencies and unresolved educational problems. According to Guevara (2016), this educational crisis has had historical sources for more than 70 years. In this sense, we highlight some of these problems: the lack of educational inclusion of the population in vulnerable conditions, ignored intercultural

bilingual education, adequate teacher formation that requires absolute relevance, the definition of a new compact and coherent educational model with true key-learning that prepares for universal citizenship, oriented to the current context of the knowledge society and to the industrial revolution in version 4.0, and above all, the persistent deficit in key-learning, one of which is part of the central body of this text, the low academic achievement in mathematics, a fundamental subject for the formation of engineers and technicians who develop technology in this interconnected and automated context. In Mexico, we are waiting for the educational policies that will guide the approach to these problems.

Educational policies

According to Navarrete *et al.* (2018, p. 11), educational policies are generally promoted "by a power that, for better or for worse, educates". In the case of Mexico, this refers mainly to the Federal Government, which, through the Secretariat of Public Education (SEP), is responsible for making educational reforms a reality and offering education to Mexican citizens. In this sense, educational policy is commonly used to respond urgently to certain problems at a given historical moment (FOUCAULT, 1992) and, as mentioned above, educational reforms and policies are formulated based on certain ideologies promoted mainly by leaders in power (TRUJILLO, 2015). Thus, "educational actors become subjects of educational policy, generally recognized as central elements in the implementation of this policy and in the improvement of education" (NAVARRETE *et al.*, 2018, p. 12, our translation).

In order to comply with educational policy stipulations, specific plans or programs must be designed to address issues of urgent concern, with clear objectives and mechanisms for their implementation, as well as for their evaluation. In other words, it is essential to make educational reform operational through a policy with procedures that establish all the parameters necessary for its implementation, evaluation, process feedback and decision making, otherwise the reform remains a dead letter. For this purpose, in Mexico, each sexennium, the federal government organizes a *Sectorial Education Plan*, an official document that ideally should reflect objectives, strategies, goals and lines of action for the implementation of sexenary educational policies. This document is useful to guide educational efforts to be able to monitor the progress of the goals and to evaluate more systematically the results obtained.

At the moment, there is no such document (or any similar one) derived from the current Education Reform of 2019 that establishes, for example, answers to the questions: how will teachers be evaluated in service? With what indicators or parameters? How and who will measure the performance of Mexican children and youth in school learning? With what mechanisms will learning improvement be evident or not? How will we know the impact that the new content that we intend to include in the curriculum of the compulsory education system will have? And, therefore, who will evaluate the effectiveness of the school curriculum? How will we identify parents' involvement in their children's educational process? Among many other unanswered questions.

That is, it is currently not known with certainty what are the actions that will seek to address the main problems of the country in this matter and thus guide itself to increase the national educational level. There is no clear educational agenda for the current government to answer these questions.

Academic achievement in mathematics in higher secondary education

Once the apparent little success of the reforms has been presented and many of the most serious problems that the National Education System faces are listed; for the purposes of this article we will focus on the low academic achievement in mathematics at the level of Higher Secondary Education (bachelor's degree) for the following reasons: a) it is documented that the failure of this discipline is one of the causes that influence the school dropout at this educational level (OSUNA; DÍAZ ; GÁRATE; CONTRERAS; MURILLO, 2016). In our country, the bachelor's degree is the educational level at which the highest school dropout rates are reported (12.1%). Related to this, there is a 13.77% failure rate, 66.6% terminal effectiveness and 76.6% coverage (SEP, 2018), thus, the school dropout problem is one of the educational problems that demand more attention in Mexico, b) Higher secondary education is the last level of constitutionally mandatory education in Mexico and it is important to make a "cut" to analyze how students graduate from this level of education, since many of them will be fully incorporated into the labor market, c) it is the mandatory previous level for young people seeking to join Higher Education and it is considered important to identify which mathematical skills they encounter at this educational level and, d) the great importance that mathematics has as a foundation for the development of technology, essential for the growth of a country, given the current globalized and technologically revolutionized context.

On this last point, Craveri and Anido (2014) emphasize the importance of mathematics, arguing that there is a strong correlation between the technological development of a society and the level of insertion of this discipline in its techniques, in order to solve problems of all kinds and become a necessary condition for a country's scientific, technological and social development. Currently with the presence of the COVID-19 pandemic, we are seeing how the countries best prepared in terms of technology and scientific advances, are dealing more efficiently and quickly with this problem, such as Korea, China, Singapore and Germany, among others.

In Mexico, the low academic achievement in mathematics is an issue that deserves attention, because the results that young Mexicans obtain in international tests such as PISA (applied by the OECD every 3 years), reveal that they are not developing the minimum mathematical skills for the society of knowledge. According to the OECD (2010), mathematical skills are defined as:

The ability of an individual to analyze, reason, and communicate effectively while posing, solving, and interpreting mathematical problems in a variety of situations that include quantitative, spatial, probability, or other mathematical concepts (OCDE, 2010, p. 23, our translation).

That is, in Mexico, our young people cannot analyze, solve and interpret mathematical problems of any kind, once the results obtained from the last applications of PISA position them very below the average of two recognized countries (see table 1).

Table 1 – Concentrated results of the performance of two Mexican adolescents in mathematics (PISA applications from 2003 to 2015)

Applications	Mathematics	
	Results Mexico (score)	OCDE Average (score)
PISA 2003	385	500
PISA 2006	406	500
PISA 2009	419	496
PISA 2012	413	494
PISA 2015	408	490
PISA 2018	409	489

Source: Devised by the authors based on the relative bibliography (OCDE, 2004; MUÑOZ-IZQUIERDO, 2005; INEE, 2007; OCDE, 2009; OCDE, 2010; INEE, 2010; OCDE, 2014; OCDE, 2016; OCDE, 2018)

The most worrying is that, according to the OECD (2018), Mexico's average performance has remained stable in mathematics throughout most of the participation in PISA. In other words, we have a flat trend, with practically no variations in relation to what

we have improved in the mathematical skills of our students over 15 years. Only “approximately 44% of students in Mexico reached level 2 or higher in mathematics” (OCDE, 2018, p. 4), while on average in OECD countries, 76% of students obtained at least a competency level 2 in mathematics, out of the 5 possible levels. And only about 1% of Mexican students achieved a level of competence 5 or higher in mathematics, while students from Asian countries had the highest proportion of students who did: Beijing (China) just over 44%, Singapore (almost 37%), Hong Kong (China) (29%), Macau (China) almost 28%, China Taipei, 23% and Korea 21%. Thus, Asian adolescents can model complex situations mathematically and "can select, compare and evaluate appropriate problem-solving strategies to deal with them" (OCDE, 2018, p. 4, our translation). It is not like this for Mexican students.

In the scope of national assessments, we refer only to the *National Plan for the Assessment of Learning* (known as the PLANEA test) whose first application was in the year 2015. This test applies at the end of each school cycle and according to INEE:

It evaluates the achievement of key learning acquired by students of the national educational system as a whole, in their transit through compulsory education, with respect to the formative areas of Language and Communication and Mathematics and, as of 2018, the Language area will be enriched with written expression and the areas of Civic and Ethics Formation, and Natural Sciences are incorporated (INEE, 2018d, p. 11, our translation).

Considering that the test seeks to identify the extent to which students achieve the key learnings established in the school curriculum, the instrument in its theoretical construct is aligned with the curriculum and allows the recognition of the competencies promoted by the Federal Government through the Secretariat of Public Education in relation to the entire National Education System. According to INEE (2018d, p. 15, our translation):

Key learnings, moreover, tend to be useful in practical and civic life, although there are some identified as key that due to their level of abstraction do not meet this condition, but are essential to continue advancing in the corresponding area of formation;

That is why it is important to systematically evaluate the results of students' academic achievement, to identify whether they are developing the appropriate skills that allow them to be applied in everyday life. Specifically in mathematics, PLANEA investigates the domain of learning, the ability to use them and transform them into tools that allow students to understand, interpret, analyze and solve different problems in their surroundings, using

different procedures: arithmetic, algebraic, graphics, geometric, variational, statistical and probabilistic (INEE, 2018d).

Then, we will describe the results obtained in mathematics in the applications of this test for Higher Secondary Education, not without first mentioning that the results of PLANEA are expressed in four levels of achievement: I: Indicates an insufficient mastery of the expected skills, II: Refers to a basic domain, III: Reflects a satisfactory domain and IV: Implies an outstanding domain in the assessed key competences and learning. It is necessary to highlight that, obviously, level IV is the most aspirated. The results obtained in the last applications of this test for EMS are shown in table 2.

Table 2 – Percentages obtained in EMS mathematics in PLANEA applications

Percentages obtained in mathematics in the application of PLANEA in Higher Secondary Education (EMS).				
Applications	Achievement levels achieved and percentage at each level			
	I	II	III	IV
PLANEA 2015	51.3%	29.9%	12.4%	6.4%
PLANEA 2016	49.2%	30%	14.4%	6.3%
PLANEA 2017	66.2%	23.3%	8.0%	2.5%
PLANEA 2018	No data for EMS			
PLANEA 2019	No data for EMS			

Source: Devised by the authors based in historical data²

As can be seen in Table 2, in all cases, most students are assessed at the lowest level of academic achievement, that is, they have an insufficient mastery of the assessed skills. Therefore, at level IV (the most aspirated level), there is the lowest proportion of students. It should be noted that in 2017 the drop at this level was drastic, further reducing the percentage of students with an outstanding domain in the competences and key learning assessed. In other words, according to this result, this year, out of every hundred students, only two obtained the key learnings of the Mexican curriculum. Another discovery that should be mentioned is that there are no data or results for the years 2018 and 2019, which marks the transition to the disappearance of INEE, which was systematically responsible for the design of the tests, for carrying out the evaluations and for the publication and interpretation of the results. Currently, there is no organization in Mexico to replace these tasks, due to 2019

² Taken from SEP (Available: http://planea.sep.gob.mx/ms/resultados_antiores/. Access: 10 June 2020) and INEE (2018).

Educational Reform. This is at the expense of the importance of educational research and assessment for decision making and for improving educational quality.

Returning to the PLANEA results mentioned earlier, these strongly demonstrate an insufficient achievement of the key learnings of the formal curriculum of upper secondary education. According to SEP (2017), since most students are at achievement level I, they have difficulties to perform operations with fractions that combine unknowns or variables (represented with letters), as well as to establish and analyze relationships between variables. Supposedly, this knowledge was acquired in their academic trajectory, as it is as already mentioned the basis of the official curriculum for this educational level.

It is undeniable, therefore, the enormous failure we face in Mexico in achieving the key learning in mathematics and skills development for the level of Higher Secondary Education, both in the PISA test carried out by students who are about to start their bachelor's degree, and in the PLANEA test carried out by students who are about to finish their last level of studies. Although they are not equivalent instruments, the results of both tests allow us to establish trends, so that it can be said that the national problem around this issue is serious, has not improved and apparently there is no positive change on the horizon for this problem, since, as already mentioned, there are still no structured, consensual and published education policies that address this problem and are oriented to improve performance in this matter.

Final considerations

Once the main educational reforms we have faced in Mexico are described, the importance of their assessment, the relevance of having structured and oriented educational policies to guide efforts and address the main issues in this area, in particular the low academic achievement in key-learnings and developing mathematical skills in SEM, we can establish the following conclusions:

a) The right to education, established in article 3 of the Constitution, was included as an individual guarantee in the Political Constitution of the United Mexican States of 1917. It is a right of all citizens and the National Education System currently offers this right from the basic level to the higher secondary level of education. This article has been modified, added or renovated 10 times, the last one in 2019.

b) Fourteen months after its promulgation, it is essential to establish appropriate procedures for the systematic assessment of the new 2019 Educational Reform and to

designate the bodies responsible for it, which ideally should be people with formation and experience in educational research, so that they are in a position to design instruments, apply them, analyze and interpret the results and provide the Federal Government with elements for decision making. Otherwise, this will be another reform, full of good intentions, but that will go down in history without achieving any educational purpose. For this, we must define: why are we educating in Mexico? What are the goals of education in our country? At the moment, we don't have that reference.

c) Regarding educational policies, it is essential that a model is selected for its design and implementation. According to (CERNA, 2013 *apud* TREVIÑO; VILLALOBOS; BAEZA, 2016, p. 32-33), there are two ways of thinking about this: 1. In this model, middle-level authorities and actors in the educational process simply function as implementers. 2. Bottom-up implementation: this approach recognizes the capacity of the actors directly involved in the process, both to design and apply national programs tailored to local realities, and to implement specific interventions that are alienated from national policies.

The author indicates that an approach combining both models is the one that best fits the reality of educational systems. In Mexico, educational policies have been planned mainly in the form of a cascade, little involving the actors that intervene in the educational phenomenon (teachers, principals and parents). Perhaps it is time to design the policies that accompany *2019 Educational Reform*, with a combined model that considers the voice of all actors for its planning. Bearing in mind that it is important to consider that we want to give to education meaning not only in its speech, but also in the daily educational reality. According to Peraza and Betancourt (2018), it is imperative to assign new meanings to the theoretical concepts that underpin educational policies.

In the same way, it is urgent to consider in its planning the variables that intervene in the educational process, such as, for example, plans and programs of study adequate to reach the egress profile and life skills; teachers with suitable knowledge for adult education; schools with management autonomy that allows them to make independent decisions that respond to their operating needs; adequate infrastructure and equipment to provide school spaces with an environment conducive to teaching and learning, efficient assessment processes that provide comprehensive information on the SEN (GOVERNO DO MÉXICO, 2017).

d) Regarding the achievement of students' learning, at the international level, the PISA test takes into account the important gap that exists between the evaluated adolescents in the scoring countries, especially Asians, in comparison with Mexican adolescents. These results reflect the great needs that our young people will have in the future and the scarce knowledge

with which we are preparing them to work in a globalized context and, thus, compete with the citizens of these great world powers (OSUNA; DÍAZ, 2020). In Mexico, we are not forming cadres of citizens prepared to face the fourth industrial revolution and, therefore, who are responding with effective solutions to the country's current demands for social, economic and technological growth.

At the level of national assessments, the results of PLANEA are discouraging and reveal the little mathematical knowledge that students in higher secondary education are gaining, it seems, our young people are not developing the capacity to understand the role that mathematics plays in the world, according to the OECD, using and relating to mathematics allows “meeting the needs of daily life that a constructive, committed and reflective citizen can have” (OCDE, 2010, p. 23, our translation).

Therefore, it is urgent to investigate: what is producing this phenomenon of low academic achievement? For this, it is recommended to consider all the factors present in this problem, for example, to ask: how is this discipline taught? What is the profile of teachers and their level of updating? What content in the study programs should be privileged? What use do students find in mathematical content?

All of these questions must be considered when planning educational policy for this educational level. Specific objectives must be established with strategies and goals to mitigate failure and low academic achievement in this discipline and, therefore, perhaps one of the phenomena that produce school dropout in Higher Secondary Education could be reduced.

It is undeniable that in Mexico we require educational policies based on serious and reliable diagnoses, whose purpose is to raise the educational quality of the SEN and that are independent of any partisan ideology or political interests, but that are consistent with the real need and that can be sustained through time regardless of the alternation in government, with the objective of achieving lasting results.

In our country there are many unresolved educational problems, but in the case of which we are concerned, the achievement of learning in mathematics is the subject pending in the educational policy agenda in Mexico, for Higher Secondary Education.

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