Learning Critical Thinking through Teacher-Guided Enquiry

تعلم التفكير النقدي من خلال الاستفسار الذي يقوده المعلم

Apprendre la pensée critique grâce à l'enquête guidée par l'enseignant

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Introduction

The place of English as an international language has been given more visibility in the national educational policies over the last decade. Consequently, students are expected to display a certain amount of proficiency in the English language. Yet, the EF English Proficiency Index (EF EPI, 2018) shows that Algeria has scored a very low proficiency index in the 2018 rankings and ended eighty first below other northern African countries.

Although different factors may be at cause for students' difficulties in learning English, the focus of this article is directed towards classroom interaction. Indeed, being at the heart of meaningful learning, classroom interaction has been subject to multiple researches (Brown, 1994). Yet, a comprehensive account of classroom interaction ability to raise students' efficiency in the EFL class is still missing. The main reason for this want is the divided opinions about the best Method to conduct interaction in class.

Indeed, some researchers consider peer-interaction to be the most effective way to ensure students' interest in learning (Allan, 1978 ; Moussaoui, 2012 ; Boudersa & Hamada, 2015 ; Arisandi, 2018, Bouzid & Bouaziz, 2018). Others, on the contrary call for a more effective teacher/student interaction (Kheladi, 2017 ; Chergui & Merrouche, 2018 ; Ahmed, 2019). The aim in this paper is to reconsider the role of teacher-student interaction in shaping classroom enquiry. The main issue that is discussed in this article is whether the teacher's classroom discourse is to be considered intrusive in students' peer-interaction and a hindrance to their learning autonomy, or whether the teacher's active participation in classroom interaction is to be regarded as a catalyst in the equation of classroom inquiry.

1. Background of the Study

In general, to enquire means to ask for information. In the Peircean tradition, however, the term enquiry represents more than just the act of asking questions, it is a whole process for generating new ideas (Peirce, 1877, 1878 ; Short, 2000 ;

Reçu le 14-03-2021. pub.num 18-05-2022. Pub. le 25-06-2022 https://aleph-alger2.edinum.org/6408

Forster, 2002 ; Bergman, 2012). The doctrine of fallibilism is at the heart of Peirce's Pragmatic theory of inquiry (Peirce, 1931 ; Cooke, 2006). Peirce (1931, para.171) explains that "....fallibilism is the doctrine that our knowledge is never absolute but always swims, as it were, in a continuum of uncertainty and of indeterminacy". Viewed from this philosophical stance, a researcher's belief might be mistaken, and can be the object of a re-evaluation. In the pragmatic sense, belief is a habit of thought. On this matter, Peirce (1877, III, para.3) explains that "… every belief… puts us into such a condition that we shall behave in some certain way, when the occasion arises". Thus, it can be said that a belief acts as a latent force that manifests in certain occasions.

In language learning for instance, a belief that the passive voice is difficult prevents students from using it in their writings. And a belief of an incorrect grammar rule leads to the production of grammatically incorrect sentences. Furthermore, in Peirce's epistemology uncertainty about a particular issue leads to inquiry, which in turn leads to the production of knowledge (Cooke, 2008). Peirce (1877, IV, para.1) writes that "The irritation of doubt causes a struggle to attain a state of belief. I shall term this struggle inquiry". In other words, settling doubt and fixing a belief are the two forces that drive humans to engage in enquiry. Similarly, the desire to learn is lit by uncertainty, and meaningful learning is motivated by enquiry (Ausubel, 1961 ; Barron & Darling, Hammond, 2008).

The origins of the enquiry-based approaches to learning go back to Ancient Greece. For Socrates, learning involves a constructive dialogue between learner and teacher about important questions of life. And inquiry was the method followed by those who seek a deeper knowledge of the world. As Ross (2003) states that, "in the Socratic method, the classroom experience is a shared dialogue between teacher and students in which both are responsible for pushing the dialogue forward through questioning" (p. 1). In this understanding of inquiry, learning is enhanced by substantial guidance from the teacher. The Socratic way of eliciting ideas through dialogue is called maieutics. This mode of enquiry aims to bring an inquirer's latent ideas into awareness (Taylor, 1998). Principles of the maieutic learning method have inspired modern education to consider teaching and learning as two complementary forms of knowledge seeking (Paraskevas & Wickens, 2003). As one of the leaders of the progressive educational movement in the 20th century, John Dewey always argued that active inquiry should be used as a way of life.

Dewey (1910), who had worked as a science teacher, was a strong advocate of inquiry in science classes. He encouraged teachers to foster the modes of

thinking and habits of the mind that generate scientific knowledge by using a model of inquiry based on the scientific method (Friesen & Scott, 2013). Dewey's particular process of inquiry involved "sensing perplexing situations, clarifying the problem, formulating a tentative hypothesis, testing the hypothesis, revising with rigorous tests, and acting on the solution" (Barrow, 2006, p. 266). In other words, teaching learners to be critical in class is preferable to teaching them mere decontextualized facts.

Principles of inquiry based learning include active learning and learner autonomy in asking questions about a subject, making hypothesis and engage in active research by using every available resources and finally make individual conclusions which may be shared with peers and teachers for further learning. The practice of inquiry as a teaching method "helps ensure the L2 learning experience stays active and dynamic which in turn keeps students engaged and attentive" (Lee, 2014, p. 2). Although inquiry-based instruction has primarily been applied to the teaching of scientific disciplines, its question-response mechanism is compatible with the teaching of English as a foreign language.

2. Method

The participants in this study are five teachers of English as a foreign language from three secondary schools in the Wilaya of Tizi-Ouzou. All five teachers have more than five years of experience teaching English in a secondary school. Participant Observations were carried out in ten different classes divided as follows : one first year class, and two third year classes, and seven second year classes. Each class was composed roughly of thirty plus students, who came from different public middle schools with different levels of performance in English.

Concerning the research procedure, the participant classroom observation sessions were randomly chosen. A total of Ten EFL classes in secondary school were audio-recorded with the awareness and permission of both the teachers and students. Unstructured interviews were used to explore teachers' attitudes about their classroom experiences. A number of questions were asked to teachers at the end of each class. The number and nature of the questions asked to each teacher was determined by the topic and materials used in each individual class.

The aim of the research being the adoption of inquiry-based interaction in EFL classes it becomes important to analyse the teachers' influence on the inquiry process. A qualitative research was applied to the collection and the analysis of the corpus of the study. Excerpts from the recorded lesson

scripts are analysed using data-driven analysis and interaction analysis (IA). The interactive dialogues extracted from each lesson are discussed in relation to the Peircean inquiry theory. It is argued that both teachers and students experience multiple doubt-belief cycles throughout the lesson, therefore, the cognitive and pragmatic aspects of the language used in the classroom are also brought to light and explained.

3. Results and discussion

Considerable research was devoted to teaching as it came to be recognised as a particularly complex activity (Calderhead, 1994 ; Grossman, Hammerness, McDonald, 2009). Although the primary goal of teaching is to foster students' learning efforts, few studies have actually illustrated the dynamic and complex classroom practices as experienced by both the teacher and the student (Verschueren, 2000 ; Church, 2008 ; Waer, 2012 ; Duan, & Ren, 2013).

The dynamic nature of classroom experiences makes it hard for teachers to predict the development and the outcomes of lessons. One of the teacher's competencies is to adapt the syllabus and textbook activities to the classroom setting. Language teachers try to adapt their teaching procedures to meet individual learners' needs. Some teachers make intuitive adaptations which are effective in helping their students' learning progression in the short and the long run. Some adaptive strategies help students to solve a particular learning difficulty during class time (Church, 2008).

In this study, teachers made drastic adaptations to their lessons plans according to students' responses. In lesson seven, for example, the teacher, Ms H adapted textbook activities for learning to express cause and effect by choosing a short expository text. With experience, the teacher came to think that the best way to learn new language structures is the use of contextualized authentic texts. When she was asked why she substituted the textbook activities with another text she said "It is short and accessible for students." Ms H thinks that textbook texts are often "too long and way beyond the real level of students." Their use discourages less proficient learners. In another activity, the students were asked to read the text before discussing it in class. The students' difficulties were addressed one by one in a collaborative inquiry model. However, before discussing the example, an overview of the guided-enquiry is necessary.

Considering the teacher guided classroom interaction as a form of verbal discovery process, we suggest that it starts with a phase of uncertainty where meaning is negotiated through abduction, because language users tend to intuitively use abduction in their reasoning, even if they are not always aware of it.

Arrighi and Ferrario (2008) observe that abductive reasoning is used in everyday conversations. The researchers state that when faced with cultural differences, an unfamiliar language item, for instance, speakers resort to abduction to hypothesize their interlocutor's intentions following six steps : Presentation, Evaluation, Rejection, Refashion, Acceptance, Follow-ups. (Arrighi & Ferrario, 2008, p. 12) The phase of uncertainty generates hypotheses which are in turn tested and conclusions are drawn from the whole process.

Classroom observations demonstrated thirteen steps during classroom inquiry. Nine steps were performed by the teacher and five by the learners. The contribution of each one of them in the interaction was punctuated by an abductive inquiry which is characterised by a doubt/belief cycle. The whole process can be summarised in the table below :

Table 1. The Inquiry Process in Teacher/Students Interaction

Teacher's doubt/belief cycle	Students' doubt/belief cycle
Assumptions : old belief about students' knowledge	
Surprising fact : doubt old belief	Assumption : Old belief
Hypothesis : formulate a new belief	
Testing the hypothesis : test new belief	Doubt old belief
Change of strategy : act on the new strategy	Hypothesis : Students formulate temporary hypothesis (generating new belief)
Adapting the strategy : to learners' feedback and test the efficiency of the strategy. May include numerous actions, such as 'guiding learners with questions, or provide instructions and vocabulary.	Testing the hypothesis : Expressing a new belief.
Positive feedback : confirmation of learners' new belief.	Fixation of a new belief.
13. Agreement on the shared belief	

Source : Adapted from : Arrighi, C., & Ferrario, R. (2008). Abductive reasoning, interpretation and collaborative processes. Foundations of Science, 13(1), p. 12 and Peirce, C. S. (1877). The Fixation of Belief. Popular Science Monthly, 12, 1-15.

The table shows all thirteen steps and their order of occurrence. Some steps of the inquisitive process are shown to be juxtaposed because they most likely occur at the same time. Cognitive actions such as doubting and hypothesizing are hard to observe as they are part of the participants' thinking, but, they can be inferred through actions performed by the participants almost immediately after. The subtle changes in the learners' and teacher's actions can be accounted for by the thirteen steps showed in the table above. Overall, it can be safely affirmed that both the teacher and the students engage in a combined inquiry process whereby they show doubt about their first impressions, formulate new temporary hypotheses and strive to discover and fix new beliefs about a common topic.

The first difficulty encountered by the students was that of comprehension. Students had to understand the text and answer comprehension questions. The excerpt shown in the table below is taken from the beginning of the lesson :

Table 2. Example 01 from lesson script 07, lines [23-43]

Lines	Steps of the doubt/belief cycle
23. T : ok… now then, "different kinds of pollution which are … ? What are they doing to the environment ?"	Assumptions : Learners are asked to read the text at home to get the gist of the text.
24. Ss : "Global warming."	Surprising fact : The majority of the students answer incorrectly.
25. T : "hum… different pollution kinds that are… hum ?"	Hypothesis 01 : May be most learners don't understand the question. Testing the hypothesis 01 : The teacher reads from the text and leaves blanks for students to fill with the right answer.
26. Ss : S1 : "Visible and invisible…"	Confirming the hypothesis : The student S1 made another incorrect answer.
27. T : "Visible and invisible what ?"	Change of strategy : (guiding question 1) Hypothesis 02 : may be students have the right answer, but they cannot express it correctly. (She tries to understand what the student S1 wanted to say.)
28. S3 : "Types of "pollutions"	Learners' feedback : S3 pronounces the word pollution in French)
29. S3 : "Air pollution."	

30. T : "What is pollution doing, here, with air ?"	Testing her hypothesis 02 : The teacher challenges the student S3 answers by demanding further explanations. (Guiding question 2)
31. S3 : "…" (Silent Answer)	Learners' feedback : The passive reaction of the student, confirms her second hypothesis : (students mistook the topic of the text.)
32. T : "Is it talking about air pollution ?"	(Guiding question 3) : The teacher reiterates the last question to test the other learners' comprehension.
33. S2 : "No, Mrs ; … about global warming ?"	Learners' feedback : S2 provides a correct answer, but in not sure of it.
34. T : (reading from the text) "Hum … visible and invisible kinds of pollution that are… ?"	(Guiding question 4) : The teacher refers S2 to the part of the text that should be examined.
35. S2 : "…contributing to global warming !"	Learners' response : Correct answer.
36. T : "Very good !"	Positive feedback
37. T : "What is global warming ?"	Guiding question 5 : Eliciting explanation of the phenomenon the text is about.
38. Ss : S4 'le réchauffement climatique.'	Learners' response : Answers in French
39. T : « Merci beaucoup, je ne le savais pas ! » (Ironically : "thank you, I didn't know that !" meaning that the student has to explain, not to give a translation in French.)	Change of strategy : (with ironical tone, kidding with the student for providing the translation in French instead of defining the concept). (use of humour) to point that the translation of the expression 'global warming' is not what is needed, but the ability to explain what it is in simple words using the target language.
40. S2 : (trying to explain the process) "It is the Earth getting hotter and hotter in the north pole… and the ice is… hum..."	Learners' response : correct answer.
41. T : "Melting ?"	Instructing : (providing vocabulary item)

42. Ss : S3 : "Yes !"	Learners' response : S3 agreed.
43. T : "Yes ! Good."	Positive feedback : Confirming the student hypothesis.

In this example, four students took part in the discussion with the teacher. The goal was to lead learners to define and explain the topic of the text. But, when the learners failed to provide the adequate answer, the debate was engaged about the exact topic of the first paragraph. Instead of providing the answer to students, the teacher tried formulating a plausible hypothesis to explain her observation using abduction.

In the very first lines of the interaction, the teacher wanted to know why learners couldn't find the right answer. She formulated several hypotheses. At first, she thought that her question was not well formulated and reformulated it. Then, she noticed that learners were trying to read random sections from the text to find the answer. Her abductive reasoning was focused on finding a cause for the students' confusion. From a methodological perspective, abduction is but the first step in the inquiry process, it is not sufficient in itself. According to Peirce (1958) :

Induction makes it start from a hypothesis which seems to recommend itself, without at the outset having any particular facts in view, though it feels the need of facts to support the theory. Abduction seeks a theory, induction seeks for facts" (Peirce, 1958, para.218).

In other words, the hypothesis which was generated in the first phase of inquiry should be tested in the second phases by inducing conclusions from facts. The puzzling reaction of students led the teacher to investigate the difficulty they were experiencing. To test her second hypothesis which supposes that the students were short of vocabulary items to provide a correct answer, she asked a series of guiding questions, entering the inductive phase of the inquiry.

At the same time, students were also experiencing a doubt-belief process. Based on the teachers' guiding, the learners made their way from the state of confusion to clarity. From line 31, students experienced doubt and started to follow the teacher's reasoning. In line 33, the student S2 tested his own hypothesis with an interrogation, waited for feedback, then restated his answer more confidently in line 35. At that stage, the teacher's hypothesis was partially confirmed. In line 37, she asked learners to explain their answer, the student S4 made a translation to French, instead of providing a definition in English. When the teacher recognised the students' difficulty to express their answer

in the target language she helped S2 to define 'global warming' by providing vocabulary and positive feedback. The guided-inquiry was completed when the correct answer and definition were deduced by the learners.

In order to guide the learners in their inquiry, the teacher adapted her way of conducting the lesson to accommodate students' immediate responses. This quick adaptation was the fruit of the teacher's critical thinking. In the research about critical thinking in education, it is argued that critical thinking is the basis of any inquiry. This understanding of critical thinking is based on Peirce's views on meaning making. In fact, Siegel and Carey (1989) conclude that :

Peirce's ideas lend clarity to the idea that critical thinking is reflective scepticism…. And his conceptualization of logic as a process of inquiry, that is, as a process of generating and refining knowledge through abduction, deduction, and induction suggests that critical thinking enables us to formulate the hypotheses as well as investigate them (pp. 35-36).

This view that critical thinking is inherent in knowledge generating processes provides teachers with infinite opportunities to teach critical thinking skills. Siegel and Carey (1989) emphasize the fact that the notion of thinking critically should be considered "a matter of reading signs" (p : 7) For teachers, this means that teaching students to pay attention to either teacher or student produced signs in conversation produced either by the teacher or other students, and strive to readjust their thinking patterns accordingly, will create a habit of thinking critically for their students.

Conclusion

As a concluding stance, it can be affirmed that teacher/ students' interaction in EFL classes are characterised by two operations that happen simultaneously. One is the double doubt/belief cycle in which the teacher motivates and monitors students' reflections on their old beliefs about language and language use. The second is the teacher's own reflective thinking about what he or she believes about language teaching and learners' cognitive needs.

During T/S interactions, both interlocutors have to rely on the clues that the other provides to conduct a qualitative investigation on the speakers' intentions and make decisions to define a meaningful or common ground which is necessary for a pragmatic understanding of the subtle meanings in the conversation. When teachers make use of critical thinking to attempt a better understanding of students' input in classroom interaction, students have access to the methods displayed by their instructors- through inference questions- and attempt to use them in return. By using these subtle thinking practices in class

repeatedly, students learn by doing, and acquire communicative and pragmatic competences through interaction with teachers and classmates.

The discussed model of guided inquiry does not exclude peer-interaction. In fact, the teacher addresses the entire class, and students' participations influence each other's responses. By encouraging and guiding the inquiry process, the teacher enables the learning of integrated critical thinking skills. In the end, it can be said that although learners are responsible for their own process of truth seeking, the teacher plays an important role in guiding their efforts in the right direction.

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Abstract

Although, different educational reforms have been launched in secondary school over the last decade, the efficiency of these adjustments on students' language proficiency is still understudied. Questions about 'meaningful learning' arise in educational research without finding a satisfactory answer. This study offers an in-depth insight on the teaching/learning interaction in the classroom. It is argued that a holistic system of interaction analysis is needed to gain clarity on learning processes that actually take place in EFL classes. The research proposes a model for the analysis of teacher-student interaction based on the Peircean semiotic theory of enquiry. Teacher guided enquiry is depicted as a learning strategy that enables a meaningful interpretation of language materials in English. The research demonstrated that by adopting such a model, the students are led to think critically through interaction with the teacher.

Keywords

Teacher-guided enquiry, model-student interaction, sign interpretation.

مستخلص

على الرغم من إطلاق الإصلاحات التربوية المختلفة في المدرسة الثانوية على مدى العقد الماضي وتركيز هذه التعديلات على الكفاءة اللغوية والتواصلية لدى الطلاب لا يزال النقاش

حول ماهية المعنى في التعلم والتعليم متواصل في البحث التربوي دون العثور على إجابة كاملة. تقدم هذه الدراسة نظرة متعمقة على التفاعل الدائر بين المدرس والمتعلم في الفصول الدراسية. نفترض إن هناك حاجة إلى نظام شامل لتحليل التفاعل بين المدرس والمتعلم للحصول على وضوح أكبر في العمليات التعليمية التي تحدث في الواقع. يقترح هذا البحث نموذجا لتحليل التفاعل بين المعلم والطالب على أساس النظرية السيميائية عند بيرس .(Charles.S. Peirce) وكذلك دراسة مدى تأثير تطبيق التعلم الاستقصائي (Inquiry-based Learning) في أقسام اللغة الإنجليزية على قدرة المتعلمين على إكتساب التفكير النقدي (Critical Thinking) و ذلك لمعرفة دور المدرس في قيادة العمليات التعلمية من خلال التفكير النقدي و الإستقصائي.

كلمات مفتاحيّة

الاستفسار التعليمي الموجه، إكتساب التفكير النقدي ، النظرية السيميائية.

Résumé

Bien que différentes réformes éducatives aient été lancées dans le cycle secondaire au cours de la dernière décennie, l'efficacité de ces ajustements sur les compétences linguistiques des élèves n'a toujours pas été étudiée en profondeur. Des questions sur « l'apprentissage significatif » se posent dans la recherche en éducation sans trouver de réponse satisfaisante. Cette étude offre un aperçu détaillé de l'interaction entre enseignant et apprentis en classe. Un système d'analyse holistique des interactions est nécessaire pour clarifier les processus d'apprentissage qui se déroulent réellement dans les classes d'anglais. La recherche propose un modèle d'analyse de l'interaction enseignant-élève basé sur la théorie d'enquête sémiotique de Peirce. L'enquête dirigée par l'enseignant est décrite comme une stratégie d'apprentissage permettant une interprétation significative des supports linguistiques en anglais. La recherche a démontré qu'en adoptant un tel modèle, les étudiants sont amenés à penser de manière critique par le biais d'une interaction avec l'enseignant.

Mots-clés

Enquête dirigée par l'enseignant, interaction modèle-élève, interprétation des signes.