Classroom Semiosis through Teacher-Student Interaction

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Abstract

The purpose of this article is to describe how teacher-student interaction facilitates the production of new meanings in EFL classes. In order to better apprehend the process of classroom exchanges which leads to the generation of meaning, it is hypothesized that teachers make use abduction to design, and then, to test temporary hypotheses about learners' learning difficulties. The findings reveal the effective mediating role played by teachers to enhance students' knowledge acquisition through interactive scenarios. The results may therefore serve to draw guidelines for teachers in their choice of the best teaching strategies to adopt in different situations.

Key words: Interaction, Meaning, Abduction, Communication Strategies.

Résumé

Le but de cet article est de décrire comment l'interaction enseignant-étudiant facilite la production de nouvelles significations dans les classes d'anglais comme langue étrangère. Afin de mieux appréhender le processus des échanges en classe qui conduit à la génération de sens, il est supposé que les enseignants utilisent le raisonnement par abduction pour concevoir, puis, tester des hypothèses sur les difficultés d'apprentissage des apprenants. Les résultats révèlent que le rôle de médiation joué par l'enseignant aide à améliorer l'acquisition des connaissances à travers des scénarios interactifs. Les résultats peuvent servir à élaborer des lignes directrices dans le choix des meilleures stratégies d'enseignement à adopter dans des situations d'apprentissage différentes.

Mots-clés : Interaction, Signification, Raisonnement par abduction, Stratégies de communication

الملخص

هذا المقال العلمي يصف دور التفاعل بين المدرس والطّالب في إنتاج معاني جديدة في دروس اللغة الإنجليزية كلغة أجنبية. من أجل فهم أفضل لعملينا التبادل والحوار داخل الفصل الدراسي التي تؤدي إلى توليد المعنى ، تمت مناقشة الأسئلة التالية: كيف يؤثر المعلم على قدرة المتعلمين على فهم الكلمات الجديدة ؟ وما الذي يحدد اختيار المعلمين لاستراتيجيات التدريس عند التعامل مع صعوبات الاستيعاب ؟ وما هي طبيعة الحوارات التعليمية الفعالة ؟ نحن نفترض أن المعلمين يستخدمون التفكير الحدسي مع التفكير الاستقرائي في اختبار فرضيات مؤقتة حول مشاكل استيعاب الطلاب وذلك لتصميم معالجة آنية لمشاكل استيعاب الكلمات الجديدة. تم تحليل البيانات بالتحليل السيميائي المقتبس من تشارلز سندرس بيرس (Charles. S . Peirce) يكشف التحليل عن دور الوساطة الذي يلعبه المعلمون في اكتساب الطلاب للمعرفة من خلال سيناريوهات تفاعلية لهدف تفعيل المكتسبات القبلية لصياغة معاني جديدة في القسم.

الكلمات المفاتيح: التفاعل ، المعنى ، التواصل ، التفكير الحدسي ، النظرية السيميائية

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Introduction

Classroom interaction analysis is an important area in applied linguistics. Researchers emphasize the importance of peer interaction because the interaction in EFL classes facilitates the learning process (Allwright, 1998; Jones, & Raver, 2013; Havik & Westergard, 2019). However, little discussion is conducted about teacher-learner interaction which is too easily associated with traditional teaching and thus blamed for discarding meaningful communication. Even though one type of interaction has been given priority in classroom interaction analysis, scholars agree on the importance of interaction in the educational context.

Different definitions are given to the concept of interaction. For instance, Fogel describes it as an active sharing of information, meanings, opinions, interests, and feelings between addresser and addressee (Fogel, 2007). Similarly, Stacey defines interaction as a collaborative effort to exchange verbal and nonverbal responses (Stacey, 2003). Brown (2001) on his part, contends that interaction is the heart of communication may be what all communication is about.

To socio-constructivist learning designs which regard communication as the basis of cognitive development, interaction is an implicit process that is involved in nearly every step of students' thinking and which allows them to connect new knowledge to old information (Salomon & Perkins, 1998). Mercer (1995) considers interaction as a basis for learning, because it enables learners to be socially creative in groups or in face to face conversations. This social interaction with a more knowledgeable person is important to leverage learning and to continuously assess learners' progress and difficulties (Vygotsky, 1978).

Accordingly, teacher-student interaction is a major aspect of interaction in the EFL classroom. It involves interaction of the teacher with one or more students. This process is identified by Nöth (2014) as a two-way process which is based on verbal exchanges between participants. This implies that there ought to be effective communication in the classroom where the teacher and the learners mutually influence each other.

Consequently, it will be argued in this article that teacher-student classroom interaction can provide a nurturing environment for meaningful learning which favours semiosis. It will also try to demonstrate that teachers are able to use meaningful signs to guide learners' meaning-making processes during active interaction. A qualitative research model is applied to highlight the role played by the teacher-students' interactions in the generation of meaning in EFL classes.

The study explores how meaning is negotiated during teacher and students' interactions by addressing the following questions: 1- How does the teacher know about the learners' comprehension difficulties in the EFL class? 2- What determines the choice of teaching strategies when dealing with comprehension difficulties? 3- How does the teacher affect the learners' cognitive processes, and bring change to their level of comprehension?

To answer the last question, segments of lesson scripts are analysed using a semiotic model inspired by Peirce. Learning scenarios constructed by Peircean scholar Winfried Nöth are then applied to the collected data resulting in the identification of two frequently used vocabulary learning scenarios in secondary education.

The literature about classroom interaction analysis is discussed briefly in the next section. Then methodological details are explained in the methodology section, followed by a discussion of the analytical framework used in the study. Finally, some recommendations are suggested in the conclusion.

1. Literature review:

In the 1980s, traditional ELT classroom interactions were considered as inferior to 'natural' interactions, which were regarded as genuine (Seedhouse, 1996). This is mainly due to the development of the communicative approach to education. Yet in the 1990's, classroom talk became recognised as another form of social discourse. Like any communication discourse, indeed, it was considered in its context as natural and genuine (Bernstein, 2004). Nunan for instance, studied a few lessons which were in concordance with all the communicative language teaching principles in vogue. He concluded that little difference was found in the patterns of interaction used in more traditional classes (Nunan, 1987).

As Seedhouse (1996) explains, the linguistic forms that are used by learners during classroom

interaction inevitably relate to the pedagogical purposes set by the teacher, regardless of the teaching methods that are used (p. 22). Thus, the interaction patterns that are produced by teachers and learners in classroom contexts fall in the category of institutional interaction (Drew & Heritage, 1992). Drew and Heritage (1992) propose the following characterization of Institutional interaction:

Institutional interaction is usually goal oriented and ritual bound communication (i.e. communication is restricted to a certain degree to some forms or conventions.) This makes of it one of the purposeful collaborative joint activities.

1 . Participants' contributions are often managed with special care to maximise efficiency in consideration of the constraints of the context, including time, task instructions, and participants turn taking… etc.)

2 . Institutional talk may involve specific procedures and inferential frameworks specific to institutional contexts (p.22).

What distinguishes institutional discourse from other forms of social discourse is also what makes it interesting for educational research. That is, studying classroom interaction procedures and characteristics may explain how interactional features such as the Initiation, Response, and Feedback pattern: i.e. (IRF cycle) help achieving institutional and educational goals (Coulthard, 1975). Seedhouse isolates three main characteristics of ELT classroom interaction which may apply to all EFL classrooms:

1. The linguistic forms and patterns of interaction which the learners produce are subject to evaluation by the teacher in some way.
2. Language is both the vehicle and object of instruction.
3. The linguistic forms and patterns of interaction that the learners produce will be linked in some way to the pedagogical purposes which the teacher introduces (Seedhouse, 1996, pp. 22, 23).

These universal characteristics may serve as a platform to the understanding of the discourse produced in the classroom and how they relate to meaning making at the micro level of interaction dynamics.

In this study, the purpose of the researcher is to analyse the recorded lessons in terms of topic, goals, and procedure. The linguistic discourse produced by the members of the classroom will be weighed against the pedagogical context in which it is performed to evaluate its contribution to the on-going institutional discourse and the purpose of each lesson. Interactive activities from recorded interactions are analysed to clarify whether and how specific teachers' and students' interactions meet the goals of EFL classes.

2. Methodological design

In order to investigate the dynamic nature of classroom interaction in the confined context of its production, the qualitative case study is used. The main focus of this methodology choice is to provide detailed description of the studied phenomenon by portraying the participants' linguistic behaviours and opinions as faithfully as possible. As stated in the Introduction, the research examines two main research questions: how does the teacher conceive learners' comprehension difficulties in the EFL classroom? And what determines the choice of vocabulary teaching strategies in EFL classes. Two hypotheses are postulated. The first hypothesis stipulates that teachers use the three existing forms of inference to diagnose learners' comprehension problems during the first stages of the language class. The second hypothesis, based on the teacher's enquiry process, stipulates that meaningful signs are brought to the learners' attention and are strategically handled to enhance learners' ability to interpret signs. The researchers argue that this interaction which involves a manipulation of signs affects learners' semiosis by facilitating the emergence of meaning and the co-construction of knowledge.

2.1. Data Collection and Analysis Procedure

To conduct this research, five EFL secondary school class sessions lasting one hour each, were recorded between January 2017 and March 2017. The sample was randomly chosen from three secondary schools in the region of Tizi-Ouzou and its surrounding towns. The targeted population was constituted of two freshman year classes, two sophomore year classes and one senior class. Students were aware that they were recorded, and the five female teachers who accepted to be recorded, had more than five years of teaching experience in a secondary school. They were asked questions immediately after the class meetings.

As mentioned above, institutional interaction is subject to rituals and procedures that govern its shape and patterns. In his study on classroom discourse and interaction, Gourlay divides EFL classes into three distinct phases: "Instructions: Teacher addresses whole class to instruct students to undertake an activity, or take part in group work. Checking answers: Eliciting outcomes or opinions as the teacher addresses whole class to elicit answers, outcomes or opinions from students after individual work, group work or homework. And third, the Leading phase in which the teacher addresses the whole class to introduce a new topic or focus" (Gourlay, 2003, p.190). He argues that most teacher-student Interactions are more likely to occur during the plenary activities.

Usually, EFL classes can be divided into two main phases. The first one is the plenary phase. It is said to be chiefly teacher cantered as teachers are in active interaction with learners, and sometimes take a larger share of talk time. The second important phase is that of group work in which learners are left to work individually, in pairs, or in groups.

The recorded data are analysed qualitatively to highlight the interaction patterns and the communication strategies of knowledge construction in the different classroom contexts. The triadic theory of semiotics is chosen as the theoretical background for the present study. The concepts of abductive reasoning and the triadic sign structure are used in the qualitative analysis of classroom interactions. However, before Indulging into the data analysis procedure in detail, it is useful to discuss the main concepts that are used for the interpretation of our data.

3. Analytical Framework

3.1. The Triadic Sign Structure

For Peirce who conceptualized the triadic semiotic theory, meaning is the result of a dynamic process that is entirely dependent on triadic relations that make up the sign. It is, in fact, the result of the interaction in the mind of an observer of a sign, between a first, a second and a third, which are respectively labelled, object, representamen, and an interpretant. Peirce writes, "I define a sign as anything which is so determined by something else, called its object, and so determines an effect upon a person, which effect I call its interpretant, that the latter is thereby mediately determined by the former" (Peirce &Welby, 1977, p. 88). Peirce's basic claim is that signs consist of three inter-related parts. The sign or representamen is the form which the sign takes. For example, a written word, an utterance, the smell of a chicken soup ...etc. Second, the object is that for which the sign stands. This could be a written or an uttered word the sign refers to, a concept, a myth, a real object in the physical world, etc (p. 89). If, for instance, a person smells the odour of a chicken soup, the object of that sign is chicken soup actually being prepared, while the representamen is just the odour. The interpretant is precisely the sense made of the sign by the person who links the smell to that of a chicken soup, thanks to his/her collateral experience of the type of odours released by a chicken being cooked.

The Interpretant therefore, is what results from a process of interpretation and it constitutes the sign's effect on the interpreter. For example, in the case of an utterance or a written word, it is what the hearer actually understands when hearing the utterance or reading the written word. If the sign is the odour produced by chicken soup, the interpretant is the effect produced in the mind and in the body of the person who perceives its smell, for instance, a sensation of hunger, or a strong desire to taste it. The notion of interpretant is of paramount importance to this study as it is used to designate the "meaning" of the signs encountered in classroom conversations. Peirce describes the sign in these words:

> By a sign I mean anything whatever, real or fictive, which is capable of a sensible form, is applicable to something other than itself, that is already known, and that is capable of being so interpreted in another sign which I call its interpretant as to communicate something that may not have been previously known about its object there is thus a triadic relation between an sign, an Object, and an Interpretant (Peirce, 1910, para. 654).

In this definition, Peirce emphasised the triadic and dynamic character of the relations that link the three components of the sign together. It is important to remind that all three components act upon and are being acted upon one another, in such a manner that any alteration in one aspect of the sign affects it as a whole, and changes the way it is

interpreted, or the meaning given to it. For Peirce, the meaning of signs is not fixed, it evolves continuously and changes depending on the way signs are interpreted, and who interprets them, thus bringing into light the importance of context of interaction for the constitution of meaning (Short, 2007). Another, element which is also an essential part of the meaning-making process is that of inference, or logical reasoning. Three modes of inference are described by Peirce, abduction, induction and deduction. The second and third modes are well-known, and the focus will therefore be put only on the first type.

3.2. Abductive reasoning:

According to Peirce, "abduction is the process of forming explanatory hypotheses. It is the only logical operation which introduces any new idea" (Peirce, 1934, para.172). Peirce describes abductive reasoning in these terms: The surprising fact, *C*, is observed. But if *A* were true, *C* would be a matter of course. Hence, there is reason to suspect that *A* is true (para.189) Peirce offers a syllogism where abduction is described as the inference of a Case from a Rule and a Result:

Rule: All the beans in this bag are white.

Result: These beans are white.

Case: These beans are from this bag.

(Peirce, 1932, para. 623)

The observer forms the hypothesis that the beans are from the same bag using his/her knowledge of a general rule and by observing a surprising event. The inference is not certain but highly probable. This study presupposes that teachers at the beginning of their classes resort to an abductive process to discover learners' interpretation of vocabulary. Arrighi and Ferrario's conversation model of analysis is used to analyse the transcribed lessons. In their paper titled "Abductive Reasoning, Interpretation and Collaborative Processes", the authors compare Clark's model for reaching mutual understanding with the steps in the reasoning processes known as abduction. Although, this model is originally designed for the study of ordinary language in everyday conversations, it is also applicable to institutional interaction. (Arrighi & Ferrario, 2008, p.13)

By embedding abductive inference in a collaborative framework of conversation analysis, this model enables researchers to observe the thinking processes involved in EFL classes. It offers a systematic way to describe meaning-making processes. Teachers' discovery process follows these five steps:

1- Assumptions: interlocutors enter a discussion with a few assumptions about their common ground, already in mind. (For instance, if they both speak English, they may assume that they should only use English vocabulary).

2- Surprising fact: when one of the interlocutors utters or performs an act which is not in concordance with the initial assumptions of the hearer that disrupts mutual understanding which needs to be restored for the communication to succeed.

3- The interpreter, who is faced with the surprising fact, needs to use abduction in order to reach the goal of interpreting the speaker's utterance, resulting in a hypothesis. The temporary hypothesis about the speaker's intent has to be tested.

4- Testing of the hypothesis is done by asking for clarification or risking a new inference with current understanding.

5- Finally, the hypothesis is confirmed or revoked by the speaker, allowing for the communication to resume. (p.14)

Furthermore, based on the findings of the teachers' initial enquiry about learners' comprehension level, choices are made about what strategy to adopt in order to bring the meaning of an unknown vocabulary item closer to learners' comprehension. Because Semiosis is an endless chain of thoughts, and every thought is a sign, the act of thinking is essentially an individual and temporal phenomenon. Peirce describes semiosis as follows: "an action, or influence, which is, or involves, a cooperation of three subjects, such as a sign, its object, and its interpretant, this tri-relative influence not being in any way resolvable into actions between pairs" (Peirce, 1934, para. 484). It is temporal in the sense that every act of thinking or conversing is unique in relation to participants, place and time of its production. In class, every single learner has a unique mind, nurtured and shaped by unique experiences of the world which make them different from everyone else. During interaction, learners are encouraged to express their thoughts. When these are expressed, these thoughts become outward signs that need

interpretation. As, indicated by Winfried Nöth, Classroom interaction is not detached from the participants' inner semiosis. In fact, both internal and external dimensions of thought are complementary, as the understanding of the nature of meaningful signs, and the interaction of its components "is essential to the understanding of how new words and signs in general can be taught and learned" (Nöth, 2014, p. 446).

3.3. The Semiotic Analysis of Vocabulary Learning

To the semiotician scholar Nöth, the proper method of teaching new words requires three signs in one: a symbol which is a complete sign has all three states of a sign namely, icon index and symbol. Icons are signs that resemble the objects they represent; indexes have a physical or causal relation with what they denote, while symbols have merely an arbitrary relation to their objects (p. 2). Nöth derived from Peirce's work a number of ways through which it is possible to learn new words. These ways, which he labelled 'scenarios of learning new words are summarized in the following table:

Table N°1. Nöth's Learning Scenarios

Model for learning new words:	
Familiar Object, Unknown sign:	The objects are available in the learners' semiotic world as the students experience them in their own language, while the signs, which are the spoken or written forms of the word in the foreign language, and the interpretants are the missing correlates. This scenario relies heavily on the learner's collateral experience
Familiar Object, Known Sign, and Unknown Interpretant:	In this case, the learner is familiar with the object of the word to learn. The learner might as well have encountered the word in the target language i.e. (the sign) but has no clue that this foreign word means something that he/she he knows or that it refers to that object. Here the habit of associating the unknown sign with the known object is required.
Familiar Sign, unknown Object:	This situation occurs when the learner is confronted with a new word and knowing neither what it refers to, nor how it does so. For the students, the word at hand is a symbol without an object or an interpretant. Without previous knowledge of the object, the learner cannot interpret this word.

Source: adapted from Nöth (2014). The Semiotics of Learning New Words. Journal of Philosophy of Education, 453-456.

4. Results and discussion

The table below summarises the five recorded lessons. It contains the description of the recorded lessons ordered in terms of their objectives, topic and procedure. The emphasis is placed on the three stages of the lesson suggested by Gourlay (2003) at the beginning of class, in the instruction phase where instructions are provided to learners and the plenary phase where most of the interactions occur. Finally, the lead-in phase when information which is indirectly related to the topic of the lesson is introduced. This generally occurs towards the end.

Table N° 2. Summary of Data Description

Data Script	Level- stream-	Lesson Goal	Topic and Context	Procedure (lesson phases)	Lines
Lesson 1	- Second year - Literature and Philosophy - Teacher 1 (Ms F)	**Using the future passive for writing a press release**	CEO of Oil Shipping company apologises for the damages his wrecked ship has caused for locals of the coasts of California.	Instructions	48 58
				Plenary answers Checking	[1-48] [49 – 58] [59- 70]
				Lead in	41 51
Lesson 2	- Second year - Literature and Philosophy - Teacher 2 (Ms H)	**Writing a press release**	CEO of Oil Shipping company apologises for the damages his wrecked ship has caused for locals of the coasts of California.	Pre-plenary	[1-6]
				Instructions	[50 - 52] [100- 105]
				Plenary answers Checking	[7 - 20] [28- 49] [53 - 79] [81-96]
Lesson 3	- First year - scientific stream - Teacher 3 (Ms M)	**Grammar point Adverbs of quantity**	Discussing ink levels in white-board markers	Instructions	22 43 44
				Plenary answers Checking	[1-21] [23- 37] [44- 94]
				Lead in	[38 – 42]
Lesson 4	Third year Science Teacher 4 (Ms B)	**Writing a short magazine article**	Causes and effects of Changing food habits of Algerian people.	Instructions	[34- 35] [51- 52] [110-113]
				Plenary answers Checking	[1- 33] [36- 50] [54- 92]
				Lead in	19 50 [114- 120]
Lesson 5	-Second year - Scientific stream - Teacher 5 (Ms N)	**Pronunciation: Intonation**	Grocery store shopping	Instructions	31 [73- 78]
				Plenary answers Checking	[1-30] [32 – 72]
				Lead in (spontaneous conversation)	[56- 67]

Source: Made by the researcher.

4.1. IRF Cycles in the plenary phase

Most teacher-student interactions happen in the plenary phase of the lesson in the form of IRF Cycles in the plenary phase, which is the heart of the lesson. The teacher usually addresses the whole class. S/he waits for the attention of all the students to start a series of Initiation, Response Feedback (IRF) cycles during which the most important points of the lesson are discussed together. Generally speaking, during the IRF episode, the teacher initiates the conversation with a question (usually referential or display questions) which is followed by a response from students to which the teacher gives feedback.

However, all the IRF Cycles do not follow the exact form. Each teacher introduced variations to the traditional IRF ritual by including explanations, word definitions and repetitions, and by allowing students the liberty to introduce their personal comments and ask their questions any time during the plenary phase of the lesson. It is worth noting that when students do not answer a question, it is considered a silent answer [SA] that teachers seek to interpret.

4.1.1. Altered IRF Cycles

Teachers often alter the shape of IRF Cycles as a strategy to adapt classroom interaction patterns to learners needs. This is done by adopting Closed-answer or open-answer checking activities. This fragment from a grammar lesson is an example of a Closed-answer checking activity

Table N° 3. Example 01- Altered IRF Cycle using closed- answer checking

	Lesson 3: **Grammar point -Adverbs of quantity**
23.	T3: It's true that there is a lot of water on earth, however …
24.	Ss: some?
25.	T3: "on est à combien ici dans la sale? On est a trente huit?" if I say: the majority of the pupils here are girls, and not boys. "Comment je vais dire" ' the majority'?
26.	Ss: "la plupart."
27.	T3: la plupart, oui! Then which adverb describes the majority?
28.	Ss: the most!
29.	T3: the most! Very good!!
30.	T3…. and…
31.	Ss: some:
32.	T3: but soon, there will be …..
33.	Ss: never…
34.	T3: Non, 'never' "c'est un" adverb of frequency, we are not talking about time here. So what should we say here?
35.	Ss:[SA]
36.	T3: Here we say none (plus rein). 'But, soon, there will be none left for drinking'

Source: *Made by the researcher*

In this segment, the teacher was also conducting a plenary closed-answer checking session with the whole class. The textbook activity consisted in choosing the right quantifier to fill in the gaps in the sentences. However, the traditional form of IRF was not respected rigorously. On different occasions, the teacher introduced definitions and explanations like in line 34 and used the French language to clarify difficult parts in lines 25 and 27. The teacher actively interacted with learners leading them to the correct answers either by providing the answer or by initiating another IRF cycle for the sake of prompting learners' personal answers, gradually guiding them toward a better understanding of the grammar point. The teacher's use of IRF patterns presented more flexibility for the teacher and learners to add examples, ask other questions, and provide definitions. In the following example, the teacher asked an open question and didn't hesitate to give supportive utterances. The greater IRF alteration is visible in the following example. Segment 1 from lesson 4 is an example of an Open-response Checking activity:

Table N° 4. Example 02-Altered IRF Cycle using open- answer checking

	Lesson 4 : **Writing a short magazine article**
1.	T4: How did eating habits change the past 10 years?
2.	Ss: Silence [SA]
3.	T4: Do you know?
4.	S1: nodes no.
5.	T5: Yes? Alright then, let's start like this... answer this question first: do you think our eating habits are different from the past?
6.	S1: Yes.

Source: *Made by the researcher*

In this example, the teacher turned to one student and prompted her to give her own opinion. By doing so, the teacher broke the traditional order of initiation, response and feedback. When the student

didn't respond, the teacher encouraged her and helped her with an easier question in line 5. The teacher initiated another reference without waiting for any response. We can say that the new question was the immediate feedback of the teacher to the student's hesitation to answer.

4.2. Abductive interaction analysis results:

Teacher and learners apply abductive logic to generate temporary hypotheses about each other's intentions in interaction. In order to understand the reasons for these alterations to the IRF cycles and the inclusion of more information in classroom discourse, we turn to the abductive inference model of conversation, bearing in mind that the teacher interacts with novice learners of English.

In addition, the English language is at the same time the target and the medium of instruction language in EFL classes. Teachers are aware of the learners' limitations and carefully choose the utterances they address students with. This example illustrates how the teacher concluded that a change in her strategy was necessary, after testing the hypothesis she had built at the beginning of the conversation with the learners. Teachers often adapt abductive reasoning to find out the best classroom procedure to choose, in order to fit activity goals, and to match the learners' needs during classroom interaction. Put differently, teachers use abductive thinking to evaluate the learners' level of comprehension to accommodate their teaching methods.

Table N° 5. Example 01 of Classroom Abductive Reasoning

Lesson 1: **Using the future passive for writing a press release**
1. T1: Okay. What happened to the Exxon Valdez do you remember?
2. T1: Look at the photo. What happened?
3. S1: It was wrecked off the coast of California,
4. T1: Yes! It was wrecked on the coast of California. Do you know what does that mean?
5. Ss: [SA]
6. T1: Look at the picture! Look at the image and tell me what happened and what is it caused by?
7. S2: Oil spilled up.
8. T1: Indeed, the ship was carrying oil pointing at the black matte displayed in the photo. Look, what happened to the beach?
9. S1: Polluted
10. T1: It was polluted. Just polluted? By what?
11. Ss: Oil.
12. T1: Yes, then what happened to the Exxon Valdez first?
13. Ss: Reading from the book: "It wrecked in the sea".
14. T1: Yes, the ship was destroyed and the oil got out and spilled on the beach.

Source: *Made by the researcher*

4.2.1. Abductive Reasoning from the Teacher's Perspective

a) **Assumptions**: The teacher assumed that learners would easily understand the sentence they read on the textbook. "The Exxon Valdez wrecked at the coasts of California."

b) **Surprising fact**: But she was surprised by the automatic and uncertain response of learners, which led her to doubt they actually did know what it meant.

c) **Hypothesis**: She hypothesised that the meaning of the sentence might not be obvious for learners.

d) **Testing of the hypothesis**: She tested her hypothesis by asking a series of questions about the situation described in the activity.

e) **Confirming the hypothesis**: Based on learners' silent response, the teacher understood that they couldn't comprehend the contextual situation of the activity. Thus, she catered for that problem before resuming the activity.

4.2.2. Abductive Reasoning from the Learners' Perspective

a) **Assumption:** Learners presumed there was a link between the teacher' request to open the book and the question. They had a vague idea that the answer was somewhere in a caption in the page right below the picture! Thus, they answered by reading the caption.

b) Surprising fact: The teacher was not satisfied with the simple answer and asked for more details, which turned out to be a more complex task.

c) **Verifying the hypothesis:** Learners waited for more instruction or explanation from the teacher. The teacher's next questions were centred on the picture. Learners could easily identify the black sticky substance that covered the beach as being "oil" and they formulated the hypothesis by deducing that the oil was on board the ship named "the Exxon Valdez", and that something must have happened to the ship which led to the spread of the oil on the beach.

d) **Confirmation:** The teacher's last assertion confirmed that learners' understanding matched that of the teacher.

When both teacher's and learners' initial hypotheses are tested and confirmed a temporary common ground is reached and both parties are clear about what they are talking about, or about the referent of the conversation. Only at this moment, can it be said that learners "understand" the teacher's intended meaning. Additional meanings can be built henceforth, and the sum of these moments of accord constructs a meaningful lesson. The same process may be applied to instructions and tasks as they are considered meaningful utterances to negotiate.

The results presented above are discussed according to the semiotic framework. According to the branch of semiotics that is concerned with education, the English language teacher is a significant component of the EFL classroom (Stables & Semetsky, 2014). The way in which the lesson is actually performed in class depends primarily on the teacher's styles and thinking strategies. The teacher's ability to be attentive to learners' responses to lesson content and to react effectively is what ensures effective and meaningful language learning.

As the data show, meaningful interaction between the teacher and students was intrinsically connected to the way both parties received and processed each other's utterances. A closer look at classroom dialogues has revealed that they take the form of short investigations undertaken to reach a common ground on which to build meaning. The process of building meaning is subject to other pragmatic considerations such as context and learner's background knowledge. In this section, a semiotic analysis of teacher-learner interactions is undertaken. A few classroom dialogues are analysed following the model constructed by (Nöth, 2014). The goal is to show how learner's previous knowledge influences the way they respond to new information and how the teacher can turn this into a learning advantage. The study reveals that teachers mostly use two recurring learning strategies. The next example is an extract from the same lesson as in table 5 but performed by a different teacher. The two examples are contrasted. Their similarities and differences will be discussed next.

Table N° 6. Example 02 of Classroom Abductive Reasoning

Lesson 2: **Writing a press release**
1. T1: Today we're going to deal with something else. When two cars collide, what do we have? 2. S1:A collision 3. S2: An accident 4. T1: Yes! An "accident" or "collision" 5. T1: Now when you have the same accident in the air, this time, when two planes have an accident what do we call it? 6. S1: A crash. 7. T1: Good! Write it on the board. (The teacher called the student to the board) 8. T1: And what if it happens in water, in the sea? 9. S3: A crash. 10. What do you call an accident between two ships? … a crash? 11. S3: "Un naufrage". 12. T1: Ok! We just called an accident in the sky a crash, but when it happens in the sea, it is called a "wreck" or "wreckage". 13. All right then, when an accident happens in the sea or the ocean, it is called a 'wreckage'. So for today we're going to the deal with the Exxon Valdez wreckage in the sea.

Source: Made by the researcher.

The teacher's abductive reasoning was part of the whole teaching strategy as it helped introducing more clarity to the difficulty encountered in class following Abductive Reasoning key steps: hypothesizing and hypothesis testing. While testing her hypothesis, the teacher asked a series of questions. The first and second questions were of the same nature, and this gave students a hint about the

nature of the following question and the expected answer. However, the teacher tackled the subject in a completely different way from her colleague in example 5.

Before that, we explain in what way the two lesson extracts are different. Three learning scenarios should be differentiated. As explained in the review of the literature, learners learn three aspects a word: its form (the representamen), its referent or what the word is about, (the object) and, it's meaning (the interpretant). In some cases, none of these aspects are ever familiar to learners. In some others, the object is familiar to the learners, as for instance the feeling of cold, or joy... etc. Yet they ignore the form of the word that designates such an object in the English language. Some students may have encountered a word in English, without necessarily being aware that it refers to some familiar object to them; in this case the interpretant is missing. The teacher's approach to teaching vocabulary may differ in each case. The following table summarizes the semiotic description of approaches to vocabulary learning that were identified in the data. Tables 5 and 6 illustrate two different approaches to learning the same word, performed by two teachers with different learning priorities

Table N° 7. Aspects the Learning Scenario Used in the Observed Data

Characteristics of the learning scenarios found in data analysis		
Aspects of the new word (sign)	**The new word is learned as a symbol through icons and indices**	**Learning the word as the representamen of a familiar object.**
Representamen	Known: provided in the context of activity instructions.	Unknown: it was provided at the end of the T/S interaction.
Object	Unknown: needed to be learnt using icons and indices.	Known: it was part of the learners' collateral experience, but had to be pointed at through an iconic description.
Interpretant	Unknown: The habit of associating the sign and the object was established once knowledge of the object was acquired.	Unknown: The habit of associating the familiar object with its sign was established only after the sign had been provided.

Source: Adapted from Nöth (2014), the Semiotics of Learning New Words, Journal of Philosophy of Education, 452-455.

5. *The new word is learned as a symbol through icons and indices*

In the example presented in table 5 above, the linguistic sign: "the Exxon Valdez wrecked at the coasts of Alaska" was provided to students at the beginning of the lesson to ponder about it. The word "wrecked" was learned as a symbol whose object was unknown, using indices and icons. The goal of this teacher-student interaction segment was to interpret the utterance "the Exxon Valdez ship wrecked near the coasts of Alaska", which was introduced very early in the plenary phase of the lesson. Students were told to open their textbooks and read the instruction and comment the photograph. It was clear from the onset that the teacher-student interaction was mediated by students' textbook instructions.

Students were given a few moments to discuss the photograph in pairs. This sequence involved an IRF. Basically, the teacher had prior expectations (assumptions that students might not understand the meaning of the word "wrecked" though it was part of the caption bellow the photo shown on the textbook page). The teacher asked the question to clear her doubt.

The question in line 01 served two purposes: one was to initiate the plenary phase of the lesson, and the second was to test the teacher's initial hypothesis about a possible communicative difficulty concerning the referent of the expression "ship wreck".) The goal was to explain to learners the meaning of the difficult word "wrecked". In order to achieve that goal, the photo was used as an iconic sign of the meaning of the word "wrecked". The picture represented the damages of a large oil spill on the beach, and a few workers wearing overalls who were trying to clean the contaminated zone. Nevertheless, it was the

intention of the teacher to gradually bring her students to the photo and make the link to the meaning of the term "wreck".

The first step the teacher undertook was to ask students what happened to the "Exxon Valdez". She prompted learners to infer meaning from the photo first, in line: 2. Then she led the learners to match their interpretation of the picture with the concept to which the word 'wreck' referred to. Accordingly, the word "wrecked" was the word that needed to be interpreted. It was a known sign without an interpretant. In order to infer the meaning of this sign, the learners were asked a few questions about the photo.

Students responded to the question in the first line by reading the textbook. But the teacher was not sure whether the learners understood what they were reading i.e. whether her learners made the link between the picture which was the sign and its object which was the concept of oil spilling as a result of a ship wreck. So, she asked them explicitly if they really understood what they read in line 4 in table 5. The students kept silent, which the teacher interpreted as a sign of 'incomprehension'

The hypothesis of the teacher was confirmed. She began a series of observations about the photo to lead learners from cause to effect, in order for them to understand what truly happened to the oil carrier ship. (Lines: 6 to 13) The photography was an iconic sign of an oil spill catastrophe with which it shared some resemblance and some indexical features as well. Prior to its spill on the beach, the oil was carried on board of the Exxon Valdez ship. Yet, since it spilled out, some disaster must have happened. So, there was a strong indexical link between what happened to the ship and the oil spill. As a matter of fact, it is known that liquids can only spill out of a broken or damaged container. In order to draw this conclusion, the learners relied on their deductive skills. Thanks to the photograph's iconic and indexical signs, the learners were able to understand what happened using their collateral experience even without understanding the symbol: "wrecked". When the learners became aware of the chain of events leading to an oil spill disaster, and acquired the information that English people use the expression "ship wreck" to refer to similar conditions, the students learned to link the linguistic structure to other objects of experience; they established the real interpretant of the question in line 1. The next example describes the other teacher's approach to classroom interaction.

6. The Word as the Representamen of a Familiar Object

Teachers usually predict the difficult words that may cause a comprehension problem to students, and thus, try to explain them in advance. Some teachers do not just give the equivalent of the word in the learners' first language. Instead, they initiate a conversation with students leading them from what they already know to what they need to learn.

Table 6 illustrates a segment of the second recorded lesson. The aim was to get the students to write a press release about an oil spill catastrophe. Segment 1 of the lesson was an interesting teacher-student interaction that displayed a specific teaching strategy or, in Nöth's terms, a learning scenario. The teacher adopted the second sub-scenario of the first scenario which was explained earlier. In short, the characteristic of this scenario is that learners were familiar with the object of the new word but whose representamen was completely unknown to them.

The teacher (T1) started by asking an easy question "When two cars collide, what do we have?" learners gave a "one-word answer". The student (S1) used his past knowledge of noun formation to form the noun of the verb (line 2: "to collide"). Another student (S2) suggested a word with which she was more familiar (line 3: "accident"). For both students, the teacher approved and gave positive reinforcement using words such as: "yes", and "good". The question that followed was asked in the same way as the former and served to create the context for learning a new concept. From line 2 to 7 the teacher relied on a didactic tool: to guide the students. She directed the attention of students to the consequences of a type of accidents linked to a new word, revealing its indexical aspect, i.e. by explaining the causal relations of the word to its object. When students were asked what was the word for "an accident in the sky", only one

student provided the right answer "crash." The teacher offered positive feedback and wrote the words on the board, providing learners with both the oral and the written forms of the words. (In other words, she gave both forms of the signs for the concept she had just explained).

The next question in line 8 was about the same concept but in a different context. This time no one knew what the word for an accident in the sea was. After a few trials, student S3 expressed the word in French. The students probably had read or had heard about accidents in the past. They were familiar with the ideas conveyed in the text, without necessarily knowing how to express them in English. The precedent inference process made it possible for learners to "see" what the teacher was talking about. The teacher made an appeal to learners' collateral experience to make analogies using 'iconic descriptions'.

At this stage the students became familiar with the object of these descriptions when teacher T1 asked: "… it happens in water, in the sea?" And "…an accident between two ships?" However, the students were not familiar with the sign in the target language (the English sign) for that object i.e. (the concept of "wrecking"). Nevertheless, one student S3 attempted an answer as he provided a word in French "un naufrage" which means "a wreck" in English. This indicated to the teacher that the student was familiar with the concept. The idea of ship-wreck got through to students thanks to a combination of linguistic background and their collateral experience and with the help of analogy. Also, the intervention of S3 helped clarify the idea for those who didn't get it.

Prior to the discovery of the appropriate word in English for the discussed concept, the learners participated in a genuine communication with the teacher to bridge the communication gap they experienced when they missed the meaning of the word "wreck". In other words, learners showed real desire to discover the English word for the topic of the discussion. The teacher exploited learners' eagerness to learn to provide them with the new word in line 12, thus, completing all three elements of the new word, which is a symbolic sign. The word was provided in the context of a verb-phrase in English "It is called a 'wreckage'." This was the interpretant the class was looking for. If the learners become able to use the word "wreck" in a meaningful in the future, they will internalize the interpretant, which will become in this way, part of their collateral experience.

The comparison between the two segments of the same lesson performed by two different teachers in two different classes showed an interesting contrast in the way information are presented and how their meaning is inferred. Although, the teachers' use of abductive reasoning showed similar patterns, it resulted in adopting two different approaches to concept building and meaning-making.

The biggest challenge faced by teachers when choosing to integrate Teacher/student interaction as a teaching strategy, is to choose the right approach, i.e. the most direct approach to tackle students' difficulties during the time allotted to the task. Managing valuable class time is a necessary skill for effective teaching. By gaining awareness of the interaction practices that take place at the moment of T/S interaction, teachers can be more specific in their language choice and more careful in guiding the conversation in a way that benefits students. In other words, to be able to work at a comfortable pace for students following their thinking processes but also, respect time constrains. This is where the value of abductive reasoning is appreciated as it allows for the generation of hypotheses that are more likely to be effective while disregarding others.

When trying to understand how meaning is generated gradually in interaction, the two main variables to observe are the inference stages (the different cycles of abductive reasoning) as well as the learning scenarios involved in the segment (i.e. the different ways to present and interpret signs in interaction). In the table below, a sample of T/S conversation from the lesson 04 is analysed in terms of the stages of inference and the learning scenario applied by the teacher to guide learners to the meaning of the word "irony".

Table N° 8. Three-part analysis of T/S interaction semiosis:

Extract 04 from lesson script 04- lines [82-97]	**Inference Stages**	**Interaction Cycles**	**Learning Scenarios**
82- T: "So how can you react to this cartoon?" 83- T: "Do you think what you say and what she's doing are coherent or the same thing?"	**Teacher's Assumption:** Learners are able to comprehend the cartoon on the prints they were provided, but may not know how to express this is English. **Hypothesis**: She also fears that the question may be too general for students to understand. **Hypothesis testing:** So she made it more specific.	**Initiation**	**Part one:** **Interpreting an icon (the cartoon/ drawing) as the Representamen of a familiar Object (the concept of irony).** - **The caricature drawing** is the **Representamen** of an ironic caricature. - **The Object:** Irony/satire - **Interpretant:** (it is ironic because, it visually displays two contradicting messages in a fanny way.) The goal of this part is to lead learners to express the meaning of the icon in words (indexes and symbols)
84- Ss: "No! it's different."	Students' response, **confirmed the teacher's initial assumption.**	**Response**	
85- T: "what do we call it when what you say and what you do is different?"	**New teacher's assumption:** Learners are better able to express the purpose of the cartoon with a helping question.	**Feedback**	
86- Ss:[SA]	The silent answer from learners came as **a surprising fact that challenged the teacher's assumption.**	**Response**	
87- T: "There's a saying a proverb which goes like that: 'I say what I mean, and I mean what I say.' But here it is inadequate." 88- T: "So do they do what they say?"	**Teacher's Hypothesis**: students are able to make the necessary link if provided with clues to the answer. **Testing the hypothesis:** she provides the opposite of the needed answer and asks a suggestive question.	**Instruction**	
89- Ss: "No!"	**Confirmation of the teacher's second hypothesis:** Students followed the teacher's reasoning and observed that the cartoon displayed two opposite ideas.	**Response**	
90- Ss: S2: "The opposite."			
91- Ss: S3: "Yeah they are eating food which is poor in nutrients."			
93- T: "So what do you think about this cartoon? Is it sad?"	**Teacher's third hypothesis:** students are comfortable with using Antonyms to recognize the right answers faster **Testing**: she elicits the description of the caricature in one word.	**Feedback**	**Part two:** **Interpretation of a symbol using the icon:** - The meaning of the caricature becomes the Object of the sign "irony" which is a symbol. - Interpretant: is the definition of the concept of "irony". The goal is to learn that "irony" is the word to use to symbolise the concept of "irony" (which is represented by the caricature and a definition.)
94- Ss: "No! Funny!"	**Confirmation:** Students provide the correct answer.	**Response**	
95- T: "No, of course not! It is funny." 97- T: "This is what you call "irony". We say something but we mean something else."	Feedback: positive feedback Providing the word in English for the concept that is being discussed using the printouts.	**Feedback** **Instruction**	

At the end of lesson four, Ms B presented learners with prints which present a funny caricature. Her goal was to enable learners to describe the cartoon using their own language to make sure they grasped its meaning, and then to introduce the term "irony". The example exhibits features of both the first and the second learning scenarios which were discussed previously. In the first part, the focus was on interpreting the caricature as the Representamen of a familiar Object. The Object (the concept of irony) is supposed to be known and previously experienced in the students' culture (it was part of the learners' collateral experience, but had to be actualised through an iconic description.) While, the Interpretant (of the icon) is unknown until it is discussed and agreed upon in class. In other words, the habit of associating the sign (i.e. the Representamen) with its (familiar) Object was established only after the sign had been provided and explained to the class.

In the second part of the interaction, the second scenario was applied: learning a symbol through icons and indices. The teacher endeavoured to make the meaning of the word/ symbol "irony" known to learners using the information learned in part one. At first, both the Representamen (the word in English) and its Interpretant were unknown to learners. However, by using three different clues: from the Object of the previous iconic sign, and by having recourse to the students' familiarity with that Object, and by providing a basis for interpretation (containing the sentence 'it is funny', the teacher provides her students with the possibility to construct meaning by themselves. Indeed, because the "index "it" and the adjective "funny" are now being related together, to form a meaningful sentence, learners learn to associate the Representamen (i.e. the word in English "irony" with the familiar "Object (the concept of ironic). Although the Representamen "irony" is given at the end, in the context of a simple definition, the Interpretant of the symbol (irony) became known to learners only after the Object of the symbol was acquired.

Globally, the interaction patterns in this example take the form of multiple- flexible IRFI cycles. The first I stands for Initiation (the initial question), while the last I stands for Instruction (additional information). Feedback however, doesn't always come in positive statements. Following up with a question after a student's response, indicates to learners that their answer is correct, which acts as positive feedback, while maintaining the continuity of the dynamic. This being said, dynamic communication between teachers and students tend to be more flexible than generally accepted, therefore, there isn't a fixed number of patterns that can encompass each and every form of T/S interaction. The reason is that interaction patterns follow contextual reasoning of the parties involved in the conversation. As shown in the table, each step of the interaction procedure corresponds to a stage of reasoning. Even though all T/S interactions cannot be planned in advance, the teachers' ability to situate their own reactions in relation to their students' responses in the middle of a conversation helps to determine the next step.

Conclusion

The qualitative case study is concerned with the analysis of a specific case. The results are not aimed at generalization, but for a better understanding and more precision on a single phenomenon. The focus in this article was on meaningful classroom interaction. The case study was conducted to explore interaction strategies used by five secondary school teachers of English. To do that, five English lessons were audio taped and transcribed. The lessons were divided into key stages. The plenary stages of the lesson involved most of interactions, including teacher-student interaction. The first stage of analysis targeted the form of interactions. Two major interactive cycles occurred in most lessons: the traditional IRF cycles with direct questions and short answers and a more flexible IRFI where the last 'I' stands for 'instruction'.

In the open-response checking phase the teacher asked indirect questions and expected longer and more elaborated answers. During this phase, the teacher guided the learner to the right answer with a set of instructions and mini-lectures. During open-response questions, the teacher had to make sure learners understand the instructions thus, needs a way to check their comprehension. Arrighi and Ferrario's model of interaction enabled the researchers to describe the thought process involved in the checking phase. Data revealed that both teachers and learners used abductive reasoning to look for plausible hypotheses and test them with inductive reasoning to understand each other.

Vocabulary learning can be problematic for foreign learners at the secondary level. This is why teachers generally use every opportunity to tap into

the learners' background knowledge creating links to new vocabulary. The semiotic analysis of sample classroom interaction enabled us to designate two main types of vocabulary learning scenarios directly related to what information the learner is aware of and which is not. As explained by Nöth learning words as symbolic signs is possible by examining iconic and indexical signs. This technique is used when learners are not familiar with the object of the word in English (written or heard). However, when learners know the object of the word in question, i.e. they had already experienced the object of the sign-word in their native language, the new word is simply provided as a form or representation by which is designated the Familiar Object (Nöth, 2014).

The initial hypothesis was that high school teachers of English engage in efficient interaction with students not only to provide them with content information, but also to monitor their understanding of instructions and provide help when needed by using an inquisitive dialogue as often as possible. The purposeful classroom interaction provides the language teacher with the necessary information about the learners' linguistic needs.

Each of the five sample lessons reflected the dynamics of thinking processes specific to each classroom context, content, end goal, and students' background knowledge. The latter being a determinant factor in the choice of teaching strategies. Classroom interaction was part of a bigger communication scheme in which students' linguistic needs were evaluated and provided for. It is the process whereby the teacher becomes part of the learners' experience, thus, playing a mediating role in their knowledge acquisition process.

To conclude, a number of implications can be drawn from this research:

1- Experienced teachers, who view teaching as a form of an ongoing communication with their students, use interaction as a resource that enables them to predict learners' difficulties in comprehension and remediate to them collaboratively.

2- Teachers gain expertise with every interaction, adding to their collateral experience elements that may help them later in their thinking processes.

3- Teachers formulate classroom related hypotheses during planning periods. But during lesson time, they reconsider those hypotheses and refashion them according to new feedback from their learners during classroom interactions. Teachers and students test their temporary hypotheses about the intentions of the other interlocutor by asking questions and providing intermediary tasks.

4- Knowledge construction in the EFL classroom is only possible through active sign interpretation. However, since the interpretation of signs differs from a context to another, a common ground must be established between interlocutors.

5- The meaning of linguistic and non-linguistic signs should be negotiated through interactive exchanges.

6- In the majority of classroom plenary time, the teacher and students step out of the traditional IRF discourse for specific purposes, such as inquiring about the meaning of a word, checking whether the meaning of a word is agreed upon, providing definitions and/or repetition of task instruction. The IRF patterns reported in the previous segments seem to be more flexible than traditional IRF discourse.

7- When Learners are asked to answer a question, they often resort to silence for two main reasons. Either because they fail to interpret the question addressed to them, or in case they know the answer, they may not possess sufficient vocabulary to express their thoughts in the target language.

8- Spontaneous contributions from students: (Questions, examples, use of the board for written illustrations and asking for explanations) could be considered as, both a learning tool and an indicator of progress that facilitates teachers' roles as monitors and guides.

9- Sometimes, learners resort to their native languages to explain their point of view. As a spontaneous reaction, it shouldn't be discouraged as it may display meaningful information about the students' learning progression and difficulties.

10- Necessary explanations should be provided just when they are needed in order to be effective. By being attentive to subtle changes in learners' levels of comprehension through interaction, teachers may evaluate the situation with more accuracy and act accordingly.

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