FIRST YEAR UNDERGRADUATES' DIFFICULTIES WITH MATHEMATICS AND FRENCH LANGUAGE

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ABSTRACT

This study is about examining the difficulties of students of the first university year in mathematics related with language and particularly with French language, as it is the language of instruction. The university is also the first place for students to learn their courses completely in French. This language is a very familiar language in Algeria as a French post-colony; it has even many words in the Algerian dialect, which is the common language of people. But when it comes to academic learning, this language becomes one of the big difficulties of students; but also one of teachers' concerns. Our investigation was completed by performing interviews with students of the first year who revealed how French language created some of their mathematical difficulties, and how it increased some others. This allowed us to see how the relationship mathematics-language is established with students and how they expect their teachers dealing with them. In doing so, we could discern some pedagogical suggestions.

Key words: French language, mathematical difficulties, language difficulties, university students.

1. INTRODUCTION

Language and mathematics seems two different things, despite the fact that verbal expressions in mathematics are expressed in some language. Language seems not affecting the mathematics' understanding as mathematics has its own language (mathematical formal language and symbols). However, there is a deep unseen relationship between mathematics and language that has been investigated by research. Researchers have examined how language is related to mathematics in reasoning, understanding, writing and speaking, and reported many dysfunctions in mathematics understanding because the language structure is not congruent to the mathematical one (Durand-Guerrier, 2015; Azrou, 2015; Chellougui… Benkilani, 2003).

The basic of this study is to understand how the relationship mathematics-French language is elaborated with students of the first university year and what are their difficulties related to it.

1.1 Historical and linguistic overview of Algeria

In spite of being considered as an Arabic country and one of the Maghreb countries (with Tunisia and Morocco) by the political world map, Algeria is a multicultural country. It hosted many civilisations that made its cultural richness. Over years, the history has been shaped there by forces whose roots were in Africa, the Mediterranean region (including the South of Europe), and the Orient. Algeria lived a long period, from 1830 to 1962, under the French colonization. Before that, it was under the Othman occupation from 1515 to 1830. Othman arrived to North Africa to help fighting the Spanish who occupied some cost areas (now Oran, Bejaia and Algiers) till 1555. Many years earlier, around 665, the Arabs came from the East to spread the Islamic religion and power in North Africa, which was populated by Berber people. Arabs stayed there ever since (Azrou, 2015, p. 2-3).

Algerian population communicate in different languages, according to different regions, ethnic groups, institutions and circumstances. The most spread languages are Classical Arabic, Dialect, Berber language and French (first foreign language). Classical Arabic is shared by Arabic countries; the Algerian Dialect, different from the one spoken in other Arabic countries, sounds more similar to the Dialects used in both Tunisia and Morocco. The Dialect is the common language; it is the most used spoken language in daily life in Algeria; it's a mixture of classical Arabic, French and other languages (Spanish, Turkish, Italian…).In Algeria, people speak in their families either Amazigh language (indigenous language) or Arabic dialect (a mixture of Arabic and local dialect), but the language of instruction in schools is classical Arabic. So, children learn from primary school in a different language. French is the first foreign language, it is taught starting from grade 3 to grade 12. Some disciplines, like exact and technology sciences, are taught at the universities in French, with French books (Azrou, 2015, p. 4).

1.2 Languages of teaching mathematics in Algeria

The teaching of mathematics in Algeria for the three school levels (primary, middle and secondary school) has shifted to classical Arabic since the 70's, before that period, the teaching of all courses was in French; except for the Arabic language course. Teaching in French in schools was designed by the colonists during the colonization period (1830-1962), but lasted also after the independence

as the educational system lacked teachers mastering both Arabic and other sciences (mathematics, natural sciences, history, etc).
Teaching mathematics in classical Arabic has lasted more than thirty years, till the beginning of the 21st century where it has shifted again. In 2005, there was a big change in teaching mathematics: formulas and symbols are written from left to right with Latin alphabet (that stands for French), while comments, names and verbal expressions are maintained in classical Arabic (from right to left); while in the past, mathematics was completely written from right to left (in Arabic). This reform was undertaken to make the transition to university mathematics (taught in French) less difficult. This situation may result in a mess and some difficulties for students in the three school levels (primary, middle and secondary). This is an example about the same issue in Tunisia (Abdeljaouad M, 2004, p.37) to see how to read and write in both senses: the area of the square EFGH is equal to $49m^2$



Teachers usually complain about a recurrent difficulty with children when they deal with operations with negative numbers: 6-1 is 5, but it is -5 if it is read from right to left (Azrou, 2015). Other difficulties are worthwhile careful investigation; some of them are the following ones:

- The difficulty of writing and reading in both senses.
- The abbreviation like (cm, km, m, m^2, h, and min) that are in French, are not clear for children.
- Dealing with signs ‘greater than’ and ‘less than’. For example $6 > 4$ is ‘six is greater than four’ but might be read, by children, from right to left: four is greater than six.

1.3 French language

French is the first foreign language in Algeria, it is taught from grade 3 to grade 12. Except, French language, all courses in all school levels are taught in classical Arabic. Teaching French has been affected during the dark decade of the civil war (1990-2000), by the lack of French language teachers in many regions; consequently, many students did not have French courses for many years. On the other hand, the technological development and the increasing use of computers, cell phones and social media has pushed students to be more in touch with English and be distant from French, this caused students to be a kind of resistant to learn French. Even though, the Algerian dialect is developing every day by importing new words and expressions from French, it is quite rare to find students who

master the speaking and the writing of this language, at the end of high school level, which is after ten years of learning French

1.4 The transition to mathematics university

In Algeria, French is the language of higher education for scientific and technical disciplines (medicine, mathematics, architecture, computer science, engineering sciences, etc.); while the other disciplines, which are human and social sciences are taught in Arabic (history, Arabic literature, humanities, psychology, etc.). These last years, university students, in technical sciences disciplines, in Algeria, struggle to pursue their studies because it is quite difficult after studying in Arabic during primary, middle and secondary school levels, and also because it is a language that is not mastered by them, and particularly not desired to be learned.

To weaken the transition high school-university, to help students be familiar with a fundamental part of mathematics (formulas) in French, politicians and policy makers have decided to undertake in schools the reform about teaching mathematics formulas in French and keep verbal expressions in classical Arabic. The principal motivation was the difficulty that students encountered at the university level, where the language of teaching mathematics is French (oral and written). The situation of mathematics at the first university year is not better actually, after more than a decade of application of this reform. Around ten years ago, difficulties of students, at the disciplines taught in French, have been increasing; many students fail at the first year of mathematics and computer science discipline and many others decide to change the discipline to other disciplines where mathematics is not a fundamental course. The situation is not much different with engineers' disciplines, students struggle also with learning in French. Among many other difficulties encountered by students; we are interested in difficulties caused with French language. We have observed that some students still have problems with mathematics even though they can understand French, but it can happen also that students are completely ignorant about French language but could master mathematics. Thus, it is important to understand how the language of instruction affects mathematics.

Our motivation for this study is about three main points:

- Examine the effects of the reform undertaken in the school levels on students' leaning at the beginning of the university level. In other words, we would like to know whether this reform improved really the transition to the university, at which level there is improvement and what the constant difficulties are related to French language.

- Understand clearly and precisely the relationship mathematics-French language that students develop when they begin their teaching completely in French at the university.
- Identify students' mathematical difficulties with French language.

To examine these issues, we would like to answer our research question: what are the graduates' difficulties with mathematics related to French language?
We have designed interviews with students of the first university year in the university of Medea. The analysis of students' responses allowed us to make a conclusion and some pedagogical implications.

2. MATHEMATICS VS NATURAL LANGUAGE

The fundamental differences between natural language and mathematical language derive first and foremost from the fact that mathematical language is more precise and less flexible than the structure of natural language. In natural language there are differences between surface structure and deep structure of the utterance, there are ambiguous statements that derive from ambiguous words, and there is a wealth of language. This wealth of language derives from the diversity of nouns, and from the diversity of words expressing relation - all the verbs and adjectives. On the other hand, in mathematical language for each surface structure there is one deep structure, all statements are unambiguous and there is a paucity of language that expresses itself in the fact that there is only one type of noun – numbers, functions, etc… And that there are two relational signs – equality and inequality (Bloedy-Vinner, 1998 in B.S. Ilany& B. Margolin, 2010, p.139).

The first mathematics problems in the school are presented as written texts, describing a daily life situation, expressing a logical structure that dictates a particular arithmetic operation. Children, facing these problems need first to understand very clearly the words used in the text and be able to translate them to mathematical concepts, relations, and meanings.

> The difficulty with the solution of mathematical word problems is the need to translate the event described in natural language to arithmetic operations expressed in mathematical language. The transition from natural language includes syntactic, semantic, and pragmatic understanding of the discourse (Bloedy-Vinner, 1998 in B.S. Ilany& B. Margolin, 2010, p.139).

Children have recurrent difficulties with problems using some words from natural language like 'double', 'as much as', 'three times less', etc. An example of a mathematical problem and of the difficulty of translating from natural language is *The Students and the Professor Problem* (Kaput & Clement, 1979, in B.S. Ilany& B. Margolin, 2010):

> *Write an algebraic expression using the variables S and P that will represent the*

> *following assertion: "In this university the number of students is* 6 *times greater than the number of professors". Use S for the number of students, and P for the number of professors.*
>
> When this problem was given to 150 first year engineering students and 47 social science students, 37% of the engineering students and 57% of the social science students got it wrong. Two thirds of the wrong answers contained reversed equations of the type 6S = P instead of 6P = S. The mistake derived from the fact that in natural language the order of the words determines the meaning. The quantifier 6 appears beside the noun (students) and equality in the mathematical equation is not considered. According to natural language, the students were represented by S, the arithmetic operation was represented by multiplication, and finally the professors were represented by P, and thus6S=P (p.140).

This problem is not specific to English natural language, the same problem exist with any other natural language.

Let's examine, now a similar situation at a higher mathematics level, the university level in which we are interested to. Some disparities with mathematical language and natural language are given.

- **Negation**

In mathematics, the negation is an operation that shifts the truth-value of a mathematical statement from true to false; it has its rules and considerations. For instance: the negation of '$\forall x, F(x)$' is '$\exists x, \overline{F(x)}$'. However, in natural language, the negation is not so precise. As example: the negation of 'All the balls contained in the urn are red' might be: 'All the balls are not red' or 'No ball is red', while in mathematical language, the negation is: 'There is at least one ball that is not red'. This was reported in (Durand-Guerrier & Ngansop, 2010), the authors asked pre-service mathematics teachers about the negation of the following two sentences and obtained multiple different responses:

- The negation of: 'all balls are red' is: all balls are not red, no ball is red, some balls are not red, and there exists at least one ball, which is not red.
- The negation of: 'some balls are red' is: some balls are not red, all balls are not red, all balls are red, and no ball is red.

The authors mentioned also a crucial issue, which is the contrary in natural language and how it is presented in mathematics. When we say in mathematics: a function is not decreasing, it does not mean that it is increasing, the same holds for many other concepts, like a relation that is not symmetric is not anti-symmetric. However this relationship of opposition, in other cases, is true land holds for the negation, like a number which is not even, is necessarily odd; and a rational number is not irrational.

- **Implication**

The same difference between mathematical language and natural language holds for 'implication'. In all natural languages, if a parent says to a child 'if you pass your exam, I will give you a present', the child will understand that in case, he/she does not pass the exam, there will be not present. Moreover,

'If you get up early' $\Longrightarrow$ 'You will not miss the bus' has the same truth-value, in natural language, of: 'if you do not get up early' $\Longrightarrow$ 'you will miss the bus.'But this is completely different and even not true in mathematics, the truth-value of the implication is not the same in mathematics and natural language, it is rather opposite.

In Mathematics:

$'P \Longrightarrow Q'$means: if 'P then Q' has the same truth-value of $'\overline{P}\ or\ Q'$ and the negation of the $'P \Longrightarrow Q'$ is $'P\ and\ \bar{Q}'$.

$'P \Longrightarrow Q'$ has the same truth-value of $'\overline{Q} \Longrightarrow \overline{P}'$

$'\overline{P}' \Longrightarrow$ nothing

In natural language

$'P \Longrightarrow Q'$ means: if 'P then Q'

$'P \Longrightarrow Q'$ has the same truth-value of $'\overline{P} \Longrightarrow \overline{Q}'$

- 'Or' for a choice

In mathematics, both possibilities, exclusive and inclusive exist for 'or', while in natural language only or exclusive exists.

In Mathematics

$(x-1)(x-2)=0$ means $x=1\ or\ x=2$. Here 'or' is exclusive.

$x \in A \cup B$ means $x \in A\ or\ \ x \in B$. Here 'or' is inclusive.

$xy=0$ means $x=0\ or\ y=0$. Here 'or' is inclusive.

In natural language

When you get to a crossroads, you choose right way or left Way. 'You cannot choose both', so 'or' is exclusive, in most cases in natural language.

The relationship between the language and mathematics

Some students think that they don't face any difficulties due to they get to the right answers, but if we ask every one of them in part the results become different, so everyone express formulas and abstractions in its own logical thinking, means the meaning is important to express any mathematical idea. The meaning of words could change the sentences, which means if we try to translate some word from French to Arabic we could have another explication far away from solution, such language differences may have deepen consequences for misunderstanding mathematical courses. So according to many languages we considering those differences of notation and logical sentences for two or more languages cost another issues (Edmonds-Wathen, 2012).

2. METHODOLOGY

In this part, we will describe the experience performed by students, in spring of 2018. In order to find out about their difficulties, we designed interviews for first university year students.

Participants

The participants are a sample of the first year mathematics learners. Eighteen students, among them eight girls and ten boys in the university of Medea, their discipline is mathematics and computer science. This discipline has two main courses, at the first year, algebra and analysis, where students manifest many difficulties. We chose those students because we are interested in difficulties with French language when students shift their leaning to French, which is the case for these students, moreover, we included six students who are remaking the first year, that is who failed the last year and starting all over. This choice was motivated by getting answers from students who could understand their difficulties better after a lapse of time and with more distance and maturity. We think after one failure, students might be able to analyse the causes of their failure and can see better the nature of some of their difficulties related to French language.

Questions of the interviews

Each question is divided into two or three sub-questions in order to get to a specific answer leading us to know the relation between mathematics and language, in general, and the possible causes of students' failing, in particular. We had categorized the questions in some few hypotheses. We wanted to examine

students' expectation when they enter the university regarding the language of instruction and their teachers' behaviour with language (Q1), their opinions about the ancient way of teaching mathematics (Q2), what do they think about French and Arabic language regarding teaching mathematics (Q3), students behaviour with languages (Q4, Q5 and Q6), language problems in learning (Q7 and Q8), language alternatives (Q9) and finally the shift from mathematical language to natural language and vice versa by the two activities proposed at the end.

The entrance to the university

Many students thought that when they pass their university entrance exam 'baccalaureate exam', the teaching at the university would be in the same rhythm. They usually expect the teaching and learning at the university would not be very different, particularly with language. We would like to know how many students are satisfied with French as the language of instruction.

Question 01: You knew before arriving at the university that the teaching would be in French. How was your reaction at the beginning of the academic year; astonished, disappointed, blocked, or normal?

Q. 1.1 How was the beginning for you, concerning French language? If difficult; in which way?

Q. 1.2 Did you expect anything from the teachers to help you take the courses in French? How did you expect teachers to help their students?.

Impact of secondary school teaching on mathematical learners at the university, in fact students would continue to perceive, think and practice mathematics as in their previous years of schooling.

Studying according to the high school method regarding language

Question 02: Would you have preferred to continue your studies as in secondary school?

Q. 2.1 If the teacher wrote in classical Arabic (as in secondary school), would it be better?

Q. 2.2 The method used in secondary school (verbal expressions in Arabic and mathematical formulas in French) would it have helped you to follow mathematics at university?

French or Arabic language and in which form

Between writing in French, speaking in Arabic, or speaking and writing in French or translating from time to time, which combination would students prefer.

Question 03: Are mathematics easy in French or in Arabic?

Q. 3.1 If teachers speak and write in French, would it be better?

Q. 3.2 If teachers translates into Arabic, would be better?

Q. 3.3 If teachers use Arabic language for verbal expressions but writing them in French, would it be better?

Students' behaviour and languages

With the following questions, we would like to examine students' behaviour when using a language with mathematics.

Question 04: When you do mathematics in French, do you translate to Arabic or do you try to understand in French language?

Q. 4.1 What happens when students copy their course in French, in class?

Q. 4.2 If you find an exercise solution or any course in French, do you try to translate it or understand it?

Question 05: What happens when a student revises his course, in French, at home?

Q. 5.1 What happens when a student writes the solution, in French, on the exam-sheet?

Question 06: in which language do you think when you solve an exercise?

Q. 6.1 When you hear the words 'image', 'group'; what do think about?

Q. 6.2When you have heard the words: limit, upper bound, rational number, the first time, what did you think about?

Language problems in learning

By the following questions, we would like to know how the change of language affects the teaching of mathematics, from the student's point of view

Question 07: Does language have an effect on mathematics learning? And how?

Q. 7.1 How do you summarize the problem of language?

Question 08: There are students who have failed because of language problems, what do you think we could do for them?

Q. 8.1 There is almost no student speaking good French, how did students who succeeded do, in your opinion?

Q. 8.2 There are some students who are poor in French and yet are very good in mathematics, how are they doing, according to you?

Q. 8.3 Now that you have a distance, how would you describe your language difficulties at the beginning of the first year?

Language alternatives

Question 09: What is the best choice, according to you, for the language of instruction, written and spoken?

Q. 9.1 Which advice would you give to mathematics teachers about language?

Q. 9.2 Which advice would you give to first year students about language?

Q. 9.3 How could we improve this language problem, in your opinion?

Activities

We added two activities in order to know, how student can shift from a language to another, mainly from mathematical language to natural language expression and how do they grasp and conceive the semantic meaning of symbols, mad how do they translate it into words, and vice versa.

Activity I

Translate in French words the following statements:

1. $B = \{f(x), \quad x \in E\}$
2. $C = \{(x, x), \quad x \in \mathbb{R}\}$

3. $\forall x \in \mathbb{R},\ x^2 + x + 1 \neq 0\ ,\ \forall\, x^2 \geq 0$
4. $\int_{-1}^{1} x\, dx \quad and \quad \int_{-1}^{1} 0\, dx$

Activity II

Write in mathematical symbols the following statements:

- The inverses of all real numbers are non-zero.
- Every real has a non-zero inverse
- All real numbers have an inverse which cannot be zero, 'every non-zero real admits a non-zero inverse.
- A differentiable function cannot be not continuous.
- A strictly increasing function contradicts the fact that it is stationary.

3. RESULTS

The entrance to the university
Response 01

12 of them (66.7%) said 'I was blocked', among them 4 students who had repeated the year (repetitive) (5girls/7boys). Among the responses: *'At first, I did not understand anything until I got to know some of my colleagues who could help me'* (Boy/repetitive).
'I knew that studying at the university would be in French, and with the start of courses, I was blocked, especially with teachers who speak only French'. (girl/new).
5 students of them (27.7%) 2girls and 3boys said, not blocked; (1girl) didn't answer to this question.

1-1) 17 (94.4%) said, study mathematics was difficult for them in the beginning, concerning French language (9boys/all girls). Among the responses: *'the study of mathematics at the university in French language was difficult at first. I thought I would not adapt and I was thinking of changing the discipline, but over time I noticed that there were key words constantly repeated that helped me continue.'* (Boy/repetitive).
1 (5.6%) student said, *'it was not very difficult, difficulties not become from language'* (Boy/repetitive)

1-2) 15 (72.2%) students said, expected that teachers talk in Arabic (9boys/6girls). Among the Reponses: *'I expected that teacher "talks in Arabic" language, I understood the teacher in some words in terms of French language, but I did not*

understand the way the teacher seeks to get the information, that's why I gave up and I was no longer present in lectures'. (girl/new)
Other answers: '*I expected it would be better if "he talks with us and explain more in Arabic", and understand that we are new students we have difficulties with French language'* (Boy/repetitive)
Among these 15 students, 3 (2 new boys/1girl) students said, they expected also teachers give them some key words before course starting, and the answer was *'I expected teacher explain in Arabic and French, also give us some key words (some words in Arabic like: then, deduct, therefore…etc.) and scientific words to follow the course'*. (boy/new).
And 3 students said, they expected that teacher gives them some examples, one of the responses was *'Simplify and give us examples'* (Boy/repetitive)

Studying according to the high school method regarding language
Response 02

12 (66.7%) students said, no they would not prefer to continue studies as secondary school (all girls/4 boys (2 repetitive)), one of them declared by *'No, because our disciplines needs French language'*. And 6 students said, yes they would, one of them explained why and he said *'yes, because when I was learning mathematics in Arabic I was an excellent pupil and now I can't understand in French language'* (Boy/repetitive)

2-1)15 (83.3%) students said, No, they would not like if teachers writing were in classical Arabic at university (all girls/7 boys).
3 (16.6%) boys (repetitive) said, yes. Among the responses *'yes it help us a lot if the writing was in classical Arabic it would be easy for us to understand better'* (Boy/repetitive).

2-2)13 (72.2%) students said, yes this methods *'writing terms in Arabic and formulas in French from left to right'* (girl/new) helped me a lot at university(6 boys/7girls). Literally, one of them said 'it's *helped me a lot otherwise, I couldn't understand a word'*.1 (5.6%) student said, No, it did not help him *'It did not help me very much, because, I had some difficulty with writing at university'* (Boy/repetitive).

French or Arabic language and in which form
Response 03

3-1) 17 (94.4%) students said, No if teacher speaks and writes only in French language. Among the responses *'in first year, some student are bad in French language, for this reason why they give up when teacher speaks and writes only in French'* (boy/ new) and *'No, it depends on the level of student in French*

language but for me, this method doesn't help me'(3 boys and 1 girl/repetitive), 1 (5.6%) student said, yes. The response *'yes, if teacher speaks and write in French (it helps students the day of exam)'* (Boy/ repetitive)

3-2) 18 (100%) students said, yes it would be a lot better if teacher translates in Arabic. Among the responses *'if the teacher explain in Arabic, yes it would help us, because we memorize the words better'* (Boy/repetitive)

3-3) 14 (77.8%) students said, No it would not help them. One of them said, *'No it didn't help us, if teacher write in French and explain only in Arabic when we revise our courses our brain can't memorized what teacher said in Arabic if it we couldn't link it to writing'* (Boy/repetitive)
4 (22.2%) students said, yes, I helped us if teacher uses the term in Arabic and writes them in French. Among the responses *'Yes, because teacher will help his students a lot'*

Students' behaviour and languages
Response 04

11 (61.1%) students said, when they do mathematics they always translate in Arabic then they try to understand (4girls/7boys). The answers was, *'I always translate then understand in French language'* (Boy/repetitive).
7 students said, they understand in French without using translation (4girls/3boys)

4-1) 12 (66.7%) students said, they write everything if they do not understand, 2 (11.1%) students said, if they don't understand they won't write anything. Literally, the answer was *'when I didn't understand I won't write anything'*. (Girl/new).
1 (5.6%) student said, he writes just what he needs, 2 (11.11%) students said, they write and try to understand, 1 (5.6%) student said, he writes and understands and if he doesn't understand he asks his teacher to help him.
Literally, the answer was *'when I write I try to understand what I am writing, and if I can't understand I ask teacher to help, because if I try to translate maybe it's not the same meaning that the teacher's give me'*. (Boy /new)

4-2) 17 (83.3%) students said *'I try to understand and if I could not, I translate some words'*. (Boy/new).
1 (5.6%) student didn't answer this question

Response 05

Each student had his special methods to revise his lessons at home, some answers were *'I revised my courses at home and when I am blocked I let it'*. (Girl/new).
'I don't revise everything in my courses at home I just make applications'. (Boy/new).
'If I understand my courses with the teacher it will be easy for me to understand it at home otherwise I will be blocked' (Boy/repetitive)
'I don't like to revise my courses at home I prefer to revise with my friends' (Boy/repetitive).
'When I revised my courses at home it's easy for me to understood them, because most of the time I usually took some note (in Arabic) at classes'. (Girl/new).
'I had some difficulties when I revised at home especially in long definitions'. (Girl/new).
'Some courses I cannot understood them until I do some exercises'. (Girl/new).

When students wrote in the day of exam, they had difficulties with the use of words, 4 (22.2%) Students said, they wrote in classical Arabic if they could not write in French language. '*I am not good at French language so, if I can't write a solution in French I write in classical Arabic'*. (Boy/new).
'Naturally, I translate the question on Arabic in order to get to the solution but always, when I try to shift into French language it is difficult'. (Girl/new).
'If I write something wrong and teacher does not understand me then'. (Boy /new).
'I had some difficulties in writing solution, and that made me afraid' (Boy/new).

Response 06

15 (83.3%) students said, they think in Arabic language before then they write their solution in French language. One of them declared *'I think in Arabic to understand question then I write in French language'* (Boy/repetitive)
3 (16.66%) students said, no they think and write their solution in French language.

6-1) 18 (100%) students said, they translated these words, when they did not know their values (definition) in mathematics; they waited their teachers to give them definition in order to understand these words.
One girl (new) said, *'I translate this word to Arabic then I link them to another word in Arabic I already seen like image for example, when I heard this word in French for the first time, I translated and I linked it to the same word in Arabic and to their meaning to mathematics, and yeah it was right, and other words I wait the teacher gives their definition'*.

6-2) 18 (100%) students said, they knew the word limits from secondary school, about the other words they waited their teacher to give them their definitions. One

of the answers was, *'the word limits I knew it from secondary school, and other words I'll wait teacher gives me their definitions, because these words are new words'* (Boy/repetitive).

Language problems in learning

Response 07

15 (83.3%) students said, yes, language has an effect on mathematics learning, one girl (new) said, *'Yes, language has an effect on mathematics, when student is good on mathematics but he cannot have good mark because of language. Therefore, language consider as an instrument to understand mathematics formulas'.*
3 (16.6%) students said, No.

7-1) each gave his opinion, some students answers were *'Language is big problem for student; we think that maybe if we were good at French language we succeed last year'.* (Girl/new)
'Problem of language is big problem because at university mathematics study base on French language, which means if student is good at mathematics he could fail because of language problem'. (Boy/new)
'Language problem became more serious from the appearance of French language' (Boys/repetitive)

Response 08

There are students who have not succeeded because of language, some students said *'Student have learned French language and try to understand terms, exercises and question on his needs'.* (Girl/new)
'In my first year, I failed because of the language and most of the time I ran out of classes because of French it shocked me. In the exam I tried to explain the question with my own understanding and my only thoughts and I didn't know if it was the same meaning as the question or not, then I realize that student have to learn French language by himself' (Boy/repetitive)

8-1) 9 (50%) students said, that those student who cannot express in French and success they rely on memorization (2girls/7boys (3repetitive)). Among the responses *'I think those students lean with memorizing'* (Boy/ repetitive).
7 students said, students rely on mathematics formulas without using words, among these 7 students, 3 girls said, *'maybe they are good in mathematics they don't need language, they use only symbols'*, also another girl declared '*I had this problem, I could not write in French, sometimes I wrote the solution in Arabic, in symbols or I drew it'.*

2 students didn't understand the question (answer out of question)

8-2) 17(94.4%) students said, they use symbols and ask their teachers and work too hard, some answers were, *'I think they work too hard and use symbols'*. (Girl/new)
'They use symbols only' (Boy / repetitive)
1 (5.6%) Student said, *'They have good base in mathematics'* (Boy/repetitive)

8-3) students faced some difficulties, they declared
'I still have some difficulties from the entrance until now, when I try to solve an exercise I understand just few word'. (Girl/new)
2 (11.11%) students said *'I faced some difficulties with French language I cannot understand courses, solution…'* (Boys/repetitive)

Language alternatives
Response 09:
16 (89%) students said, the best methods of teaching, concerning language was, teacher needs to explain a lot in French and in Arabic, especially in exam we want teacher explains questions in Arabic, and in writing, it's fine if teachers write in French but we want them to simplify in words, among the responses:

'I want teacher to explains more in French and in Arabic and write in French it's fine and we want him to write clearly that's all' (Girl/new).

'We want teacher explains in French and in Arabic especially in the question we want him to explain more in Arabic to understand more' (Boy/repetitive).

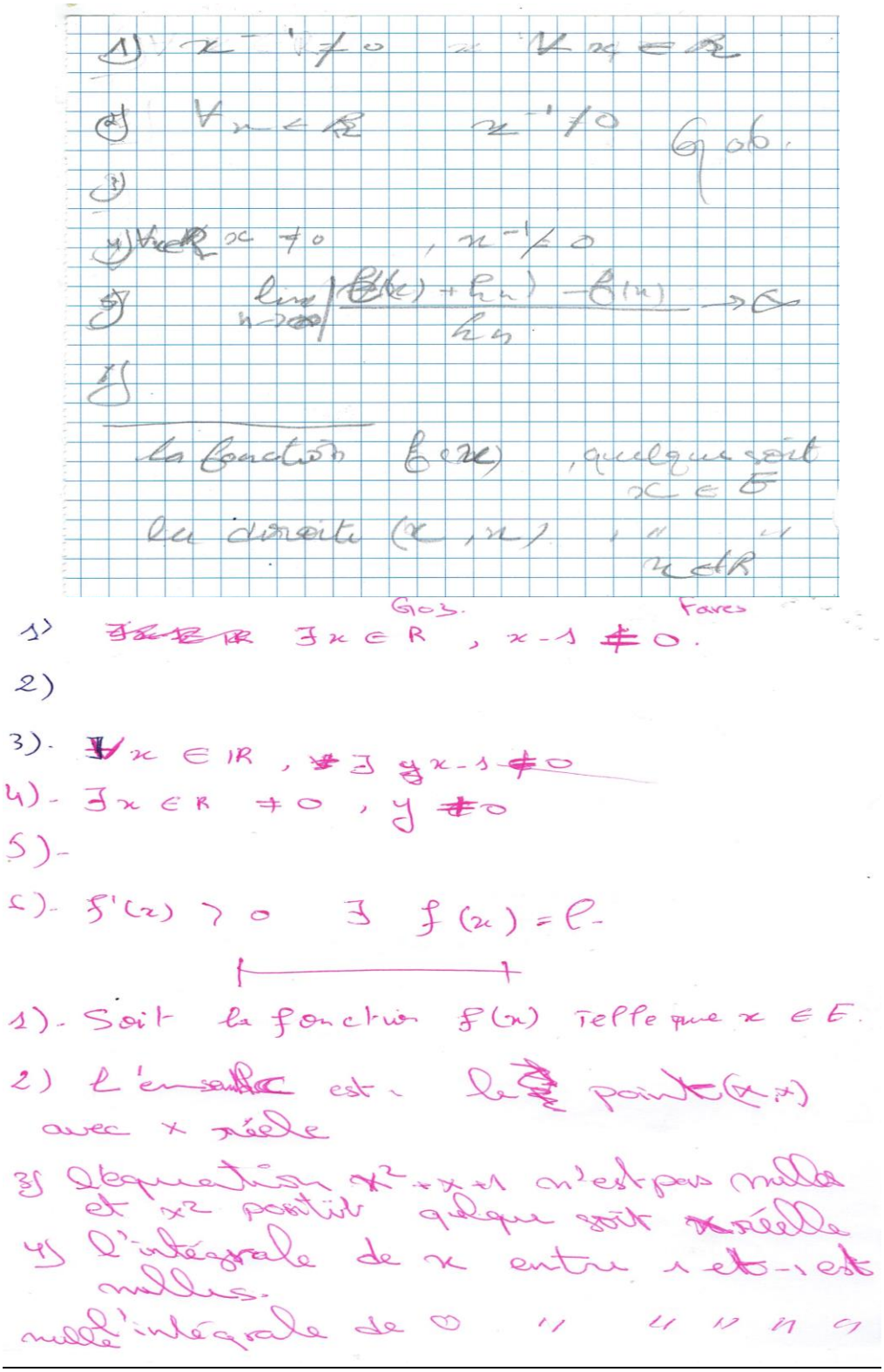
2 (11.1%) students said, they preferred if teachers teach in one language for speaking and writing, the answer: *'Teacher write and explain in one language "Arabic" or "French" language*9-1) *'In mathematics discipline, we want teachers add more French classes or change mathematics learning into classical Arabic'*

9-2)18 (100%) students said the advice '*We made a mistake, which we did not learn French language and we did not prepare for university. Therefore, they have to work hard and learn the language.'*(Girl/new).

9-3) to solve the problem of language, student suggested some solution as the following, 8 (44.4%) students gave same solution: '*To solve this problem they have to start French language at secondary school'* (7 boys (2 repetitive)/1girl new).
Other answers were *'To avoid this problem of language they said, student have to learn out school for its need of language'*. (Boy/new)
'Improve French language from primary school'. (Girl/new)

'I think in the first year its better if they teach some courses in Arabic and other in French until the student is prepared for the French language' (Girl/repetitive).

Activity 1 and 2



G7.

1) $a \in \mathbb{R}, \hat{a} \neq 0$

2) $\forall a \in \mathbb{R}, \exists \hat{a}$ tq $\hat{a} \neq 0$

3) $\forall a \in \mathbb{R}, \exists \hat{a}$ tq $\hat{a} \neq 0$

4) $\forall a \neq 0, \exists \hat{a} \neq 0$

5) ~~f continue ⟹~~
f dérivable ⟹ f continue.

6) $f'(x) = ax$ avec $a > 0 \neq f(x) = 0$?

~~B) Im f~~

~~c) $x \in \mathbb{R}^2$.~~

1) les Images de $f(x)$ tellque x appartient à E
2) ~~tout~~ les couple (x, x) qui appartient à E.
3) pour tout x appartient à $\mathbb{R}$, $x^2 + x + 1 \neq 0$
tellque x^2 superieur ou égale à 0 pour tout
x appartient à $\mathbb{R}$.
4) ~~l'aire~~ la surface entre $[-1, 1]$ l'intervalle

1) $1/R \neq 0$

2) ~~$\exists$~~ $x \in R \Rightarrow x^{-1} \neq 0$

3) $\forall x \in R \Rightarrow x \in x^{-1} \neq 0$

4) $(\forall x \neq 0) \in IR \; . \exists \; x^{-2} \neq 0$

5) Soit f une fonction continue

$f' \nexists$

- / B égale l'ensemble de l'image de x ($f(x)$ telque x aparteint $a \in$.

✓

- / pour tout x aparteit à IR $(x^2 + x + 1 \neq 0)$ tel que $x^2 \neq 0$ telque pour tout $x \in IR$.

1) - $x^{-1} \neq 0$

2) - $\forall x \in \mathbb{R} \; . \; \exists x^{-1} \neq 0$

3) - $\forall x \in \mathbb{R} \; , \; x^{-1} \in \mathbb{R}$

2ème fille

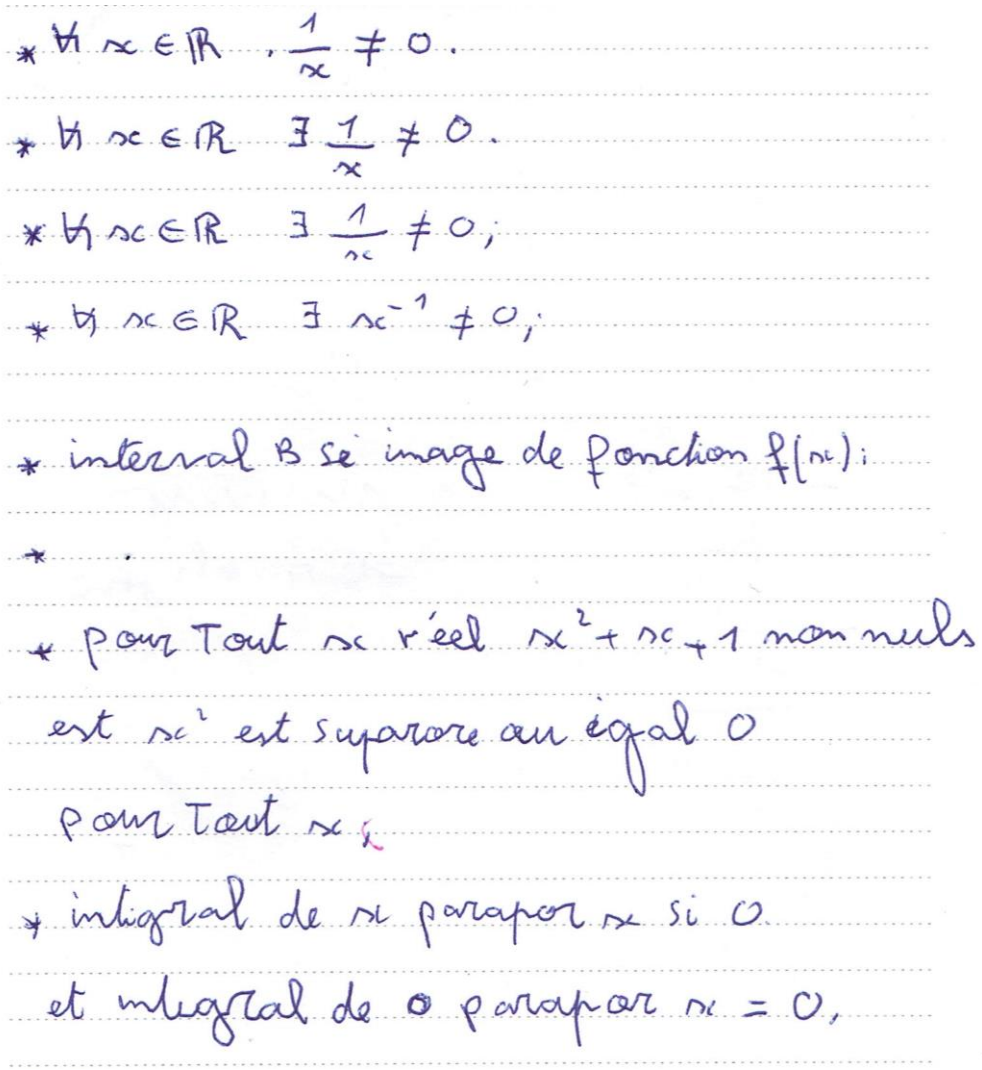
$$\lim \frac{f(x) - f(x_0)}{x - x_0} \neq l$$

Qf :

- $B = \{ f(x) \, , \, x \in E \}$

$C =$

- $\forall x \in \mathbb{R} \; x^2 + x + 1 \neq 0 \quad x^2 \geq 0, \; \forall x \in \mathbb{R}$



3. DISCUSSION

To examine the mathematical difficulties of undergraduates of the first university related to French language, we designed interviews that were performed by a sample of students. The results are very significant. At the stat of the academic year, students are not at ease, coming with a very low French level, they are rather blocked when they attend a mathematical lecture where French language is the master language. Most of students said that the beginning was compromising, some of them wanted to quit and some others searched help with their classmates, other students have failed. Most of students expect teachers to help by talking in Arabic, and by translating into Arabic some basic words that students call ‘key-words’. They mean words that are important in an exercise, like: then, therefore, conclude, etc. For using the same method of teaching and learning in high school, not all students agree on continuing by using it. Those who do not agree mention that it would not help them learn French and thus

learning in French, we think that students did not really understand this question. For the others who accepted continuing to learn in that way, they mentioned that because they think if it was the case they would not have failed, and besides, they were good students at high school and because the language shift, they become very weak in mathematics. Students argue that not mastering the language made them uncomfortable to ask questions, therefore, they rarely understand what is going on with the teacher.

When copying down from the black board, students believe that they should copy even if they do not understand some words; they believe that that is their job and the courses are written to be copied even if it is not clear how it is written. It is strange how students explained that most of the time, they 'transcripts' some words like signs, because they either do not understand the hand writing of the teacher or they do not understand the written word.

In front of feeling powerless, students memorize some exercises and techniques, it is clear that in this case, if tiny details are changed, students would be completely lost.

Students make two to three activities when doing mathematics; they translate to Arabic, solve the question in Arabic then translate again into French to write down. For these different operations, there is a high probability that a student misses one or all of them, moreover, students are never sure, they are stuck to mathematical formulas and try to guess how would be the question about them, they try to 'make' a solution by writing the less they can. It is clear that this way cannot work all the time, as students are not able to understand effectively what it is about in the question.

Students believe that if there are few students who could succeed, even though they have a weak level in French, it is because these students memorize their mathematics and rely completely on symbols. This shows that those students have no idea about mathematical mastery and mathematical success.

Students are aware that learning in French language is a big problem that affects their achievement directly and impede them to follow a normal learning. It is even a handicap that they cannot overcome. In spite of suggesting to provide students with French courses, or course where mathematics are translated from French to Arabic, students are powerless and have no present solution for their language problem.

According to the activities, students written texts show how understanding and expressing mathematics in meaningful way is very difficult with students. The formulas are only formulas, students fail to see them behind that and fail to foresee

any possible meaning. So all we can see that, student doesn't do much effort to express the formulas in other way by developing his ideas, he uses the formulas as he reads them this is the first side. About the second side, student can shift from expression to formulas by using definitions in independently way with no attention the meaning.

Students confuse many words that are meaningless like (si and c'est), which shows clearly that the problem is beyond language difficulties.

A study done before, benrabbah shows that among 1,035 Algerian citizen responses, 44.4% (M: 34.8% F: 65.2%) preferred French language and about 55 % (M: 40.1% F: 59.9) like to study in French language (benrabbah, 2015, p.237), this means that, all the results are satisfy this study because girls preferred and supported mathematics' studies in French language instead boys.

4. CONCLUSION

The problem of teaching mathematics in French language is a serious problem; it affects not only the understanding, but also the writing, the reading and the thinking of students. Students mimic their teachers, memorize some technics and ideas, and translate usually from Arabic to French and from French to Arabic, most of the time in a wrong way. Students try to focus on formulas, as they knew them from their previous school levels in French, and neglect the verbal expressions that stand for the main activities of any text. Words like, deduce, therefore, then, let, and others have no meaning for them.

Teachers, who are certainly aware about students' difficulties with language, do not understand them effectively and cannot help them, as they have no other options for adapting the teaching.

In conclusion, students learn mathematics in a problematic way, without any real meaning.

Limitations

Our limitations of this study, is about the nature of some questions, we could include other questions that would have revealed more specificities of other difficulties. We could not find out more about the meaning of some French words or expressions for students.

Pedagogical implications

Research suggests that mastering mathematics in natural language would be enough to master mathematics in any other language. The problem of French language is not the principal problem, because these students do not master mathematics in Arabic language, the problem is deeper that formulas and verbal expressions. If students use memorization, it is because they are very lost and are not into it. Some students come to the university with a very low level in understanding, writing and expressing mathematics in Arabic. It is sure that even if mathematics would be written in Arabic at the university, the problem would not improve much, because the teaching approaches in schools and in the university are very different. Meanwhile, French language stands for the tree that hides the forest.

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