

Teaching French as a foreign language through the interdisciplinary method: teaching through science

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ABSTRACT

This article highlights a new approach to teaching French to students in scientific and technical sections in the second qualifying cycle where literary works reign as an exclusive support for teaching French, the first foreign language in Morocco. What we have developed in this paper is an interdisciplinary method that draws on other disciplines and thanks to which it will be easy for French teachers to reconcile the literary and aesthetic substance conveyed by the integral literary works with the rational tendencies and the scientific representations of the students of the scientific and technical sections. The approach discussed in this article aims to create interdisciplinary complementarity to establish a continuum of acquired knowledge by analyzing some prototypical statements extracted from the works programmed at the second qualifying cycle of the school system. The method of analysis is based on the scientific content studied in the following disciplines: mathematical logic, the method of reasoning of which makes it possible to ensure whether the entities expressed in the literary texts have the truth and the just coherence or not. Secondly, Isaac Newton's universal gravitation (fundamental mechanics) whose three famous laws make it possible to understand the principles that generate the relationships between a solid body in a position exposed to the impact of other forces. Thirdly, the natural sciences, whose Darwin's theory allows comparison between the semantemes that give rise to the constituents of statements that fall under the wonderful register and the semantemes that characterize the categories of species in nature.

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INTRODUCTION

For more than a decade, the teaching of French in Morocco has been experiencing a real revival. It is about pedagogy by competence and teaching by integral literary works. Thus, French literature has crossed the threshold of high schools and the students who arrive there begin to discover, in their respective classes, integral works of different literary genres. Consequently, the teaching of the French language is reduced to purely instrumental functions corresponding to the desire to establish a framed and controlled mode of reception where individual free expression remains restricted.

In fact, project didactics based on integral literary works implement approaches that are limited to a flat understanding of the meaning of the passage studied. This strips the literary text of any aesthetic quality and reduces it to a reservoir of lexicon to be acquired, of sentence to be analyzed or of figures of speech to be explained. The 2002 reform calls on teachers practicing in the second qualifying cycle to implement a new program designed around the notion of educational project and the study of the integral literary work approached in its socio-cultural context. Many of them declare that they find it difficult to establish a literary approach to the full text, more so, they settle for a flat approach that is not interested, either, in the effect produced by stylistic ornaments, nor in semantic, discursive and enunciative connections that participate in the construction of the meanings of the literary text.

The literary text is certainly full of aesthetic and stylistic concepts such as focus, narrative instances, figures of speech, language registers ... etc. whose skills are rather disciplinary than linguistic. However, the learners of the scientific and technical sections, given their rational and methodical tendencies, might lose interest in this tale, especially if it is presented in a summary and flat way. Therefore, the fact of seeing it distant from their center of interest

creates in them a certain resistance to the content taught, which leads to the disinterest of the entire discipline.

The present article proposes to present a new systematic interdisciplinary approach to reconcile the literary and aesthetic concepts conveyed by the integral texts with the rational tendencies of the students of the scientific and technical sections in high school. It turns out that the literary text, by its nature, should summon within the framework of its pedagogical exploitation several knowledges, in particular the new concepts in didactics of languages-cultures. This is why our article aims to set up a new approach more adequate to the rational representations of learners whose mental particularities require that the explanation of literary notions such as language registers, figures of speech and language games be precise, exact and without redundancy.

1. Theoretical considerations

1.1. Status of French in Morocco

The introduction of French in Morocco is closely linked to colonization. It has been presenting there since 1907. When Morocco became a protectorate in 1912, the French language acquired the status of official language. Even after independence, the link to the French language has not been broken insofar as the transition from a state of dependence to a state of autonomy was accompanied by a process of emancipation in which French, still the language of teaching and administration, will sometimes be challenged, sometimes adopted, even defended and sublimated.

In the new constitution of 2011, French is recognized as the first foreign language whose learning will be "introduced from the second year of the primary cycle of primary school, focusing, during this year, on oral and phonetic familiarization" (Constitution of the Kingdom of Morocco, Article 5). The educational system

gives French a rather special place in that it turns out to be "the first compulsory living language in a school context" (Sadiqui, 2016: 1). Even the National Education and Training Charter promulgated in 1999 implicitly emphasizes that French is the first foreign language. It is therefore a question of "a status of fact not de jure" (Benzakour, 2007: 51).

Of course, French today has no official legal status as long as the Constitution declares that only Arabic and Amazigh are the official languages of the state. Nevertheless, this idiom occupies a prominent place, officially considered to be the first foreign language of the country. Such a place has been conferred on it both by the royal speeches and by those of the national ministers of education (Boukous, 1995).

In short, the French language has a special status in the Moroccan language market as it has been interpreted, a de facto status. Although in official texts, it is an alien language present both in the practice of Moroccans and in their imagination. The study of the sociolinguistic presentation relative to this idiom reveals that it holds the position of "language of indisputable prestige" (Moatassime, 1992 quoted by Mansouri, 1996: 91).

1.2. French in the education system

Since 1987, the didactic configuration of the discipline of French at the second qualifying cycle has been largely influenced by the functions granted to this language at the university. In fact, it is "a configuration that draws on the didactics of languages and the didactics of scientific disciplines in particular" (Sadiqui, 2016: 1). In the Moroccan educational system, French imposes itself quite strongly not only as a taught discipline and language of instruction, but also as a widely used communication language in Morocco, or even as an instrument of school, social and therefore professional selection. This is also the reason why the National Charter of Education and Training (October 1999) has found an appropriate name for it with the expression "privileged foreign language".

Teaching / learning French integrates, in fact, the educational system almost at the same time as the Arabic language, and many years before the other foreign languages. Thus, until the early eighties, all scientific and technical subjects were taught in French. However, the Arabization policy that was carried out between 1981 and 1986 meant that all disciplines, in particular scientific and technical, are taught in Arabic from the first year of basic school until the baccalaureate.

In response to the arabization of scientific disciplines and according to the official instructions of 1987, several other changes will impact the configuration of the discipline of French. First of all, "the schedule reserved for the discipline will be increased" (Men, 1987: 45), in order to be able to achieve the new objectives assigned to it, namely "to get students to communicate in French (understand, speak, read, write) with maximum ease in all situations where French is essential to them, or simply useful" (Men, 1987: 3).

The official instructions published in 1987 therefore focus on the utilitarian and functional objective of teaching the French language, which must serve as a means of access to sources of information, especially in the fields of science and technology. They also aim to acquire a communication skill that will make students able to understand, speak, read and write with ease in all situations where French is essential to them. Thus, new manuals are published. They are organized in didactic units with various themes and supports and activities to be done outside the classroom. The contents are functional in nature and the organization of the didactic unit presents the language activities in the following order: reading, language, oral activities and written expression.

The last reform and which is still in vogue dates from 2002. It is focused on project didactics based on literary texts. In reality, this is a reform that marks the turning back. This is for two main reasons: firstly, because it adopts the traditional conception of language teaching which takes the literary text as a model whose language used has nothing to do with that of daily transactions. Secondly, the reform represents a regression because during the sixties integral literary works were programmed.

• French as a taught language

Au niveau du second cycle qualifiant, le français est enseigné en tant que discipline proprement dite dont le coefficient est 4 pour les sections scientifiques et littéraires et 2 pour certaines sections techniques et professionnelles. Les instructions officielles de 1987 ont augmenté l'horaire du français qui varie selon les sections entre deux heures, quatre heures et même cinq heures par semaines pour les sections littéraires. Comme nous l'avons déjà mentionné, la didactique de la langue française au lycée est une didactique de projet à base de textes littéraires. La séquence qui dure une semaine se répartit entre quatre types d'activités à savoir, les activités de lecture (étude de textes), les activités de langue, les activités orales et les activités de production écrite.

À ce niveau d'enseignement, le français est basé sur le concept de compétence comme pour les autres matières. L'élève doit être capable de s'exprimer correctement dans toutes les situations de communication, de consolider ses acquis, de se perfectionner pour une appropriation élargie et progressive des dimensions culturelles, discursives, et linguistiques de la langue française.

• French as a language of teaching

In 2013, Morocco opened the international sections in qualifying secondary education. And for the past two years, scientific subjects have been taught in French at the college level. Thus, the trend is to gradually generalize French-language science education in qualifying secondary schools. Currently, some 85,000 middle school students and 99,258 high school students are learning science in French.

At the university, French is the language of instruction par excellence. In fact, with the exception of a few courses such as Arabic studies, Islamic studies and Arabized law, all higher education courses are French-speaking. The student must thus transpose the knowledge acquired in high school in Arabic, sometimes in Moroccan Arabic, into a completely different new linguistic system. In other words, he is obliged to reconstruct them with specific semiotic coding and new didactic tools because the expectations of the university institution require to know how to speak but also to know how to read, write, reason, explain, describe, argue, summarize, observe, compare ... in French. It is in French that the teacher will now do the course.

1.3. French program in the second qualifying cycle

The reform of 2002 installed project didactics based on French-speaking literary works. These are, for the common core, the realistic short story "Aux champs" "In the fields" by Guy de Maupassant, the fantastic short story "Le chevalier double" "The double Knight" by Théophile Gautier and the comedy "Le bourgeois gentilhomme" "The Bourgeois gentleman" by Molière. As for the French-speaking literary scheduled for the first year of the bachelor's degree, there are the autobiographical novel "La boîte à Merveilles" "The Box of Wonders" by Ahmed Sefrioui, the modern tragedy "Antigone" by Jean Anouilh and the thesis novel "The last day of a convict" by Victor Hugo. It should be noted in this sense that these contents are programmed for all the classes and sections combined, with the exception of the professional section whose program includes instead of the modern tragedy a fantastic short story entitled "The legend of the man with the golden brain".

1.4. French by literary texts

In September 2002, two major innovative principles structured the start of the school year: the teaching of French through literary work and pedagogy by competence. These two lines of strength, which nothing connects a priori, are justified by "two disciplinary matrices imposed by the globalization of training: cultural openness and literature" (El-Harmassi 2008: 3). The literary text which aims through the point of view or the focus, the narrative instances, the figures of style, the language registers ... rather disciplinary skills than language skills is introduced as the main support in the French class. Its objective is to allow the teaching/learning of French to set as its goal "the appropriation of the language-culture" (Sadiqui, 2016: 3). According to the

responsible ministry, this aim should contribute to the development of national values and universal values (Men, 2007).

The introduction of the full literary text in the classroom is largely inspired by recent research in language-culture didactics, which agrees that the literary text is the "place where languages and cultures grow" (Cuq and Gruca, 2005: 76) or even "a privileged space where interculturality un-folds" (Cuq and Gruca 2005: 413). All sections, even technical and scientific, must be equipped with "the cultural competence necessary for learning a language" (Men, 2007).

It turned out that the eviction of the literary text in favor of authentic documents was justified in the name of a diffuse anthropological argument according to which "the cultural substance of the texts would be too distant from the representations of the students and would, therefore, hinder the mastery of the language" (Sadiqui, 2008: 2). The same motive now serves a strictly opposite choice, namely, the re-tour of literature guarantees a better mastery of the language. However, it is necessary to standardize the corpus of literary works on the program at the national level, under the pre-text that "Literature would carry moral codes and social mores likely to blur the national identity" (Sadiqui, 2008: 2).

To tell the truth, the introduction of this new medium should therefore place the discipline in a triple perspective based on a specific approach (Men, 2007) and by valuing the appropriation of the language-culture. It would target fundamental cultural and intercultural competences currently in language teaching/learning in Morocco. Nevertheless, and by its nature, the literary text should summon, as part of its pedagogical exploitation, several knowledges, in this case, the new knowledges in didactics of languages-cultures and which would imply the establishment of new and more adequate approaches.

Undoubtedly, the level of the learners plays a primary role in achieving the intended objectives. That is why, in this article, we try to propose a new method through which it would be easy to explain the literary and abstract aesthetic concepts conveyed by literary texts in the second qualifying cycle. It is in fact a rational and systematic approach much more adequate to the expectations of the students and which would allow the teachers to reconcile the linguistic and aesthetic substance of the integral literary works with the representations and the tendencies of the students of the scientific and technological sections.

2. Methodological considerations

2.1. Delimitation of the research object

The teaching / learning of French has always occupied a special place in the reforms that the Moroccan educational system has known since the advent of independence. Since 1987, the didactic configuration of the discipline "French" in high school has been largely influenced by the functions assigned to this language at the university. Since the introduction of the teaching of French by integral literary works and pedagogy by competence in September 2002, the progress made in the development of the teaching of this language has ended with insufficient results. The latter testify to a low quality of learning as well as a lack of internal and external effectiveness. This is due to our sense, to the fact that learners find themselves forced to study literary works that do not speak to them, whose themes do not correspond to their center of interest or their expectations. Moreover, these works work on languages already constituted, refer less to reality than to other works and convey an abstract literary and linguistic substance and completely removed from the mental tendencies of the learners.

For all these reasons, the purpose of this article is to present to French teachers, pedagogical supervisors, researchers in language didactics a new systematic approach likely to allow learners of scientific and technical sections to easily grasp the concepts and the literary, stylistic and aesthetic abstract instances specific to integral texts, and this, in a concrete, reasonable and rational way. The new approach draws at the same time, in mathematical logic, in the laws of fundamental mechanics, in the principles of biology as well as in the experimental method. Its purpose is to create

interdisciplinary complementarity and the continuum of acquired knowledge.

2.2. Research problems

Since the reintegration of the literary work in the French course, many didactic difficulties have imposed themselves in the teaching-learning of the discipline of French. These difficulties seem much more upsetting with prejudices stipulating that the text precedes theoretical artifices and pedagogical strategies careless of paratextualisation or even, turned to the personal readings of learners who barely read.

In this regard, it will be important for us to answer the following question: to what extent does the agreement of the content of the literary works integral to the program with the expectations of the students make it possible to improve the quality of learning in French and to overcome the disinterest of the discipline. From this question, other questions emerge, among others; is it possible to reinstate the basic knowledge of learners in other disciplines in the French course? If so, how can they be exploited in the explanation of the linguistic substance conveyed by the literary text? Likewise, to what extent would the prerequisites of students in mathematics, physics and natural sciences be useful in explaining certain linguistic, aesthetic and abstract stylistic instances relating to the French course?

2.3. Corpus

The corpus that we will analyze in this topic consists essentially of statements taken from the integral works on the program. Indeed, the corpus (1) is extracted from the autobiographical novel "The Box of Wonders" by Ahmed Sefrioui, which is one of the three works programmed during the French course of the first year of the baccalaureate. The corpora (2) and (3) return to the philosophical novel "Candide or Optimism" by Voltaire, one of the integral literary works programmed for the second year of the baccalaureate. The three corpora have as a common criterion the wonderful register. The presentation of the statements noted is carried out in the following order :

- Enter the title of the work.
- The novel numeral represents the chapter from which the statement to be analyzed is extracted.
- The Arabic numeral indicates the page from which the statement is taken.

3. Analysis of the corpus

3.1. Language registers

A. Check the conformity of the statements with mathematical logic

In order to overcome the discrepancy between the cultural competence conveyed by the full text and the representations of the students of the scientific and technical sections, the following method proposes to explain the abstract literary concepts in a systematic, concise and precise way. In the following, the corpus (1) presents a statement extracted from chapter III of the work "La Boîte à Merveilles" The Box of Wonders". The statement in question falls within the wonderful register which in reality constitutes the entry to the study of figures of speech.

Corpus 1

La Boîte à Merveilles « Ce soir, **les objets** de la Boîte ne me **parlaient** pas. Ils **gisaient** inertes, maussades, un peu hostiles »
- "Tonight, the objects in the Box did not **speak** to me. They lay inert, sullen, a little hostile"

Normally, the wonderful register is defined as linguistic elements (nouns, verbs, adjectives, adverbs, past participles) that denote the wonderful or the supernatural in the narrative. However, such a definition remains vague and ambiguous for students whose mental tendencies are rational and methodical. Our experience of working with this category of learners has allowed us to get an idea about

the representations that they make of the achievements presented to them.

The purely literary substance of the integral literary works in the program creates in the students a certain resistance to the content taught. Moreover, despite the expression of the debates of ideas that constitute the integral works as well as the aesthetic effects that they carry, the students do not hesitate to judge them as superfluous. Literature is certainly related to language, but the logic that binds them is neither descriptive nor expressive. Likewise, "the literary text is not the repository of the most just and perfect use of the language" (El-Harmassi, 2008: 8) since it is precisely defined by its propensity to denounce its infirmities, or even inauthenticity or deception by all kinds of transgression or transmutations. This is the reason why we have developed a much more practical and relevant method that would allow students in the technical and scientific sections to acquire the syntactic and stylistic tools guaranteeing mastery of the French language. In fact, what is innovative about the method in question is that it relies on interdisciplinarity in the construction of literary concepts. This involves the prerequisites of the students in mathematics, mechanics and fundamental physics and the principles of natural

sciences, and this, according to the phases as they will be presented in the following.

• **Phase 1 : Identification of the semantemes of the statement**

During this step, it is first of all a question of determining the semantic nature of the actor of the action described by the verb. The determination consists in the fact of attributing to the subject the characteristic [inanimate]. This means that it is a personified subject whose semantic is defined according to the parameters; [-person], [+thing]. In other words, it is a subject that semantically de-notes one thing. By undergoing the identification of semantemes, the verb is either animated or in-animate. The animated character of it evokes an action whose semantemes are ; [+person]// [-thing]. Whereas, the inanimate character evokes an action whose semantemes are: [+ thing]//[-person].

• **Phase 2 : Verification and demarcation of the semantemes of the statement**

The logical verification of the semantemes (compatible// incompatible) in the statement {III. 54} brings out the following results:

Nature of the subject		Nature of the verb	
“Les objets” (S) “The objects”		“ parlaient ” (V. 1) “were speaking”	“gisaient” (V. 2) “The lay”
[+inanimate]		[+animated]	[+inanimate]
[+thing]		[+person]	[+thing]
[-person]		[-thing]	[-person]
[+definiteness]		[-definiteness]	[-definiteness]
[-animated]		[-inanimate]	[-animated]
[+genre]		[-kind]	[-kind]
↓		↓	↓
Semantemes of relevance		Semantemes of relevance	Semantemes of relevance
↓			
[+inanimate]		[+animated]	[+inanimate]
[+thing]		[+person]	[+thing]
[-person]		[-thing]	[-person]

Table 1: Verification and demarcation of the semantemes of the statement

• **Phase 3 : Systematic comparison of semantemes**

Following the demarcation of the semantemes of the constituents of the statement {III. 54}, we will then proceed to the comparison of the semantemes obtained in such a way as to respect the logical relationship linking the subject to the verb. In other words, logic implies that any action performed by a [+animated], [-inanimate] subject must necessarily be marked by [+animated]- [-inanimate]. Similarly, any action semantically signaled as: [+inanimate], [-animated] is logically assumed to be done by a subject [+inanimate], [-animated]. Therefore, any report that violates this linking rule will be considered illogical or (wonderful).

Therefore, any relationship that connects the subject to the verb will be qualified as follows: the logical relationship is the equivalent of the ordinary register, that is to say, an affirmative statement. Whereas, the illogical relationship is the sign of the wonderful and supernatural register. It is through the assimilation of the latter that the student can methodically grasp the different combinations of the figures of speech, since these are combined by means of illogical games of language that the wonderful register offers.

The systematic comparison of the above semantemes leads to the following result:

The objects	were speaking	Report S →V.1	Connections	Language register
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→ [-animated] →	[+animated] →	- +	S ∉ V.1 →	illogical →	Wonderful register
→ [-person] →	[+person] →	- +	S ∉ V.1 →	illogical →	Wonderful register
→ [+inanimate] →	[-inanimate] →	- +	S ∉ V.1 →	illogical →	Wonderful register
→ [+thing] →	[-thing] →	+ -	S ∉ V.1 →	illogical →	Wonderful register

Les objects	were laying	Report S → V.2	connections	Language register
→ [-animated] →	[-animated] →	- -	S ∈ V.2 → logic →	affirmative statement
→ [-person] →	[-person] →	- -	S ∈ V.2 → logic →	affirmative statement
→ [+inanimate] →	[+ inanimate] →	+ +	S ∈ V.2 → logic →	affirmative statement
→ [+thing] →	[+thing] →	+ +	S ∈ V.2 → logic →	affirmative statement

Table 2: interpretative comparison of the semantemes of the statement

• **Phase 4 : Interpretation of the results**

The interpretation of the results resulting from the systematic comparison of the semantemes brings out the following finding:

In the first case, the comparison of the semantemes of the subject

Corpus 2	
Candide ou l'optimisme XIX. 75 :	« Candide et Cacambo montent en carrosse ; les six moutons volaient, et en moins de quatre heures on arriva au palais du roi » "Candide and Cacambo are getting in a carriage; the six sheep were flying, and in less than four hours they arrive at the king's palace"

and those of the verb indicates that the verb (V.1) is incompatible with the subject. In other words, the action carried out by the subject has the semantic character [+animated], while the subject is marked by the character [-animated]. This is clearly manifested in the results of the comparative test which in all cases displays either [- +] or [+ -]. This means that there is an illogical or contradictory relationship that connects the subject to his verb. This relationship associates the inanimate or chosified subject (the objects) with an animated or personified action (spoke), hence the dominance of the illogical and wonderful character of the meaning.

In this way, we can clearly and logically demonstrate to the student that the wonderful register, including the figures of speech, is established through attributing to the subject of the sentence a verb that denotes an action semantically contradictory to the subject.

In the second case, the test indicates that the verb (V.2) is semantically compatible with the subject insofar as the appearance of the results [- -] and [+ +] reveals that the two constituents share the same semantic particularities. Therefore, the relationship that connects the subject (objects) to the verb "lay" is of a logical order, which makes it possible to deduce that it is a simple declarative statement and that the wonderful character is not attested to.

A. Checking the conformity of the statements with the rules of science

The extract in the corpus (2) falls under the wonderful register. It is about a statement taken from the literary work "Candide or Optimism". The scientific verification method stipulates that any affirmative statement is certainly in logical relation with the rules of nature and / or science. However, sometimes in literary texts, the expressiveness of linguistic formulas can violate either the rules of science or the rules of nature or both at the same time. In this way, the logic that links literature to science on the one hand, and literature to natural realism on the other, does not need to be justified, because the linguistic and cultural substance conveyed by literary texts is under the sign of creative freedom.

In fact, the method that we have developed with our students is based on checking the conformity of the studied statements with the rules of science as well as those of natural realism.

At first place, we will proceed to verify the conformity of the statement {XIX. 75} with the standards of science.

The statement {XIX. 75} constitutes a violation of one of the main rules of fundamental physics, namely, Isaac Newton's gravitation. To clarify it, we will note the semantic characteristics of each of the two underlined words in corpus (2) as follows:

Subject "Sheep"	Concordance with the act of "flying"	Verb "were flying"	Concordance with the actor "sheep"
→ [+ mammal] →	Impertinent -	[+ bird] →	Impertinent -
→ [+ weighing] →	Impertinent -	[+plumage] →	Impertinent -
→ [+ quadruped] →	Impertinent -	[+ biped] →	Impertinent -
→ [- winged] →	Impertinent -	[- weighing] →	Impertinent -
→ [-plumage] →	Impertinent -	[+ winged] →	Impertinent -

Table 3: Distribution of the semantemes of the constituents of the statement

In the statement {XIX. 75}, the fact of associating the verb "to ly" with the subject "the sheep" constitutes from the scientific point of view a violation of the rules of fundamental physics. It is more precisely about Isaac Newton's third law, called the principles of interaction relating to the equilibrium of a solid. According to it, if a solid body is subjected to the action of three forces \vec{A} , \vec{B} , \vec{C} : \vec{A} is the strength of its weight, \vec{B} represents the force of gravitation, while \vec{C} is a force so

$$\begin{aligned} &\Rightarrow [+ \text{mammal}] + [+ \text{weighing}] + [+ \text{quadruped}] + [- \text{winged}] = \text{walking.} \\ &\quad \downarrow \quad \quad \quad \downarrow \quad \quad \quad \downarrow \quad \quad \quad \downarrow \\ &\Rightarrow [+ \text{bird}] + [- \text{weighing}] + [\text{biped}] + [+ \text{winged}] = \text{flying.} \end{aligned}$$

Proceeding to the logical demonstration, we can say that according to natural realism, beings whose semantemes are [+mammal], [+weighing] and [+quadruped] do not fly, rather, walk, because their expressed weight $\vec{P} = m\vec{g}$ constitutes a real obstacle that prevents them from flying over easily. As opposed to beings whose semantemes [+bird], [-weighing], [biped], [+wing], flight is a feasible act.

Indeed, the above statement defies the rules of fundamental mechanics because for the sheep to be able to fly over, they first of all need wings [+winged] which will make their weight negligible or zero $\vec{P} = 0$ and this, through an opposite force that counteracts the force of gravitation. In this way, the flight will be possible. As with birds, the wings create a force $-\vec{F} = m\vec{a}$, which is opposite to the force applied by gravity on the sheep according to the formula $\vec{F}_{A/B} = -\vec{F}_{B/A}$. Thus, the application of this mechanical relationship allows the sheep to cancel their weight, and consequently, to fly over. This is expressed by the following mechanical relationship: $\vec{F}_{A/B} + \vec{F}_{B/A} = \vec{0}$.

In the end, students can deduce that this is a transfiguration since in nature sheep can never fly, for two reasons: first of all because they do not belong to the category of birds. Secondly, since their weight being heavy creates a resistance force \vec{F} (gravitation) which prevents them from flying. And that to overcome this obstacle, its need to have wings in order to create a second force $-(\vec{F})$, which

for this body (the sheep) to be able to fly, it is necessary that the vector sum of these forces is zero according to the following formula: $\vec{A} + \vec{B} + \vec{C} = 0$.

By examining Table (3), we note that the comparison of the semantemes relating to the noun "the sheep" and the verb "to fly" makes it possible to bring out the following results:

makes it possible to counteract the force of gravitation. Since the statement {XIX. 75} violates the rules of science (gravitation), the standards of natural realism (sheep flying) and the principles of logic (flying without wings), so it is wonderful register.

B. Checking the conformity of the statements with natural realism

Checking the conformity of the linguistic substance of literary texts with natural realism is another much more appropriate method for explaining language registers and figures of speech to students in scientific and technical classes. In fact, it is a question of making a very concrete and rational comparison between the linguistic and cultural substance of the integral texts and the reality lived in the natural space. It has also been proven that natural species are divided into categories, each has its own peculiarities that distinguish it from other categories.

The verification of the conformity of the linguistic substance of literary texts is carried out by means of comparing the semantemes to which the constituents of the utterance give rise to ensure whether the substance addressed is in conformity with natural realism or not. In the following, we will explain the steps of the verification relative to the statements {XIX. 75} and {III. 19} with the realism of nature.

■ Phase 1 : Spotting of the semantemes of natural species

For the statement {XIX. 75}, the semantemes to which the constituents of the statement give rise are the following:

Catégorie des moutons	Catégorie des oiseaux (voler)
⇒ [+ mammal]	⇒ [+ oviparous]
⇒ [+ quadruped]	⇒ [+ biped]
⇒ [+ weighing]	⇒ [- weighing]
⇒ [+ruminant]	⇒ [- ruminant]
⇒ [+ fleece]	⇒ [+plumage]
⇒ [- winged]	⇒ [+winged]

Table (4): Semantics of the categories of natural species (sheep and birds)

■ Phase 2 : Verification of semantemes

Proceeding to the comparison of the semantemes of the category of sheep as they are present-ed in the statement {XIX. 75} with those of sheep in nature, it appears that the noun "sheep" as pre-sented in the statement in question presents a violation of the specificities of

the category of sheep. In the sense that in reality, beings whose semantemes [+mammalian], [+quadruped], [+weighing], [-winged] are endowed with natural specificities that qualify them more for walking than for flying.

Likewise, beings who are naturally qualified to fly must normally possess the following se-mantemes: [+bipedal], [+plumage],

Corpus 3

Candide ou l'optimisme
III. 19 :
« Un être à deux pieds sans plumes, qui n'avait pas d'âme »
- "A two-footed being without feathers, who had no soul"

[+winged] and [-weighing] so that they can defy the force of

Catégorie des humains	Catégorie des oiseaux
→ [+ biped]	→ [+biped]
→ [+ soul]	→ [-soul]
→ [+ conscious]	→ [+ovipare]
→ [+ weighing]	→ [-conscient]
→ [- plumage]	→ [-biped]
→ [-winged]	→ [- weighing]
→ [+mammal]	→ [+plumage]
	→ [+winged]

Table (5): schemes of the categories of natural species. (humans and birds)

Phase 2 : Vérification of semantemes

The comparison of the semantemes relating to the two categories indicates that they have a single semanteme in common, namely, [+bipedal] that the author of the text used it to evoke through the expression "a being with two feet" the point of resemblance between man and bird. However, the addition of another semanteme to the statement namely, [-plumage] removes in principle, the being in question from the category of birds and attributes it to the category of humans. Likewise, the absence of feathers implies the absence of the wings [-winged], since in nature the birds have the body covered with plumage [+plumage], in

addition to wings [+winged]. The first part of the statement therefore constitutes a transfiguration of the category of birds. The general impression that emerges from the second part of the statement draws on the oddi-ty insofar as the absence of the semantic [+soul] takes on the statement of a strange character. The latter is clearly manifested on the one hand, with the use of the semanteme [+plumage] in the first part of the statement, and on the other, with the absence of the semanteme [+soul] in the second part. The first rule violates the category of birds, while the second violates the category of humans. Normally, the result that the logical distribution of semantemes brings out should be the fol-lowing :

→ [+biped]+[+plumage]+[+winged]+[-soul] = bird

→ [+biped]+[-plumage]+[-winged]+[+soul]= human

} → Declarative statement

→ [+biped]+[-plumage]+ [-soul] = fantastic creature

→ [+biped]+[+plumage]+ [+soul] = fantastic creature

} → Wonderful register

Thus, students can discover that the violation of the specificities of natural species allows the authors to create wonderful linguistic images through juggling with the particularities of beings. Nevertheless, such an occurrence could not pass without drawing attention to the strange character of the linguistic expression produced.

Conclusion

In this article, we have presented a new systematic approach thanks to which it would be easy for French teachers to reconcile the linguistic and cultural substance taught in the French course where literary works prevail in exclusive support with the rational tendencies and logical represen-tations of the learners of the scientific and technical sections in high school.

The approach discussed in this topic feeds on scientific content studied in parallel in other dis-ci-plines such as mathematics, fundamental physics and natural sciences. Indeed, in order to verify the conformity of the statements to the logical order, we relied on the principles of mathematical logic whose reasoning method makes it possible to ensure whether the entities expressed in literary texts have the truth and the just coherence or not.

The aim of the approach in question is to create a continuum of acquired knowledge and com-plementarity between the various disciplines studied. Thus, to verify the conformity of the analyzed statements with the rules of science, we involved some basic notions of fundamental mechanics that the learner discovered at the common core. It is more precisely about the universal gravitation of Isaac Newton whose three famous laws make it possible to understand the principles that generate the relationships between a solid body in a position exposed to the impact of other forces,

among others, the force of the earth (gravitation) and that practiced by the air on the body.

Another aspect of the complementarity between the disciplines offered by the systematic approach is manifested in using of students' knowledge in the discipline of natural sciences to explain the wonderful linguistic and cultural content of literary texts. The linking of the two disciplines consists in the comparison between the semantems to which the constituents of the statements that fall under the wonderful register give rise and the semantems that characterize the categories of species in nature. This is to highlight the vague or illogical character of the statements.

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