

Attitudes and Reflections of Moroccan High School Science Teachers towards the Language(s) of Instruction in Regards to the Teaching of Scientific Subjects: A Mixed Approach Study



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ABSTRACT: One of the thorniest issues regarding language in education in the majority of post-colonial countries is the issue of the language(s) of instruction. This study examines how Moroccan high school science teachers perceive the language of instruction when teaching scientific subjects. The Frame Law 51 17, which stipulates the use of foreign languages in the teaching of scientific subjects, is the point of departure. As such, the study main objective is to explore the appropriate language(s) of instruction in regards to the teaching of scientific subjects from high school science teachers' perspective. In this study, a questionnaire was administered to 66 high school science teachers randomly chosen. The questionnaires were analyzed by SPSS. In parallel, interviews were conducted with nine science teachers which were analyzed using Braun and Clarke's 2006 Thematic Analysis. Different results were revealed most importantly the positive attitudes that science teachers have towards English as a means of instruction, the incompatibility of language planning and policy (LPP) with the teaching/learning process needs inter alia. These results can be seen of great importance for syllabus designers, researchers in the field and teachers to understand more the nature of the issue. Accordingly, some recommendations to better the teaching/learning process regarding scientific subjects are suggested.

KEYWORDS: high school science teachers, attitudes, language of instruction, reflections

I. INTRODUCTION

Language is one of the thorniest issues regarding education in post-colonial countries around the world nowadays and Morocco is of no exception. The issue then has been a platform for different investigations and has raised the attention of different parts of the society at the top of which there is His Majesty the King Mohammed VI. In different speeches, the problems of the Moroccan educational system in general and the issue of the language of instruction in particular have been raised repeatedly. The following passage, from His Majesty the King speech to the Nation On the Occasion of the 60th Anniversary Of the Revolution Of the King And the People in 2013, demonstrates how His Majesty is aware of the problems facing the educational sector in general, and the importance that should be given to the language of instruction in particular.

The education sector is facing many difficulties and problems. They are mostly due to the adoption of some syllabi and curricula that do not tally with the requirements of the job market. Another reason has to do with the disruptions caused by changing the language of instruction from Arabic, at the primary and secondary levels, to some foreign languages, for the teaching of scientific and technical subjects in higher education. Accordingly, students must be provided with the necessary linguistic skills so that they may fully benefit from training courses. (maroc.ma, 2013)

After Morocco's independence in 1956, the issue appeared on the surface as one of country's priorities. Factors like Morocco's linguistic diversity, French colonization, Morocco's political amalgam have all contributed to this instability regarding the language of instruction. Because of these different factors, the issue of the language of instruction has been considered a platform of multiple discussions in the past, in the present and may be the case in the future as well if the problem is not resolved. This debate revolves around the use of a specific language in specific contexts. While some advocate the use of Arabic since it is the language of the Holy Coran and part of the Moroccan identity, others advocate the use of foreign languages, especially French for the present time, because there is a global need for them (Ennaji, 2005). More than that, there are calls that advocate the use of English since it is the language of science, research, global business, diplomacy, the internet inter alia (Sadiqi, 1991).

Attitudes and Reflections of Moroccan High School Science Teachers towards the Language(s) of Instruction in Regards to the Teaching of Scientific Subjects: A Mixed Approach Study

What remains problematic from the part of policy makers is to establish a specific language for instruction. Many criteria come into action like the question of national identity, Morocco's openness towards Europe and Morocco's adaptation to the international scale. These criteria and others lead to weak planning and constant crisis.

As such, the present article takes as a point of departure the new language policy of teaching scientific subjects using foreign languages in Moroccan high schools which came into effect in 2019 with the adoption of the Frame Law 51 17.

A. The objective of the study

This study investigates the attitudes of high school Moroccan science teachers in regards to the language of instruction for the teaching of scientific subjects. Accordingly, the study may serve as a source for identifying high school science teachers' views towards the different languages of instruction, provide an opportunity to better understand the Moroccan educational system in what concerns the use of different languages in the teaching of scientific subjects and finally suggest appropriate linguistic paradigms for the teaching of scientific subjects. The importance of this study then is to investigate high school science teachers' attitudes towards the issue since the success of any reform depends highly on those on which the reform is going to be applied. This goes in line with Lewis' (1981) quote when he claimed that:

Any policy for language, especially in the system of education, has to take account of the attitude of those likely to be affected. In the long run, no policy will succeed which does not do one of three things: conform to the expressed attitudes of those involved; persuade those who express negative attitudes about the rightness of the policy; or seek to remove the causes of the disagreement. In any case, knowledge about attitudes is fundamental to the formulation of a policy as well as to success in its implementation. (Lewis 1981, p. 262)

Seen in this way, the study of language attitudes emerges as an important domain for investigation since the formulation of any language policy and its success highly depend on these attitudes. Moreover, language attitudes can influence students' academic achievement and career opportunities (Garrett et al., 2003).

B. The Research Problem

As a result of the coming into effect of the Frame Law 51 17, Morocco is now undergoing a change in its language policy. This study then attempts to address one main problem which is the most appropriate language of instruction for the teaching of scientific subjects bearing in mind that the new change is mainly about the use of French as means of instruction for the teaching of science subject for the time being. In this regard, the issue at stake concerns high school science teachers who are the population that is going to reveal much about the issue since they part of it. In other words, the study gives voice to high school science teachers to unveil their concerns, discuss their problems and reveal their needs and expectations in regards to the language of instruction.

C. The Research Question

The research explores the issue of the most appropriate language of instruction in regards to the teaching of scientific subjects at the high school level. Seen in this way, the whole research takes as a point of departure the following question: What is the most appropriate language of instruction in regards to the teaching of scientific subjects in Moroccan high schools?

II. REVIEW OF LITERATURE

A. The Policy of Arabization

Arabization is a language policy that was adopted in Morocco after independence in 1956. Its main goal was "to establish a linguistic and cultural unification, and to distance itself from the colonial past" (Jaafari, 2019, p.131). However, there were contrasted stands towards Arabization as discussed by Ennaji (2002) between "The Arabisants (Arabic-educated intellectuals and politicians)" and "the Francisants (French educated elite)". The Arabisants were for the total implementation of Arabic with a complete exclusion of French. The justification of such claim was that the French language carries colonial tendencies and tends to fight the language of the Holy Coran (Ennaji, 2002, p. 8). The French educated elite, on the other hand, "have a moderate and pragmatic attitude toward the Arabization policy and favor French-Standard Arabic bilingualism" (Ennaji, 2002, p.9). For them, "Standard Arabic alone cannot replace French in science and technology because, according to them, it is not fully prepared and modernized as yet" (Ennaji, 2002, p. 9). In the same context, Marley (2004) discussed Arabization as a process adopted by the newly independent Morocco through which "restoring 'authenticity', asserting the country's Arabo-Islamic identity and removing French cultural influence" (Marley, 2004, p.3) can be achieved. Moreover, Arabization, according to him, was presented as means to achieve the unity of the country. In this vein, Marley (2004) said that: "the fact that Islam is so central to Moroccan identity means that Arabic is a uniting force, symbolising not only Moroccan unity, but also Muslim and Arab unity" (Marley, 2004, p. 3).

Attitudes and Reflections of Moroccan High School Science Teachers towards the Language(s) of Instruction in Regards to the Teaching of Scientific Subjects: A Mixed Approach Study

As far as policy makers are concerned, they were accused to have ambivalent position towards Arabization since they remained loyal to the ex-colonizer's language. While they encouraged the masses to send their children to Arabic schools, they sent their children to French schools (Redouane, 1998).

Among the problems that faced Arabization policy was the shortage of teachers and administrative staff which pushed the state to recruit them from Arab countries (Jaafari, 2019). It is true that Arabization has gained ground year after year till a total implementation in 1980 for both the primary and secondary education. However, higher education has never been Arabized. According to Ennaji (2005), the reasons for not Arabizing the university are many like books and textbooks are either in French or English in the university, professors do not master the Arabic language and the need of the French language in the socio-economic sector (Ennaji, 2005).

B. The teaching of languages VS the Languages of Instruction

The teaching of languages is among the priorities of any educational system. In Morocco, this has been stressed repetitively in different King's speeches for example the speech of March 2013 on the occasion of the 60th anniversary of the Revolution of the King and the People. The debate revolving around the teaching of languages and the language(s) of instruction was also the concern of different TV programs which were aired on Moroccan TV channels mainly 2M and Medi 1 TV. Moreover, there are various official documents that guide the teaching of languages and their use as means of instruction most importantly The National Charter for Education and Training¹, The Strategic Vision² and the Frame Law³ 51 17.

In Morocco, languages taught are both official ones and foreign ones. In this context, there is a number of ministerial notes that guide the teaching of different languages in each cycle. For example, the Ministerial Note 43 issued on March 22, 2006 is concerned with the organization of studies in the secondary cycles. There is also the Ministerial Note 102 issued on August 08, 2008 which deals with the teaching of English in terms of allotted hours for each level, coefficients and others.

A language of instruction, on the other hand, is a language used in teaching school subjects. This language can be the official language of the country or a foreign language taught in the country. In bilingual or multilingual countries, the use of more than one language of instruction is possible. In Morocco, the language of instruction mainly concerns the teaching of scientific and technical school subjects (Frame Law 51 17).

Scientific subjects have been taught in Morocco in Standard Arabic for a long period of time after independence thanks to the Arabization policy which was part the four principles of The National Commission for Education and Culture⁴ which came to replace The Royal Commission for Education Reform of 1957 (Mili, 2017). During the school year 2013/2014, the International Baccalaureate came into existence where students have the possibility to study scientific school subjects in French. English has also been used to teach scientific school subjects but just in a few high schools in the kingdom. In August 2019, the Frame Law 51 17 as part of the Strategic Vision (2015-2030), has come to stipulate the use of foreign languages as means of instruction for the teaching of scientific subjects for all.

C. The Frame Law 51 17

In 2019, the Frame Law 51 17 came into effect as a global and complete law that tackles different issues related to the realm of education among which there are the issues of the teaching of languages and the language(s) of instruction. It was published in the Official Bulletin issued in August 2019. This Law stipulates the replacement of Standard Arabic by foreign languages in the teaching of scientific and technical subjects. Moreover, the Frame Law 51 17 is considered as a step forwards for an education of quality.

What is important to note in this context is that the Law is not seen as being very positive. Accordingly, it has caused various debates ranging from those who support and those who oppose it. Article 2 and Article 31 are the two articles which have raised the debate revolving around the language(s) of instruction. Concerning Article 2, it comes to stipulate language alteration as well as the teaching of scientific and technical subjects in foreign language. As for Article 31, it comes to consolidate the concept of language alternation stipulated in Article 2. It also stresses the importance of mastering both the Arabic language and the Amazigh one as the two official languages as well as the mastery of foreign languages. The Article also stipulates adopting Arabic as the primary language for teaching and developing the Amazigh language. A gradual plurilingual offer that aims at making the learner

¹The National Charter for Education and Training is a roadmap for the organization of the Moroccan educational system for a period called "decade of education". The Charter is twofold. The first part specifies the foundations of the education system; whereas the second part shows the vision and the way in which the education system will be renovated.

² The Strategic Vision was initiated by the Moroccan Higher Council for Education, Training and Scientific Research as a means to renew and reform the Moroccan educational system. This reform is based on three main principles: education for all, equity and equality of opportunity, and integration of the individual in society.

³ The Frame Law 51 17 (See C)

⁴ The National Commission for Education and Culture was based on four fundamental principles which are: the generalization of education, the unification of the educational structures, Arabization of programs and the Moroccanization of the teaching body.

Attitudes and Reflections of Moroccan High School Science Teachers towards the Language(s) of Instruction in Regards to the Teaching of Scientific Subjects: A Mixed Approach Study

fluent in Arabic and Amazigh and proficient in at least two foreign languages once the student obtains his/her Baccalaureate was also emphasized. The Article also emphasizes the mastery of foreign languages at an early age.

Worth to underline when discussing the Frame Law 51 17 is that there is no specification regarding the foreign language(s) to be used. In other words, blurriness and indecision are the two characteristics that prevail the position of foreign language in the teaching of scientific subjects which result in different stands and perspectives.

III. METHODOLOGY

A. Participants

The sample which took part in this study comprised 66 Moroccan high school science teachers of the three taught subjects at the high school level which are Physics and Chemistry, Math, and Life and Earth Sciences. The 66 high school science teachers were randomly chosen. Next to these teachers, nine science teachers participated in the interview. The participants were selected according to their availability and willingness to participate.

B. Research Instrument

In order to address the research question, two instruments have been used as a means to reach reliable results. The first instrument used in this research was a questionnaire which was quantitative in nature since the obtained results will be represented in numbers, graphs, percentages and so forth. Three different methods were used to administer the survey: hard copies, copies via Whatsapp groups and others via Facebooks groups.

Since the questionnaire was quantitative in nature, the type of questions used was closed-ended questions. In this way, the respondents were restricted to choose one of the fixed and multiple answers proposed. These types of questions are easy and quick to answer and allow themselves to calculation, statistical information and percentages. All the asked questions targeted the respondents' attitudes towards the different means of instruction used now, in the past or may be used in the future. Moreover, there was a particular section concerned with teachers' attitudes towards LPP and their future expectations about it. **After** obtaining results, they were imported to the software data analysis SPSS (Statistical Package for Social Sciences) for statistical analysis. As such, the data collected can be represented in the form of graphs or charts or percentages.

The second tool used in this investigation was semi-structured interviews which were conducted with nine high school science teachers. The language used in these interviews was Moroccan Arabic. The designed questions were intended to get more insight about the issue and to check the validity of the questionnaire findings as well. The questions asked were mainly about the current and the future language policy in Morocco, teachers' training programs and professional development, the teaching context and teachers' future expectations and desired future. To guarantee the validity of the interview, the researcher tried to get more confirmation and clarifications from the interviewee through recapitulating ideas and views.

The analysis of the interviews followed the six stages of Thematic Analysis as proposed by Braun and Clarke (2006) as a means to group the patterns within the text and then move to the identification of themes that are important to the research (Braun & Clarke, 2006). The six stages are familiarizing oneself with the data, generating initial codes, searching for themes, reviewing the themes, naming the themes, and finally describing the findings in tables.

IV. FINDINGS

A. Questionnaires' Findings

The questionnaire consists of four sections. It starts first with collecting some personal information mainly the gender, the age, the last degree obtained, the teaching experience, and the types of class taught. The following table provides more details about the participants.

Table 1: Science teachers' information

Gender	Male: 53%		Female: 47%	
Age	under 25 12.1%	between (26 – 35) 19.7%	between (36 – 45) 36.4%	Over 45 31.8%
Last degree obtained	BA 24.2%	Master 60.6%	PhD 15.2%	
Course you teach	Math 33.3%	Physics and Chemistry 33.3%	Life and Earth Sciences 33.3%	
Teaching experience	less than 5 years 18.2%	between (6-15) 34.8%	between (16-30) 47%	more than 30 ---
Types of class (Arabic/French)	Standard Arabic 6.1%	French 15.2%	Both 78.8%	

Attitudes and Reflections of Moroccan High School Science Teachers towards the Language(s) of Instruction in Regards to the Teaching of Scientific Subjects: A Mixed Approach Study

As table (1) illustrates, male science teachers represent 53%, whereas female science teachers represent 47%. As far the age is concerned, the category which is more represented are teachers who are aged between 36 and 45 with a percentage of 36.4% and the one over 45 years old with a percentage of 31.8%. This shows that we are dealing with teachers who have considerable years of experience which is something that will be beneficial to the study. Moreover, it has been recorded that the highest percentage in regards to the teaching experience is related to teachers who have between 16 and 30 years of experience. This is again beneficial for the study in terms of the research credibility since what teachers will report is highly related to their personal experiences which consist of daily encounters with students in real classrooms. It is also noticed that the majority of the participants are Master holders with a percentage of 60.6%. As far as the data concerning the language of instruction used to teach scientific subjects (Arabic or French), it was revealed that a great proportion of science teachers (78.8%) are still having both types of classes; those in which the language of instruction is Arabic and others in which the language of instruction is French. Moreover, the percentage of teachers who teach just French classes (15.2%) is higher than those who teach Arabic classes (6.1%). This shows that French implementation is still in progress and that Arabic is in the way of extinction. Accordingly, this reflects the gradual procedure in the implementation of the reform.

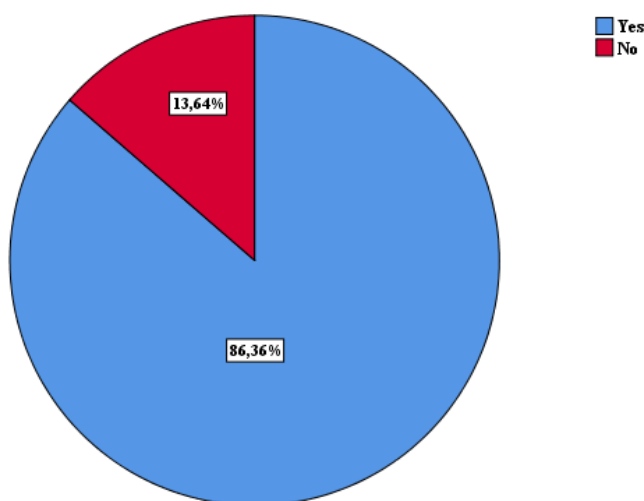
The first section of the questionnaire (Section A) targeted teachers' attitudes towards both Arabic and French as means of instruction. The results are provided in table (2) below.

Table 2: Science teachers' attitudes towards Arabic and French as means of instruction

	S.agree	Agree	Neutral	Disagree	S.disagree
Scientific subjects should be taught just in Standard Arabic.	13.6%	4.5%	18.2%	34.8%	28.8%
Scientific subjects should be taught just in French.	7.6%	30.3%	10.6%	47%	4.5%

What is interesting to comment on here is the percentage recorded by the first statement which has revealed that there is a disagreement towards the use of Arabic as the sole language of instruction with a percentage of 34.8% of teachers who disagreed and 28.8% who strongly disagreed. However, when it comes to French, ambivalent attitudes were recorded between the ones who agreed with a total of 37.9% and the ones who disagreed with a total of 51.5%. This shows that some science teachers consider French as the alternative language that can replace Standard Arabic, but, at the same time, others do not see French to be the most suitable one.

The second section (Section B) is concerned with code-switching in the classroom. The purpose of incorporating code-switching in the questionnaire is to see to what extent the language of instruction is respected and, if not, what is the proportion of code-switching in the teaching/learning process. Before introducing the statements with which science teachers have to show their level of agreement or disagreement with, science teachers were first asked if code-switching takes place in their teaching process. From the graph below, the majority of science teachers answered with 'yes' to the question: "Do you code-switch?" with a percentage of 86.4%.



Graph 1: The presence of code-switching in the classroom

To delve more into the issue of code-switching, teachers were asked to show their level of agreement and disagreement with the statements in table (3).

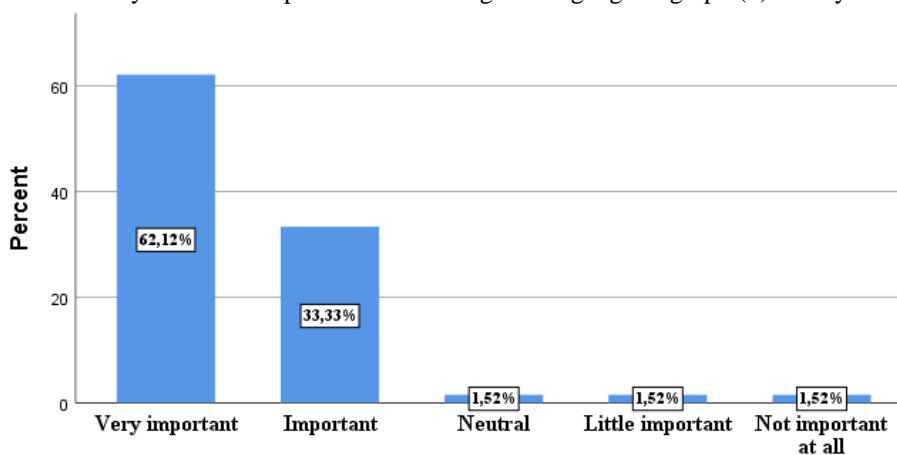
Attitudes and Reflections of Moroccan High School Science Teachers towards the Language(s) of Instruction in Regards to the Teaching of Scientific Subjects: A Mixed Approach Study

Table 3: Code-switching in the classroom

	S.agree	Agree	neutral	Disagree	S.disagree
Code-switching facilitates the teaching process.	6.1%	48.5%	25.8%	16.7%	3%
Code-switching increases the students' chances of passing the exams.	3%	37.9%	31.8%	22.7%	4.5%
Code-switching leads to the weakness of my languages.	4.5%	39.4%	28.8%	16.7%	10.6%
Respecting the language of instruction of the course is more beneficial for the teaching/learning process.	13.6%	63.6%	13.6%	4.5%	4.5%
I tolerate code-switching in the classroom.	7.6%	51.5%	7.6%	28.8%	4.5%

From table 3, it can be noticed that there are two types of attitudes towards code-switching: positive and negative. On the one hand, code-switching is seen by high school science teachers as a facilitator for the teaching process with a total percentage of 54.6% and at the same time it is considered as a means to increase students' chances of passing the exams with a total percentage of 40.9%. These results justify science teachers' tolerance and acceptance of code-switching in the classroom (59.1%) as revealed by statement (5). On the other hand, science teachers admitted that code-switching can lead to the weakness of their languages (43.9% who strongly agreed and agreed). What is interesting to note in this vein is that science teachers have revealed through statement (4) that respecting the language of instruction is more beneficial to students with a total percentage of 77.2% of teachers who strongly agreed and agreed. The last result can be explained by science teachers' awareness of the importance of respecting the language of instruction but code-switching remains desirable and tolerated as a means to overcome problems related to language proficiency.

After dealing with both Arabic and French as means of instruction, the concern of Section C is the use of English as a means of instruction mainly in the future. To start with, the respondents were asked about the importance of English in education. Unsurprisingly, there was unanimity about the importance of the English language as graph (2) clearly shows.



Graph 2: The importance of English in education

Later, science teachers were asked to show their level of agreement or disagreement with four items targeting the English language as a means of instruction in regards to the teaching of scientific subjects. Table (4) below highly illustrates science teachers awareness of the importance of English in the realm of education, especially as a means of instruction whether at the high school or at university. They are also aware of the positive results it could bring to Morocco's scientific research and the country's position worldwide.

Table 4: English as a means of instruction for the teaching of scientific subjects

	S.Agree	Agree	Neutral	Disagree	S.Disagree
English should replace Standard Arabic and French in the teaching of scientific subjects in high school.	16.7%	51.5%	22.7%	6.1%	3%
Teaching scientific subjects in English will help students in their higher education.	34.8%	54.5%	6.1%	3%	1.5%

Attitudes and Reflections of Moroccan High School Science Teachers towards the Language(s) of Instruction in Regards to the Teaching of Scientific Subjects: A Mixed Approach Study

Moroccan scientific research cannot improve unless scientific subjects are taught in English.	37.9%	39.4%	10.6%	9.1%	3%
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The last section of the questionnaire (Section D) is about science teachers' attitudes towards the Moroccan language planning and policy. The main objective of this section is to find out high school teachers' attitudes towards the Moroccan language planning and policy at the high school. As such, science teachers were asked to show their level of agreement with language planning and policy in Morocco as shown in table (5). The table comprises three items targeting the Arabization policy, the current French implementation and the English language as a means of instruction.

Table 5: Science teachers' attitudes towards Moroccan LPP

	S. agree	Agree	Neutral	Disagree	S.Disagree
Arabization policy was a successful policy.	10.6%	12.1%	31.8%	28.8%	16.7%
French as a language of instruction for scientific subjects is a successful policy.	3%	25.8%	34.8%	22.7%	13.6%
English as a language of instruction instead of Standard Arabic and French is a necessity.	37.9%	33.3%	16.7%	9.1%	3%

A close examination of table (5) has revealed that a total percentage of 45.7% of science teachers disagreed and strongly disagreed with the fact that Arabization was a successful policy. Important to note as well, a percentage of 31.8% remained neutral. As far as the current French implementation is concerned, it was divulged that a considerable percentage remained neutral (34.8%) and others showed a level of disagreement with a percentage of 36.3% (22.7% disagreed and 13.6% strongly disagreed). However, when it comes to the English language as a means of instruction, it has been recorded that a great percentage was for the substitution of both Arabic and French by English which seems to be a necessity (37.9% strongly agreed and 33.3% agreed). These results show that there is a kind of unclear attitudes of science teachers towards both Arabic and French since the percentages are scattered among all the proposed choices. However, when it comes to English, no hesitation is recorded as the percentage shows (71.2% of science teachers agreed and strongly disagreed).

B. Interviews' Findings

In what follows is a description of the themes that were identified through the Thematic Analysis process. The main themes that emerged from the analysis are five, which are:

- Ambivalent attitudes towards the current language policy;
- Blaming the Moroccan LPP;
- Absence/ scarcity of training programs and professional development;
- Challenges faced by science teachers in the teaching/learning process;
- Science teachers' expectations and desired future.

Theme 1: Ambivalent attitudes towards the current language policy

Science teachers revealed ambivalent attitudes towards the current French implementation. As a result, three categories of teachers can be classified: teachers who were satisfied with the current policy, others who were not satisfied and others who remained indifferent. With no transition, science teachers extended the discussion to the previous language policy i.e., Arabization especially when teachers started to make some comparisons between the current language policy and the previous one. They also showed an awareness of the importance of the use of the English language in the teaching of scientific subjects.

Seen in this way, science teachers who were satisfied tend to have a positive attitude towards the use of French but with certain reservation. For them, French is no more than a first step before moving to the next one which is the use of English. However, the implementation of English depends on the availability of different conditions summed up in teachers' and students' language proficiency, the position of the English language in the educational system and others.

Regarding science teachers' dissatisfaction towards the current language policy, it was mainly the result of students' low proficiency level in French. According to them, students should be given the possibility to choose the language of instruction they see appropriate for them as means to cater for students' abilities since there is still a problem of language proficiency.

Attitudes and Reflections of Moroccan High School Science Teachers towards the Language(s) of Instruction in Regards to the Teaching of Scientific Subjects: A Mixed Approach Study

The third category of science teachers was indifferent towards the issue. For them, a language of instruction is no more than a tool and it is not that problematic. For them, even the use of English is not considered as a real solution because more interest should be given to the teaching of languages before taking the decision to choose a specific language of instruction.

Theme 2: Blaming the Moroccan LPP

Science teachers have revealed through the discussion their various attitudes towards the Moroccan LPP which most of the time, if not all the time, are seen to be negative. Whenever talking about LPP, the majority of science teachers linked it to either the government abrupt decisions or some hidden agendas. According to them, studies and investigations should be taken before hand in order to guarantee the success of any policy. Science teachers strongly believed that the socio-cultural and global contexts should be taken into consideration when planning and legislating language policies. They also asserted that there is a close and strong link between what is educational and ideological; something that affects negatively the quality of education.

Theme 3: Absence/scarcity of teachers' training programs and professional development

The scarcity or even the absence of teachers' training programs and professional development is another theme which has been identified through the Thematic Analysis. It has been noticed that this theme has been re-occurred throughout all the interviews with science teachers. In this context, almost all teachers agreed on the point that the amount of training they received is not enough or even absent.

Theme 4: Challenges faced by science teachers in the teaching/learning process

In all discussions, science teachers complained about the low level of proficiency of students in regards to all languages be it Arabic or French. As such, linguistic problems faced by science teachers are not specific to the French language, but also to Arabic. Problems faced when teaching in Arabic were mainly related to the use of vocabulary and the structure of the sentence. This bring into the surface the debate about the most appropriate approaches to the teaching of languages be it Arabic, French, English or any other language in general before moving to the choice of the language of instruction.

Through the discussions about the encountered problems faced by science teachers, other issues were evoked by teachers most importantly the issue of code-switching. Though, most interviewed science teachers proved to have a positive attitude towards code-switching, the same as the results revealed by the questionnaire, they showed a certain awareness about some negative impact on students' language proficiency and teachers' as well. As such, the majority of science teachers agreed that there is no 'pure language of instruction' in the classroom. A 'pure language of instruction' seems to be something ideal that rarely happens in the real life. Accordingly, one has to be cautious when discussing the idea of 'a pure language of instruction' since there is a deep gap between what is theoretical voiced by laws and what is real and happening in the field. In other words, there is a difference between *de facto* which means what is in practice and *de jure* meaning what laws stipulate.

Theme 5: Science teachers' expectations and desired future

Science teachers suggested some solutions which can be divide into types of solutions: solutions to the Ministry and others to teachers themselves. For solutions suggested to the Ministry, they revolve around four main points, which are: increasing the number of hours allotted to languages per week, reconsidering the methodology of teaching languages, introducing the language(s) of instruction as early as possible, providing teachers with continuous and updated training and finally emphasizing the importance of the English language. As for the solutions directed to teachers themselves, they are mainly related to autonomous training, which is the responsibility of teachers themselves, as well as the necessity to take part in Action Research in order to provide feedback about the teaching/learning conditions.

To sum up, the findings revealed from the Thematic Analysis have resulted to the identification of a number main themes. As a result, it can be concluded that the interviews with science teachers have revealed deeper insight into the topic. Not only the interviews have elaborated issues already dealt with in the questionnaire, but also, they brought into the surface new issues pertinent to the topic. The results of the interview analysis with science teachers, thus, showed a positive view toward the use of foreign languages in the teaching of scientific subjects with a special focus on English. However, negative attitudes were recorded in regards to the Moroccan LPP, teacher training and professional development, and students' low proficiency in languages. The success of the implementation of any foreign language as a means of instruction, according to science teachers, cannot be realized only if the approaches, the allotted time, the start of learning the language(s), the socio-cultural context, the global context and other criteria are taken into consideration far from any ideological consideration.

Attitudes and Reflections of Moroccan High School Science Teachers towards the Language(s) of Instruction in Regards to the Teaching of Scientific Subjects: A Mixed Approach Study

V. IMPLICATIONS AND SUGGESTIONS

The current section comes to draw on the major implications mainly educational ones. In this context, four points are going to be discussed which are Arabization in education, the current French implementation as a language of instruction, the status of the English language as a language of instruction and the place of code-switching in the teaching/learning process.

From the results obtained, it has been revealed that Arabization has not been considered as a success in the Moroccan educational system. This result aligns with different previous studies. For Entelis (1986), Arabization was more a policy whose main concern was to establish one's cultural identity and maintain power after the period of colonization. In this context, he said that "after Morocco and Tunisia gained their independence in 1956 and Algeria in 1962, they decided, as an affirmation of their cultural identity, against the former colonial power, to adopt Arabic as the official language instead of French" (Entelis, 1986, p.3). Zouhir (2017) as well claimed that Arabization was more concerned with regaining Morocco's national identity.

Other studies have attributed the failure of Arabization to the fact that Standard Arabic is not the language used in the conversations of everyday. Hence, once coming to the classroom context, students as well as teachers may find difficulties in learning and using the language. In this vein, respondents in Bentahila's (1983) study have asserted that Arabic is characterized by its grammatical complexity and its difficulty in learning. This idea of difficulty attributed to Arabic may result in lack of motivation which can lead again to what is known as code-switching.

Moreover, Arabization failure is also attributed to the discontinuity between the high school level and the university level in terms of the language of education as proven by Ennaji's (2002) study. Arabization is absent at universities which makes students in front of the challenge of using another language: French. In other words, students are confronted with a language in which maybe they are not fluent and proficient enough. As a result, students are at risk of failing because of their inability to carry on their higher education in which Arabic is not used. More than that, a great proportion of Baccalaureate holders from science streams tend to switch to other faculties like the faculties of Law or Letters and Humanities rather than faculties of sciences because of their low proficiency in French. This is what has been asserted by Bouziane and Rguibi (2018) when they claimed that students are not prepared to pursue their tertiary studies because of the way French has been taught to them in high schools which results in opting for studying in literary streams at university.

Another point which has been linked to the failure of Arabization is its disconnection with the job market. It is noticed that the job market favors more French educated students than Arabic educated ones. According to Elbiad (1991), job opportunities for Arabic educated students are limited to occupations like judges, teachers, lawyers and administrators.

As far as foreign languages are concerned, it is clear that they do not enjoy the same status and do not have the same level of importance in the Moroccan context. For example, French is still widely used in official and formal domains more than English though voices have started to call for giving more importance to English for its utilitarian and instrumental aspect. In this study, a great proportion of high school science teachers believe in the great importance of foreign languages in education, especially English, along with their importance as means of instruction.

Concerning the presence of the French language in the Moroccan context, no one can overlook it. French has always been the sole language of instruction in higher education (medicine, agriculture, engineering, chemistry and others). With the coming of the Frame Law 51 17, a gradual implementation of foreign languages as means of instruction has been gradually implemented in middle and high schools. For the time being, the French language has been implemented since it is the first foreign language in Morocco. English as a means of instruction, on the other hand, has been limited to few cases in some Moroccan high schools but with little success. What is important to note in this vein is that French has been favored over Arabic but English remains the most preferable language for the teaching of scientific subjects.

When it comes to English, positive attitudes were recorded towards its use as a means of instruction; something that can be attributed to its utilitarian aspect. This goes in line with different studies like the ones of Sadiqi (1991), Ennaji (1991), Crystal (2003), Ferguson (2006) and others. However, the English language still occupies a relegated status in Moroccan schools and this does not really reflect this elevated or prestigious status recognized internationally. What is more is that the respondents in this study showed some hesitation in regards to the use of English as a means of instruction. This highly implies that not much attention has been paid to its teaching, especially when it is compared to French. Meanwhile, the respondents believe that English will rank top in the educational system in the future. The reasons behind this belief can be linked to three main reasons: social, economic, and historical and cultural reasons. Socially speaking, English is considered the lingua franca that can bridge differences in the world and it is believed to be a popular language that does not belong to any specific social class; contrasted to French, which is seen as a language that belongs to the upper class. Economically speaking, English is considered as the universal business language that opens door to international business worldwide. Whereas from a historical and cultural perspective, English has no bad connotations since it is not related to any ex-colonizer.

When discussing the issue of the language of instruction in the Moroccan context, one cannot escape talking about the issue of code-switching in the classroom; an issue that has been evoked by science teachers repeatedly. As it has been revealed by the respondents, code-switching is part and parcel of the teaching/learning process since it has been claimed to be present and

Attitudes and Reflections of Moroccan High School Science Teachers towards the Language(s) of Instruction in Regards to the Teaching of Scientific Subjects: A Mixed Approach Study

sometimes even needed and necessary. This goes in line with Zentilla (1981) who defended the presence of code-switching, but, at the same time, she opposed its direct incorporation in the classroom.

Although the majority of high school science teachers do agree on the utility of code-switching in the classroom since it may foster students' understanding and help students passing exams, science teachers have shown an awareness of the possible negative impact code-switching can have on the teaching/learning process and on the teacher's language proficiency as well. It is perhaps worth noting in this context that the presence of code-switching comes to prove that there is a problem of language proficiency that lead to the violation of the language of instruction prescribed.

Therefore, despite the fact that code-switching violates the language policy, science teachers believe that it facilitates the teaching/learning process especially with those learners who are not proficient enough in the prescribed language. Seen in this way, code-switching can be considered as an effective language teaching tool employed by teachers in the classroom. This point was underlined by Lawrence (1999) who believed that code-switching is not an inadequacy but rather an instrument for effective communication.

VI. GENERAL CONCLUSION

In the light of the results and the conclusions made, humble recommendations can be made to language policy planners, the Ministry of Education and teachers. These recommendations are presented through the following points:

- Revisiting the way languages are being taught because the current approaches to languages teaching have been more oriented towards passing exams and thus have not proved to be that fruitful and successful.
- Ensuring students' as well as teachers' good command of the language(s) before moving to their use as means of instruction.
- There is general agreement that the language of instruction should be preferably English as advocated by the majority of the respondents.
- Professional development should be continuous and updated for teachers since the teaching of languages is a field which is dynamic. This professional development should also be paralleled with autonomous training which is the responsibility of teachers themselves.
- Action Research should be encouraged and results obtained from different academic research should be taken into consideration and not neglected.

To sum up, a bottom-up approach to reforms that gives scope for the participation of other components of the Moroccan educational system, teachers as a case in point, should be adopted. Accordingly, research that give voice to this population need to be involved in the scope of reforms since they can be considered as a source of feedback and useful recommendations.

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