Teaching mathematics in Moroccan high schools in the past fifty years

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Abstract

This paper will trace the educational development in the teaching of mathematics in Moroccan high schools over the past fifty years. The discussion will cover the main reasons behind three major reforms of mathematical education, and present innovations in the concepts and pedagogical approaches of their corresponding curricula. We will also proceed to the analysis of the educational material associated with each reform (academic studies, committee reports, official documents, textbooks... etc.), with the aim of highlighting the evolvement of mathematical concepts taught in Moroccan high schools over the last half of the past century.

Keywords: arabization, high schools, National Charter, reform, teaching

Introduction

History shows that any curriculum reform within a country reflects its internal evolution as well as the external factors, such as international reform movements, inciting the re-evaluation of the established norms. The reforms of mathematical education in Morocco are no exception to this rule. In fact, Morocco has experienced three major reforms in the teaching of mathematics since its independence in 1956. These reforms are: the Reform of modern mathematics (1960's), the Reform introducing Arabization (1980's), and the Reform advocated for by The National Charter for Education and Training (turn of the 20th century). While the first reform concerned mostly high school curricula, the two other reforms affected the middle and primary school programs as well¹.

We present in this paper the motivation behind each one of these reforms, the general objectives they aimed to achieve, and the pedagogical orientations defining

¹ The Moroccan school system consists of three cycles: primary school, middle school and high school. Each cycle has its own characteristics (a different local, a specific organizational structure, particular profiles for its teachers ...etc). The number of years in each cycle and the names given to it have been modified over the years as follows:

⁻ Number of years: 1956-1964: (6,3,3), 1965-1988: (5,4,3), and 1989-2017: (6,3,3).

⁻ Cycles' names: 1956-1989: (primary, first cycle of secondary, second cycle of secondary), 1989-2002: (first cycle of fundamental education, second cycle of fundamental education, secondary cycle), and 2003-2017: (primary, intermediate secondary, qualifying secondary).

Bjarnadóttir, K., Furinghetti, F., Krüger, J., Prytz, J., Schubring, G. & Smid, H. J.(Eds.) (2019). "Dig where you stand" 5. Proceedings of the fifth International Conference on the History of Mathematics Education. Utrecht: Freudenthal Institute.

them. Emphasis will be placed mainly on high school programs, while some aspects of the lower levels may be mentioned occasionally.

The reform of modern mathematics

The teaching of mathematics underwent a major reform in several countries since the late fifties of the 20th century. This renovation revolved mainly around the introduction of "modern mathematics" in pre-university education. Several studies have highlighted the reasons behind this major pedagogical shift (Carsalade, Goichot & Mermier, 2013; Bkouche, 2013), while the premises of this change can be noticed as early as the 30's of the 20th century (Barbin, 2013). The new perception of mathematics was explained for instance by the official Moroccan document presenting the programs, named Official Programs and Instructions (1969)², in the following words³:

It is important first to have a precise idea of what has become of mathematics. A few years ago, school curricula provided our pupils with a conception of mathematics from the ancient Greeks and the mid-nineteenth century. After about a hundred years of profound evolution, the researches and discoveries of mathematicians, and their reflections on the reality and the object of mathematics, have led to new ideas expressed in a new language. Current mathematics is no longer exclusively, nor is it essentially, what Augustus called "the science of the indirect measurement of magnitudes".(p.6)

The document also stated that the new mathematics gives more importance to the relationship between objects than to the objects themselves, making of set theory and algebraic structures central topics of the curricula.

Any "calculation", in the most general sense, has two main components: the objects on which one operates and the operative rules. Of these two constituents, only the latter is essential. Mathematics appears as the science of relations and systems of relations, the nature of the objects to which these relations apply becoming irrelevant. (p.7)

(...) Finally, the study of a structure, based solely on a small number of axioms unrelated to the objects studied, is an exercise of pure reasoning. It teaches to order and enchain thoughts according to a rigorous method, admirably developing clarity of mind and rigor of judgment. (p.9)

Another element that characterizes this new vision of mathematics is the abandonment of traditional geometry and its replacement by vector and affine geometries. Arguments of famous mathematicians were cited to justify this choice. One of these

² In the following we use MEN(1969) to refer to this document.

³ All translations are by the author of this paper.

arguments - as reported by the MEN(1969) - is that of the French mathematician Jean Dieudonné, who stated:

It seems to me that the goal is to overcome two definite psychological difficulties:

(i) The student must be made aware of the necessity of an axiomatic treatment of mathematics.

(ii) The student must be familiarized as soon as possible with the constant handling of certain abstract notions, the most difficult to assimilate being undoubtedly that of application (or "transformation") and even more perhaps that of calculation on applications.

As it can be said without exaggeration that either difficulties are truly cornerstones of the entire modern mathematical edifice, all the other aspects of teaching in the first years should be consciously subordinated to the assimilation of these ideas. (...) it is thus desirable to free the pupil as soon as possible from the straitjacket of traditional "figures" (point, right, plan being an exception of course) by mentioning them as little as possible, in favor of the idea of a geometric transformation of the whole plan and of space, which must be constantly emphasized and illustrated by numerous examples. (p. 21)

In Morocco, modern mathematics appeared in school programs from 1962 on. It is worth noting that the introduction of modern mathematics in Morocco faced less obstacles compared to other countries⁴. The former director of the Ministry of National Education in Morocco during the 1970's, Mohammed Akkar (2002), explained in this regard:

The needs of higher education and the concern of the public opinion for the growing gap between the evolution of sciences and that of education led to this reform in France. In Morocco, it was a decision of the head of programs and mathematics education, J.P.Nuss, who was strongly influenced by the ideas and movements circulating in France and Belgium at the time. The "modernization" of the programs was carried out in Morocco in two main stages: one in 1962 by Nuss and the other in 1968 by Peureux. (p.180)

Another excerpt coming from the MEN(1969), added the following:

⁴ For example, in France despite the fact that we had started preparing for this reform since the 1950s as it is well explained by Bernard Charlot (1986), and despite the creation of IREM to support it, voices had been raised against this reform since the early 1970s. Carsalade et al. (2013) reports that:

By 1972 with the introduction of the program of the fourth year, the very spirit of modern mathematics began to be attacked from all sides; the criticism goes beyond the group of refractory teachers and spreads to scientists, the public, the press. On all sides, we condemn the excess of abstraction, the heaviness of the new programs and their dogmatism. (p.241)

Many countries indulged in the renovation of mathematical education. The reform began in Morocco in the aftermath of independence. Our methods and programs follow a normal evolution adapted to the realities of our teaching. (p.8).

The instructions of this reform encouraged teachers to use the language of modern instead of traditional mathematics in their teaching. These instructions stated:

The language of this theory is the best fit for mathematics. It allows for a clear, precise, and simple expression, better and easier to grasp than ordinary language. The teacher, having become aware of the vagueness of the traditional mathematical language, will make a very wide use of the "new" vocabulary thus placed at his disposal. Certainly, he will retain, with regret, certain words consecrated by custom. (p. 10)

These instructions also stipulated that this new conception of mathematics would be an effective means to train students intellectually, consequently achieving one of the fundamental aims of mathematical education.

This conception leads to an exceptional economy of thought, by standardizing the mathematical tool. It created an instrument so general and powerful that it now applies to all activities of the mind, for example, to the social sciences (...). Considering the essence of the mathematical method as the main aim of mathematical education, this novel approach helps achieve intellectual training more efficiently than any other method. (p. 9)

The main reasons for supporting this reform seem commendable. On one hand, symbolism and structures provide a safe, simple and rigorous language. On the other hand, the study of algebraic structures develops intellectual training, clarity of mind and thought, and rigor of judgment.

Despite the general support of this reform in Morocco, some Moroccan authors called out on the absence of a national need justifying it. Those authors believed the reform to be an experiment in which France, former colonial power, tested the introduction of modern mathematics in Morocco before including them in French curricula. For instance, for al Jabri (1985) this reform is an illustration of the dependence of the Moroccan educational system on its French counterpart. In this regard, al Jabri (1985) said:

These "reviews and amendments" were not, one day, born of a desire to create a purely national program that responds to the requirements of the desired "Moroccan National School". They were, in most cases, unclean, answering other motives far from these requirements. If we have counted the number of times our programs have undergone operations of "adjustment and change", and we search for the hidden motives dictating those, we will find they come down mostly to one of three things. <One of them is>⁵ The almost complete subordination to the educational system in France and its developments. This dependence manifests itself in two basic aspects. The first is the imitation of the developments happening in France blindly, without taking into account our reality, our circumstances and our specific needs. The second is the desire of French circles to conduct a particular experiment in Morocco, and study its results, in order to apply it in France if found valid. This is what happened when Morocco - before France - started teaching modern mathematics in all high schools' sections ... (pp.80-81)

This argument has its origin in the difficulties faced by Morocco at this time in managing the legacy left by the protectorate period in relation to education. These difficulties suggest that the reform of mathematics education of this period did not meet the needs of the Moroccan reality (see Appendix for more details).

The reform introducing Arabization

This reform brought about two major changes. The first concerned the language of teaching, which was changed from French to Arabic (hence the term Arabization)6, while the second related to the abandonment of modern mathematics from school programs.

While many disciplines such as philosophy, history and geography, transitioned to Arabic without much difficulty, the Arabization of scientific disciplines turned out to be harder than expected⁷. As a result, the Arabization of the latter subjects only began in the late 1970's. Mathematics itself was taught in Arabic as early as the 1960's in primary schools. However, as it seemed challenging at the time to propagate translation to subsequent cycles, it was decided to go back to French from the third year of primary school (French as a foreign language was first taught to students that same year at the time). In 1978, the plan of Arabization for scientific disciplines was resumed and preparations for its concretization were launched. Finally, the reform was carried out for primary school curricula in 1980, middle school in 1983, and high school in 1987.

⁵ The two other motives are: the random developments of our educational system and the balance of power among the categories of "ruling elite".

⁶ Arabization of education was one of the four principles expected to be at the basis of any reform of the educational system after the independence of Morocco in the late 1950's. The other three principles are Generalization, Unification and Moroccanization (see Appendix for more details).

⁷ The implementation of Arabization encountered several difficulties not only due to technical reasons (like the lack of trained teachers, the preparation of manuals...etc), but also to political and ideological reasons. (See Appendix for more details)

The remarks made by one of the official texts testify to the interest given by educational leaders to Arabization:

If the language of instruction is an obstacle to the communication, understanding and assimilation of mathematical concepts, the decision to put Arabic in the place of a foreign language should be one of the most commended changes of this reform. Arabization in our opinion is an effective means and a strong and solid base for any reform aiming at raising the level of mathematical education in our country. (MEN, 1983, p.12)

Regarding modern mathematics, the process of its abandonment began in the mid-1970's, when several 'users' of mathematics (namely teachers of other disciplines and professionals in scientific fields) criticized both the content and the teaching approach taken in the new high school programs. Critics of the curriculum focused on its elitist character, which they also described as solely catering for the needs of heavily scientific professions such as engineering and mathematical research.

Subsequently, a meeting was held in Rabat in 1975 organized by the ministry of National Education, bringing together spokespersons from different levels of education (from primary school to university) and different disciplines (math, physics, economics ...). Among the arguments brought up in that symposium was the fact that teaching math, particularly in high school, failed to achieve the objectives set for it. It could not target a large enough audience of learners, failed to prepare students for higher studies in disciplines other than mathematics, and did not accommodate the needs for professional careers on demand in the labor market. Critics, however, turned a blind eye to the role of geometry in the development of intelligence and learning aptitudes stated among the objectives of the old program. Other points brought up in the discussion included:

- The excess of formalism and the abundance of vocabulary emptied mathematics of its meaning.
- Solving problems involving computations or geometric configurations created enormous difficulties for students.
- The exercises and problems on algebraic structures are often superficial and purposeless⁸.
- The complete abandonment of the classical geometries of the plane and space and their replacement by the affine geometry turned out to be more harmful than beneficial.

The culmination of these two changes led the Ministry of National Education to create a commission called The National Committee for Reflection and Reform of

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⁸ Often at the level of high school, the exercises given to students were superficial and concerned properties that the majority of students already knew in other forms, which made them unable to see the interest of such exercises.

Mathematics Education in 1978. This commission included representatives from all sectors interested in the teaching of mathematics. The points to be discussed by the commission, as set by the minister, were:

- The Arabization of mathematical programs.
- Coordination between the mathematical curricula from different educational levels.
- Coordination between the teaching of mathematics and that of other disciplines.

The commission made general recommendations concerning the aims of mathematical education, in addition to specific remarks to improve the programs taught. Recommendations insisted that the goals of high school mathematics and the minimum level required to integrate into the job market must be clearly stated. Concerning the programs, the committee recommended reducing the number of general concepts and logical symbols, enriching the teaching of geometry, striving to enhance numerical computational skills, devoting the necessary time to practice exercises, and introducing examples inspired by other disciplines.

The programs generated from this second reform were considerably less 'formal' than those of the 60-70's. They notably contained more geometry and incentives to observe, to experiment and to solve problems leading to the construction of knowledge. High school programs were also relieved of logical rigidity and conceptual abstraction⁹. Additional changes included the restoration of traditional geometry, bridging the gap between middle school and high school programs, and openness to other disciplines through textbook exercises and mathematical activities.

It may be noted that, despite the Arabization of mathematical education, there has been an introduction of activity sessions in the form of mathematical exercises in French since the early 1990's. This is due to the fact that the teaching of mathematics was never Arabized in higher education. These activity sessions would allow students to surmount language barriers when pursuing higher degrees in French¹⁰.

⁹ The official programs explained that it is possible to use the terminology of sets theory without it being the object of study.

The vocabulary of sets and their related symbols can be used in various paragraphs of the program without being the subject of a study per se. Whenever necessary and without being studied in themselves, the vocabulary and symbols associated with the sets presented in the first year are progressively complemented by the following elements: application of a set to a set, bijection, commutativity, associativity, distributivity, neutral element. (MEN (1987), p.23)

¹⁰ Generally this was achieved by the introduction of one hour of translation (Arabic to French), once a week for scientific subjects (mathematics, physics and chemistry, and natural sciences). These hours were provided by translation professors (who were trained for this purpose), and in their absence, by professors of the concerned disciplines.

During this same period, a change was introduced to the baccalaureate examination system. The new system divided the baccalaureate exam in several stages, taking into account the accumulation of school results during all three years of high school. This encouraged average students to succeed through regular work while depriving bright pupils from developing a deep interest in mathematics¹¹. In order to remedy this situation, a number of activities, such as math Olympiads and similar competitions, have been set up to enable talented students to enhance their mathematical vocation.

Once again, the stability of the program did not last long. The rapid progress in new technologies during the 1990's called for yet another reform to keep up with the emerging trends of the modern world. The impact of computing and the advent of automatic calculation methods created new social and technical needs in almost all fields. It became necessary for programs to propose activities and working methods that account for the era of large amount of information, networks and computing. All of these rapid changes made of reforming mathematical programs once more an urgent necessity.

The reform advocated by The National Charter for Education and Training

The reform advocated by The National Charter for Education and Training was part of a global review aiming at restructuring the entire Moroccan educational system. This review strived to offer students a school focusing on useful and functional knowledge, in which basic education is a solid and guaranteed foundation for all fields. It also aimed to achieve the Education for All goals in 2010, to adapt the curriculum to the needs of individuals and society and to improve the quality of teaching and learning. (Belfkih 2000, p.80, Mili, 2017, p.10).

King Hassan II appointed a commission in the second half of the 1990's to implement these goals¹². The work of this commission was gathered in a basic

¹¹ Since the grades obtained in the class tests were accumulated in the final grade of the baccalaureate exam, and since the teachers were expected to make several exams per trimester, students had to give priority to their exams' preparation at the expense of their own learning. This also did not leave enough time for teachers to dive into the depths of the curricula, nor did it allow students to go beyond the class lessons by their own means.

¹² In addition to the President, the Special Education-Training Commission has 33 members, including representatives of political parties (14) and trade unions (8) in Parliament. The 11 other members were chosen individually, among the oulamas, the economic operators and the heads of non-governmental organizations and associations of parents of pupils (Belfkih, 2000, p.80)

document called the National Charter for Education and Training¹³. The purpose of this charter is detailed by Belfkih (2000) as follows:

Despite the undeniable development of the educational system since independence, a widening gap has been appearing between the expectations of the nation and the solutions put forward by schools. This has led to the creation of a National Charter for Education and Training which will lay the foundations of a new Moroccan school system at the start of the 21st century while taking into account the new economic and technological climate. (p.77)

The charter, which summed up the basis of trending reflections on education, set out the aspects to be renovated in the curricula and teaching methods. Another main feature of this reform was the explicit adoption of skills' pedagogy -which aimed globally to develop five types of skills: communication skills, methodological skills, strategic skills, cultural competences, technological skills- for all disciplines. In the case of mathematics, the said reform has brought about a new vision emphasizing the aspects illustrated below through excerpts from official texts:

Objectives of teaching mathematics:

In view of the above, and in accordance with the provisions of the National Charter of Education and Training, the general objectives of teaching mathematics in secondary education should reflect the importance of mathematical culture and its contribution to the integration of citizens in a society that is constantly evolving. (MEN(2006),p.10)

Objectives in terms of competencies:

1. Promote positive values and attitudes towards mathematics among students to enhance their confidence in their mathematical skills and enable them to appreciate the role of mathematics in the development of the individual and society.

2. Develop students' ability to solve problems, communicate mathematically, use logical reasoning, and establish connections between ideas

3. Provide students with solid foundation skills to prepare them for higher studies and other professional endeavors.

¹³ This charter appears to represent a national consensus on the teaching issue. Belfkih (2000) reports in this regard:

While there is unanimous agreement on the need for reform, the debate on the foundations and objectives of the reform has exacerbated passions and hardened positions. The ideological and political dimensions will prevail, leading the various protagonists to hide behind positions of principle and the validity of their convictions. Therefore, the search for a national consensus, or at least the widest possible agreement around the issues of the reform of the educational system, will slowly become the only way of reconciliation between the nation and its school. (p.79)

According to this reform, mathematics is attributed a new role and function in the training of students. We can read at MEN (2006):

Mathematical training is not limited to the formal knowledge of definitions, theorems, results and techniques, but should be made so that these acquisitions are significant by the ability to use them and synthesize them in the face of challenges and problems. The teaching of mathematics should contribute to the development of the student's aptitude for personal work and self-development. It should aim at strengthening their willingness to seek, to communicate and to explain their position. (p. 6)

The teaching function of mathematics must be built in accordance with the student's mental and emotional composition. This education, which should be adapted to the pupil's reality, in accordance with the cultural, socio-economic data of their country, must also remain open to the technological and scientific developments of their world. (p. 7)

Among the main features of this reform, we can mention the use of problems and numerical methods to combine experimentation with reasoning, the highlighting of the algorithmic aspect of mathematics, and the introduction of elements from the history of mathematics.

Another novelty brought by the reform was the matching of teaching material with corresponding competences in the program description. Thus, the content of each lesson was aligned with the skills and abilities it aims to develop in students. In addition, the adoption of several textbooks for each grade level allowed for multiple interpretations of the same program.

Conclusion

The reforms presented in this text allow us to draw several conclusions concerning the aims of mathematics' education in Morocco, the approaches used for its teaching and its role in society.

For the first reform, the main goal of mathematics' education was to provide high school students with tools to quickly access mathematics used in research and/ or in high level scientific and technical trainings. Thus, the teaching was focused on an abstract and general presentation of the studied concepts favoring their theoretical aspects. In doing so, the mathematics taught was catering for specific higher studies and neglecting other disciplines which use mathematics in its more classical form (human sciences, short and medium term courses and vocational training ... etc). This reduces the different roles mathematics can play to the role of a course preparing senior technical staff and researchers in the field itself.

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It is in this perspective that, during the preparation of the second reform, the criticism voiced by the various pedagogical actors of the time, and especially by the official commissions, against modern mathematics was fundamentally intended to show the usefulness of classical mathematics. The recommendations then advocated that secondary education should emphasize mathematics' role as a "tool for other disciplines". In addition, this vision must ensure that the mathematics taught is more accessible to the majority of students and not only to those who will be devoted to scientific careers and discipline-centered research.

Moreover, this reform led to a change of language of instruction (from French to Arabic), which ended up not being pursued for higher education. This led to the introduction of certain pedagogical provisions, notably in the form of translation sessions, aimed at facilitating the pursuit of higher education in French. Also, the change in the system of baccalaureate examination led to the introduction of extracurricular activities to help the emergence of the mathematical vocation of students who showed interest in the discipline.

The third reform, which is not specifically concerned with mathematics, has consisted of a revision of the mathematical teaching system at the level of objectives, content and the teaching approach. Mathematics' education was not only aimed at providing content but also at developing skills and competences to use acquired knowledge, or to associate the acquisition of knowledge with the skills to be used for. This was done in accordance with one of the general objectives advocated for by this reform which is to prioritize practical knowledge and functional know-how.

Acknowledgment. I thank Najwa Laabid for her help with the English of the present paper.

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Appendix: Historical overview on the educational system in Morocco¹⁴

It is well known that Morocco was under French protectorate from 1912 to 1956. During this period, the French were de facto ruling over Morocco. They had introduced several types of education that Morocco inherited following its independence in 1956¹⁵. This appendix gives an overview of each of these types.

Traditional teaching¹⁶: The primary and secondary levels were taught in traditional schools, known as *msid* or *madrasa*, while its higher level was taught at the University of Fez, Qarawiyine. The disciplines generally taught there were the Arabic language, history, geography, utilitarian mathematics, in addition to the disciplines related to the juridico-religious corpus (learning by heart of the Koran, basic principles of Islam, the Muslim jurisdiction, theology ...). The language of instruction was Arabic and French was introduced as a foreign language at the secondary level.

Modern Muslim-Teaching¹⁷: This type of education, intended for Muslim Moroccans, was divided into several types according to the social class of the pupils:

- Schools of notables which were reserved for children of notables, big traders, high officials, agents of local authorities.
- Urban schools for the children of workers, craftsmen, petty traders and small officials (for the inhabitants of urban centers).
- Rural schools devoted to the children of workers in the agricultural field (for the inhabitants of the countryside).

In general, the majority of pupils in these schools enter the fields of work after completion of primary education. Some laureates, especially those from schools of

¹⁴ Based on the books: Baina (1981), Al Jabri (1985) & Al-Mu^ctassim (1991) and on the papers: Belfkih (2000) & (Mili, 2017).

¹⁵ For a very brief overview of the history of Morocco, the reader can see: http://www.localhistories.org/morocco.html

¹⁶ This education is inherited from the time before the protectorate, but was renovated, at the level of structures and content, during the period of the protectorate in order to control it and to ensure that Moroccan students who wanted to continue their higher education were not obliged to go to the middle-East (Egypt). This trip would have exposed them to the reforming ideas that were circulating at that time in eastern Arabic countries.

¹⁷ The term 'modern-Muslim' assigned to this type of education aims to distinguish it from other types of education which were also in force in Morocco at the time. The adjective 'modern' sets it apart from the traditional teaching mentioned above, whereas the term 'Muslim' aims to separate it from both the 'European education' which was intended for children of settlers and Europeans who resided in Morocco, and the 'Hebrew teaching' intended for the Moroccan Jewish community (which existed before the protectorate and was modernized during the protectorate).

notables, could access secondary education. It was taught in institutions that were called Muslim colleges.

This categorization of schools for Moroccans was the result of the educational policy adopted by the protectorate. One of the principles¹⁸ of this policy was that the education given to Moroccan children must preserve and respect the existing social categories within the Moroccan society. The point of view defended by Marshal Lyautey, with respect to this question, is explained by al-Mu^ctassim (1991) in these words:

He<Lyautey> objected to the policy of integration and assimilation, and went as far as respecting the local institutions he found in Morocco and keeping them as they are (...) Desiring to preserve local institutions, Lyautey subjected his own conception of social justice to his idea of the beautiful hierarchy. As such, the large number of "national" schools that he created, of all kinds, was in reality designed to match the hierarchical structure of the Moroccan society" (p.23-24)

In parallel with these types of education totally supervised by the protectorate, there was an Arabized education taking place in 'private' schools founded by individuals following the incitement of the nationalist movement. These schools appeared for the first time in Morocco in the 20's of the 20th century as a response to colonial policy in education. This pedagogy was also an attempt to renovate and modernize traditional teaching. In addition to religious subjects, the subjects taught in modern education were taught in Arabic¹⁹.

Another aspect worth mentioning was the compartmentalization of different types of education. A student's transition from one type of education to another was rather an exception. Let us quote again, al Mu^ctassim (1991) on this subject:

Some students from urban and rural schools joined the Qarawiyine. A minority of the sons of the rural notables (Caids) were transferred to the schools of the notables. In exceptional cases, some Moroccans from the schools of the upper classes moved from the secondary school to the secondary school of the French system (lycée). In any case, Moroccans were generally not accepted in schools dedicated to the children of French settlers.(p.33, note 31)

¹⁸ Another principle is that Moroccans should receive a limited education, so as not to create a class of intellectuals as in Europe; it is a danger that must be avoided. Education for notables should give them the opportunity to work in administration and commerce. As for the education intended for the other classes, it had to allow a professional qualification according to the economic environment of the child. In the cities, teaching was preparing for manual work for handicrafts or building, while in the countryside, education was oriented towards agriculture and livestock.(Baina, 1981, pp.110-111)

¹⁹ For more details about these schools see al Mu^ctassim (1991).

At the time of independence, the Moroccan authorities were aware of the role that education plays in the country's development and tried to set up a unified education in the early years of independence. In fact, this desire to build a unified education was one of the concerns of the Moroccan authorities several years before independence. The following quote by al-Mu^ctassim (1991) illustrates this well:

The French isolated Moroccans from each other by introducing different types of education. All public schools will then have to be unified in a national educational system. (...). Muhammad V <the king of Morocco at the time> referred in 1946 to the need for a unified, free and compulsory public educational system designed to make the school "the savior of the nation."(p.110)

Unification was one of the four principles established by the Royal Commission on Educational Reform, created in 1957, which was to form the basis of all educational reform. The other three principles were: generalization, Moroccanization and Arabization. Generalization means allowing all Moroccan children at school age to access education. Unification involves the merging of the various types of education that existed during the French protectorate in a single type of public education. Moroccanization implies that all staff working in education should be Moroccan. Finally, Arabization means Arabic language should become the main language of instruction.

In reality, the implementation of the four principles above would remain, particularly problematic at the time of the independence of Morocco and even several decades later. The following quote highlights some difficulties related to the principle of unification:

If we consider all these various teachings, we find that we are faced with an "amalgam" that would make unification very difficult: First, the very fact of this diversity was already complicating the situation; but the support given by each social class - who shared power - to its favorite teaching made matters worse. Everyone therefore advocated "his" type of teaching as the "model" of unification. (Baina,1981, p.171)

With regards to the principle of generalization, its realization proved to be much more complicated than expected as well. The problem of schooling has even become progressively more complicated by the loss of many students who leave school before acquiring a qualification allowing them to enter the workforce well prepared. Belfkih (2000) considers this aspect as one of the indicators of the crisis of the Moroccan educational system at the turn of the 21st century:

In terms of performance, many indicators show that the Moroccan school has performed poorly given the efforts made by the community. Certainly, the legacy out of the colonial period was particularly heavy. As the school had no other purpose at that time than to ensure the reproduction of a very small indigenous elite, the overwhelming majority of Moroccans could not access it. However, while a large part of this deficit has been absorbed in the postindependence phase, the goal of widespread enrollment has proved difficult to achieve. In addition, the modes of operation that have prevailed within the school have generated relatively low returns and efficiency, which will translate into even greater losses, to the point that today most beneficiaries leave the educational system without any real qualification and, therefore, without being equipped to begin the path of integration into the working life. (p.83)

As for the principle of Moroccanization, there was no significant progress for secondary education until the mid-1980's. Indeed, still in the 70's, teachers from Eastern European countries (Bulgaria, Romania, Poland) were still called to teach science subjects and teachers from Arab and Muslim countries (Jordan, Egypt ...) were brought to teach history, geography, philosophy ... etc in order to meet the growing demand of secondary school teachers. To overcome this lack, in addition to the laureates of universities, whose number did not cover the need of teachers, specific institutions (Ecole Normale Supérieure) were created for teacher training in the late 1970's. These institutions have helped fill the teacher gap within less than a decade.

The introduction of the principle of Arabization has not been easy either and has experienced many hesitations in the early years of independence. Its implementation has been hampered by difficulties of technical as well as political nature. Some aspects of the technical difficulties are illustrated in the following quote:

When popular pressure at the beginning of independence imposed a sort of "generalization"" of education, this led to an automatic Arabization from the bottom up. But as the Arabization of primary education was completed - after several attempts - we found ourselves faced with a great dilemma: to continue the Arabization of science and mathematics in secondary education without having enough teachers (...)or return to bilingualism in primary education. After a year or two of hesitation, where students translated their knowledge of mathematics and science from Arabic into French in the <first class of middle school> observation class, it was finally decided (October 1970) to return to French to teach mathematics at the primary level.(Al Jabri 1985,p.90)

When faced with political difficulties, they were linked to the visions and convictions of the various actors involved in teaching. The following quote highlights a political dimension related to Arabization:

The question of Arabization was, in fact, an essentially political affair. At the level of the people, those who advocated a complete and rapid Arabization were those of the government and the ministry which had a traditional and Arabized training. (...)While people with a bilingual education insisted on bilingualism <in teaching>. At the level of political parties, the economic and social composition of party members dictated, to a large extent, a certain approach to the question of Arabization.

<For example> the Istiqlal party, which had a traditional and Arabized base, had always advocated for a complete and rapid Arabization. While the National Union of Popular Forces party based on industrial workers in urban centers supported an advanced bilingual approach. (Al Mu^ctassim, 1991, p.114)

In spite of these divergences, a new process of Arabization of the scientific disciplines was started during the year 1979-1980 starting from the third grade. It progressed year after year until its arrival to the first year of high school during the year 1987-1988. However, technical education and higher education kept the French language as the language of instruction. In fact, the problem of the language of teaching scientific subjects was not yet settled and the debate is still open to date. Even the national charter has only accentuated the ambiguity with regard to this issue, as evidenced by the following quote from the chairman of the commission that drew up the charter. Belfkih (2000) stated:

In order to provide high-level scientific and technological options in the Arabic language and in the most promising languages in the various fields of knowledge at the higher education stage, a vigorous effort must be made. In keeping with this orientation, high school education in the most specialized disciplines will be taught in the languages used in the corresponding courses at the university. Correlatively, it is planned to promote the teaching of foreign languages, introducing the first of these languages from the age of seven years and the second language from the age of ten years. (Belfkih, 2000, p.83)

Nowadays, the process of reverting to the teaching of scientific subjects in foreign language(s) in secondary education is under process, after being triggered in 2015. The reversion is implemented through the creation of international baccalaureate options. In this type of baccalaureate, the scientific subjects (mathematics, physics-chemistry, and natural sciences) are taught in French, English or Spanish. Of course, these options, which are in the minority, coexist with the ordinary baccalaureate where these subjects are taught in Arabic.