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The Implementation of Bloom's Taxonomy to Assess Students' Critical Thinking Skills: The Case of Third-year LMD Students of English at Khanchela University

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Dedication

We dedicate our dissertation work to our families and friends.

Deepest thankfulness is gifted to our beloved parents for their precious love ,affection and support .

We also welcome the opportunity to remember our friend's dead father: Boumaaza Segni,

Enormous thanks are offered to our brothers: Mouhammed ,Zakaria, Youcef.

To our sisters who have never left our side

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Abstract.

The present study intends to investigate and analyze the changes in the development of the students' critical thinking skills as a reaction to the implementation of Bloom's taxonomy of educational objectives. For this purpose, the researcher used two questionnaires – one administrated to students and the other to teachers - as instruments for collecting data. Basically, the questionnaire designed for the students aimed at testing their different cognitive skills of the students based on the six levels of the taxonomy, in addition to the questions which are related to critical thinking abilities. However, the questionnaire designed for the teachers was for the sake of checking the extent to which they apply Bloom's taxonomy in the classroom in order to attain the underlined goals of the course and to engage students in the learning process through practicing their critical thinking skills. The data obtained were analyzed quantitatively and qualitatively. The results of the study revealed that when Bloom's taxonomy of educational objectives is better applied and used effectively by teachers, it helps in assessing and developing the students' critical thinking abilities due to the strong relationship that exists between the mentioned variables.

Keywords: *Bloom's taxonomy, Cognitive skills, Critical thinking skills, Implementation, The learning process.*

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3.1. Section One: Methodological Framework

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General Introduction:

Developing critical thinking skills in the 21st century is more important than ever before. Each year the world seems to increase in complexity. With a wide range of information at the fingertips of students, learning how to process information is crucial. In this connection, the need for critical thinking development is extremely topical, but it does not find a corresponding implementation in teaching different domains. According to educators , there exist several ways for developing critical thinking skills among them ; the implementation of Bloom's taxonomy of educational objectives which entails the categorization of cognitive skills and abilities needed for achieving the goals of any curriculum. This taxonomy is regarded as one of the crucial models that contribute to the curriculum development in the 21st Century. In fact, there is no escaping that thinking critically is a necessary condition for being educated because it is a moral right of students. While there is no general agreement on a single definition . Instead, there is a consensus on the importance of critical thinking as a life-long skills.

This study aims to examine the impact of implementing Bloom's taxonomy inorderto assess students' critical thinking skills. This problem arises from experience over studying career. The final destination when applying this model is the assessment ofthe student's critical thinking skills. The current situation shows that Bloom's taxonomy is misused by teachers as an effective model to assess,as wellas, toimprovethe student's critical thinking skills.

Thus, the present questions are asked:

A_ Do Bloom's taxonomy of educationalobjectives correlate to EFLstudents' critical thinking skills at tertiary level?

B_ How far would Bloom's taxonomy ofeducationalobjectives model inform EFL students' critical thinking skills?

To answer these questions, the following hypothesis is presented:

Theimplementationof Bloom's taxonomy will helptoassessingthestudents' critical thinking skills.

General Introduction

Educators have long been aware of the importance of critical thinking as an outcome to students' learning processes. Since its importance relies on how it can be taught, therefore implementing the right models such as Bloom's taxonomy education objectives to assess it is very likely to produce positive effects on students. The definition of critical thinking is related to two primary academic disciplines: philosophy and psychology (Lewis & Smith, 1993). Sternberg (1986) has also noted a third critical thinking root within the field of education. These disciplines have developed different definitions to critical thinking.

Philosophically, Ennis (1985) has defined it as *«reflective and reasonable thinking that is focused on deciding what to believe or to do"(p.45)*. However, the cognitive psychologists tend to define the term by the types of actions or behaviours a critical thinker can do (Lewis & Smith, 1993). In the other hand, the educational discipline focuses on learning how to learn, it means, developing the students' capacity to think and act creatively (Sternberg, 1986).

All the three disciplines share some key points; at the same time they disagree upon certain issues concerning the definition of critical thinking. The previous definitions share specific abilities such as asking and answering for clarifications (Ennis, 1985). In addition, they involve dispositions such as the desire to be well-informed (Ennis, 1985; Facione, 1990). And finally, the importance of the background knowledge. The scholars, however, disagree upon whether the dispositions should be viewed in its normative sense as well as its laudatory sense. There are other concepts that are believed to be related to critical thinking such as metacognition, motivation, and creativity.

Researchers and educators have faced obstacles when it comes to assess critical thinking skills amongstudents. One of the assessments is The California Critical Thinking Skills Test (Facione, 1990). Despite the challenges faced, researchers suggest new design assessments for better evaluation. Ku (2003) suggested the use of open-ended problem assessments rather than the multiple-choice tests.

Bloom's taxonomy of educational objectives has been defined as a classification system created by «Benjamin Bloom" in 1956 that focuses on developing thinking abilities through six cognitive learning categories: knowledge, comprehension, application, analysis, synthesis, and evaluation. Each level is composed of different illustrative materials. In 1999, Lorin Anderson published an

updated version of Bloom's original taxonomy. The revised taxonomy is composed of six cognitive processes: remembering, understanding, applying, analyzing, evaluating, and creating. Each of these skills is discussed in details in the second chapter. This version has not brought a radical change onto Bloom's original taxonomy, though has been made the skills wider and more comprehensible. Bloom's original taxonomy has been criticized by educators. The need for the revision comes crucial due to the appearance of new theories and approaches in literature (Amer, 2006). Also Krathwohl (2002) has criticized it in terms of difficulty in the classification of the six cognitive skills.

The research design of this study is oriented to mixed method paradigm to investigate the impact of implementing the independent variable that is considered to be «Bloom's taxonomy of educational objectives" to assess the dependent one which is "students' critical thinking skills". It is the appropriate design in this case to capture the trends and details of the study, in addition, the findings are more dependable and provide a more complete explanation of the research problem than either method alone could provide.

The researchers designed two questionnaires - one for the students and the other for teachers - to reach the major objectives of the present investigation. Both questionnaires contain two sections; the first is about Bloom's taxonomy and the second is about critical thinking skills. The students' questionnaire is composed of fourteen questions; however, the teachers' questionnaire is composed of sixteen questions. Those questions are a mixture of list, category, rank, and open questions. Thus, the findings will answer the research questions, besides, will support or reject the hypothesis after analyzing data.

The participants of the study are third year LMD students of English at Abbes Laghrour University that is located in Khenchela province. The research will randomly select thirty students from the whole population. The reasons behind choosing this specific sample are that they tackled the theme of critical thinking in classroom especially in the oral expression sessions over the three years at university.

The current study aims at looking into the following objectives:

* Investigating the changes in the development of students critical thinking skills as a reaction to the levels of Bloom's taxonomy educational objectives.

* Determining whether there exists a relationship between the mentioned variables.

The present investigation is mainly divided into three chapters. It begins with an abstract that is followed by a general introduction thatconsistsof the statement of the problem, research questions and hypothesis, the background of the study, in addition to the design, the tools of research, the sample and aims and objectives. It ends up with general conclusion. The first and the second chapters are concerned with the theoretical background of the investigation. The first one discusses the most important aspects that are related to critical thinking such as its definition according to three main disciplines. However, the second one includes Bloom's taxonomy that subdivides the academic skill into six categories. The third chapter is about the methodological framework, fieldwork data analysis and discussion. We divided it into two sections; the first section consists of the research design, data gathering tools, participants and ends with the procedures followed to collect data. The second sectionincludes the description of statistics and reporting data through graphs and diagrams, in addition to the interpretation and the discussion of the findings. The dissertation concludes withan extended essay about what have been done in the theoretical framework,also, answering the research questions stating how was the hypothesis confirmed or rejected. In addition, mentioning the limitations of the study and how are managed.

Chapter one: Critical Thinking

1. Introduction

Critical thinking is an important topic in modern education. It aims at improving thinking skills of students and thus preparing them to succeed in the world. It enables them to challenge the other's ideas and make their own judgments. There are some key characteristics for a good thinker as Nikerson (1987) suggested that "*a good thinker is the one who uses evidence skilfully, organizes thoughts and articulates them concisely and coherently, and suspends judgments when there are insufficient evidence to support a decision"* (p.4)

Scholars were in a debate concerning thinking concept. The definition of critical thinking has roots in two primary academic disciplines: philosophy and psychology(Lewis & Smith, 1999). Sternberg has also noted a third root within education domains. Each of these disciplines has developed different approaches to defining critical thinking.

2. Definition of Critical Thinking

2.1. Philosophical Approach

The writings of Socrates, Plato, Aristotle, Mathew Lipman, and Richard Paul exemplify the philosophical approach. This approach focuses on the hypothetical critical thinker through enumerating the qualities and characteristics of this person rather than the behaviours or actions s/he can perform (Lewis & Smith, 1993; Thayer Bacon, 2000). Besides, Sternberg (1986) has noted that this school of thought consider the critical thinker as an ideal type, focusing on what people are capable of doing under the best circumstances. Moreover, Paul (1992) proposed that the ideal thinker is someone open-minded, flexible, has a desire to be well-informed, and understands diverse viewpoints. One drawback of this approach to defining critical thinking is that it does not always correspond to reality (Sternberg, 1986). By emphasizing the ideal critical thinker and what people have the capacity to do, this approach failed in determining how people actually think.

2.2. Cognitive Psychological Approach.

The cognitive psychological approach contradicts the philosophical point of view in two ways: first, cognitive psychologists tend to focus on how people actually think versus how they could or should think under ideal conditions (Sternberg, 1986). Second, rather than defining critical thinking by pointing the characteristics of the ideal critical thinker, those working in cognitive psychology tend to define critical thinking by the types of actions or behaviours critical thinker can do (Lewis & Smith, 1993). According to Sternberg (1986), critical thinking process involves three components of thought: meta-components which refer to the process of higher mental order by the people who used to use plan, performance components which entails the actual steps taken including comparing, mapping, and justifying, knowledge-acquisition strategy which refers to the way in which individuals relate old to new material, and apply new material.

Philosophers have often criticized this latter aspect of the cognitive psychological approach as being reductionist_ reducing a complex orchestration of knowledge and skills into a series of disconnected steps or procedures (Sternberg, 1986). For more clarification, Bailin (2002) argues that it is a fundamental misconception to view critical thinking as a series of discrete steps or skills, and that this ambiguity rooted from behaviourists need to put these skills into practice.Based on the previous clue, the cognitive psychologists have tended to focus on the products of thoughts such as interpretation and formulating good questions.

2.3. Educational Approach

Finally, educational approach also has marked its presence in the discussion of critical thinking. It focuses on "knowing how" rather than "knowing what"; learning how to learn. It is based on developing students' capacity to think and act creatively (Sternberg, 1986). Benjamin Bloom and his associates are included in this category. The taxonomy of educational objectives (1956) is one of the most widely cited sources for educational practitioners when it comes to teaching and assessing higher order skills. Bloom's taxonomy is hierarchical, with "comprehension" at the bottom and "evaluation" at the top. The three highest levels analysis, synthesis, and evaluation are frequently said to represent critical thinking (Kennedy et al., 1991). Some scholars have noted that the

educational approach is limited in its vagueness. Concepts within the taxonomy lack the clarity necessary to guide instruction and assessment in a useful way (Ennis, 1985; Sternberg, 1986).

3. Areas for Agreement

Despite the differences among the three schools of thought and their approaches to defining critical thinking, there exist areas for agreement. First, researchers typically agree upon specific abilities encompassed by the definition, which include: asking and answering questions for clarification**(**Ennis,1985), interpreting and explaining(Facione,1990), reasoning verbally, especially in relation to concepts of uncertainty(Halpern,1998), seeing both sides of an issue(Willingham,2007). Second, they also agreed that critical thinking involves dispositions(Facione,1990). According to Facione (2000), empirical evidence appears to confirm that abilities and dispositions are separated unites. This latter have been presented as attitudes or habits of mind. Researchers tend to identify sets of dispositions as relevant to critical thinking including: Fair-mindedness(Bailin et al.,1999; Facione,1990); the desire to be well-informed (Ennis,1985; Facione,1990), and flexibility(Facione,1990;Halpern,1989).Third, researchers emphasize the importance of the background knowledge. They see the background knowledge as fundamental for students if they are to demonstrate their critical thinking skills (Case, 2005; Kennedy et al., 1991; Willingham, 2007). Moreover, Facione (1990) noted the following:

> *Although the identification and analysis of critical thinking skills transcend, in significant ways, specific subjects or disciplines, learning and applying these skills in many context requires domain-specific knowledge. This domain-knowledge includes understanding methodological principles and competence to engage in norm-regulated practices that are at the core of reasonable judgments in those specific contexts.*(p.10)

4. Areas for Disagreement

Although critical thinking involves both skills and dispositions, there remains a disagreement as to whether the disposition to think critically should be viewed in its normative sense as well as its laudatory sense. In 1990, the American Philosophical Association (APA) formed a group of researchers to establish a definition for critical thinking. Even though dispositions were core components within the definition of critical thinking, some experts argued that these elements have a laudatory role, and others maintained that they also have a normative role (Facione, 1990). That is to say, most researchers agreed that critical thinking is synonymous with good thinking in the sense that critical thought can be achieved by those with both abilities and dispositions. Another gap is the extent to which critical thinking is domain -specific. Some researchers disputed that critical thinking can be generalized for all domains, however, the others disputed that these skills can be taught according to the context of domain-specifity.

There exists a range of assumptions regarding domain-specifity presented by Ennis (1989). For instance, most researchers appreciate the importance of the background knowledge while they found it insufficient condition for critical thinking. There are supporters who call for the domain-specifity. Willingham (2007) spoke up for the idea of learning critical thinking skills within a given field. Similarly, McPeck (1990) promoted the trend of usefulness of critical thinking skills within the scope of domain-specifity. As there are supporters, there are people who are in opposition to and they maintainthat critical thinking skills and abilities are not domain-specific. According to Lipman (1988), the process of critical thinking helps in creating good judgments through certain criteria where the original sense of critical thinking is the same across domains. Based on the previous opinions and views, there are those who opt for both trends, general and domain-specific

elements. Yet Faction (1990) notes the importance of domain-specific knowledge, he falls into the category of researchers who acknowledge both trends. Furthermore, Paul (1992) points out that critical thinking skills and abilities can be taught using both trends.

Transferability is another area for disagreement among researchers. It deals with the extent to which abilities and skills can be transferred to new contexts. As Willingham (2007) points out those students may succeed in achieving critical thinking skills in one context, but they may fail to do so in another. Besides, Halpern (2001) describes the outcomes of a study conducted to determine whether college students would transfer critical thinking skills acquired in the context of specific discipline to a new context several months after the course had ended. Evidence show that most of them did apply the reasoning they had previously learned. Nickerson (1998) concludes that the success of any transfer method appears to depend on what is being taught and how it is being taught.

5. Other Concepts Related to Critical Thinking

For the sake of establishing the definition of critical thinking, researchers have limited this term to other skills including; metacognition, motivation, and creativity.The term metacognition refers to the ability to monitor the quality of critical thinking by asking the questions; what do I already know? What is my goal? How will I know when I get there? Am I making progress?(Halonen,1995). Kuhn (1999) views critical thinking as a form of metacognition. There are some researchers such as Facione and Schraw argued that there exists a strong relationship between critical thinking and metacognition in a form of self-regulation. As Facione (1990) asserted that the APA Delphi report includes self-regulation as an essential component of critical thinking. Besides, Schraw et al. (2006) argued that metacognition, critical thinking, and motivation represent the concept of self-regulation which they express the ability to grasp and control the learning environment. However, others have

argued that critical thinking and metacognition are distinct constructs. In other words, Lipman (1988) has pointed out that metacognition is not necessarily critical in a sense that one can think about one's thought in an unreflective manner. McPeck (1990), on the other side, identifies metacognition as the representation of general intelligence.Thus metacognition can be viewed as a supporting condition for critical thinking.

Another concept that is related to critical thinking is motivation. Most researchers view critical thinking as including both, abilities and dispositions. Facione (2000) has defined dispositions as *«the consistent internal motivation to make decisions by using critical thinking*"(p.65). Likewise, Halonen (1995) noted that a person's disposition to demonstrate higher-order thinking relates to their motivation. Thus, like metacognition, motivation functions as a supporting condition for critical thinking.

The last concept that is related to critical thinking is creativity. At first glance, critical thinking and creativity might seem to have little in common. However, Bailin (2002) revealed that a certain amount of creativity is needed for critical thought. As such, critical thinking and creativity are two faces of the same coin. As the authors note, *«critical thinking without creativity reduces to mere scepticism and negativity, and creativity without critical thought reduces to mere novelty*"**(**p.35). Thus, Paul and Elder (2006) reached the point that both concepts are strongly related and developed in parallel.

6. Challenges in Assessing Critical Thinking

Researchers have found it challenging to assess critical thinking skills and dispositions among students the issue is mainly linked to both reliability and validity of existing measures. Norris (1989) argued that the degree of domain-specifity remains unclear which makes it hard to evaluate critical

thinking skills. He,again, pointed out that the type of inferences one is trying to make seem doubtful because researchers disagree upon whether critical thinking is general or domain specific. Another challenge is transfer because the transfer to another context is confronted with domain specific knowledge. That is to say, a student fails in transferring to another context due to two main reasons; either he did not get enough instructions in critical thinking or enough instructions in the subject matter.

There exists a various number of published assessments of critical thinking among them: the California Critical Thinking Skills Test (Facione, 1990), the Cornell Critical Thinking Tests (Ennis &Millman, 2005), and the Watson-Glaser Critical Thinking Appraisal (Watson & Glaser, 1980). According to Ku (2009), these instruments vary widely in both the purpose and the item format. On the other hand, Kennedy et al. (1991) noted that these tests are not useful with students below the fourth grade level. Thus, the mentioned tests tend to be more general critical thinking assessments rather than subject-specific.

7. Assessment Recommendations

Despite the fact that researchers have faced obstacles in assessing critical thinking skills, they suggested new designed assessments for better evaluation. According to Ku (2003), open-ended problem assessments are more adequate to measure critical thinking skills than the traditional multiple-choice tests. Due to this reason, He recommended using assessments of mixed items, both open-ended and multiple-choice format. Furthermore, Ku (2009) stated that "*teachers should adopt different assessment methods, such as exercises that allow students to self-construct answers, assignments that facilitate the practice of strategic use of thinking skills in everyday contexts*"(p.75). In addition, as (Bonk & Smith,1998;Halpern,1998) pointed out that the assessments should be

"authentic" and reflect real-world issues, as well as, it should open gate for students to give sufficient information and evidence to support their multiple views(Moss & Koziol,1991). Evaluation of the assessment should take into account the quality of arguments given by students rather than seeking correct answers (Moss &Koziol, 1991). Similarly, Smith (1993) argued that the assessments must help students to be creative not just answer questions for the sake of targeting the right answers. That is to say, they should manipulate what they learned in a creative manner. For instance, testing the validity of critical thinking required to observe the process itself (Norris, 1989). Thus, students provide justifications for their choice in the context of multiple-choice test (Kennedy et al., 1991).Among the suggested assessments to measure high-order skills the novel item formats (Silva, 2008). As an example, River City Research Project (developed within Harvard's graduate school of education with National Science Foundation funding) is a type of assessment that engages middle-school students in real-world problems which they have to solve through the application of the scientific process: generating hypotheses, testing hypotheses, analyzingresults, and drawing conclusions

8. Conclusion

One of the key objectives of education is to develop students' intellectual abilities such as critical thinking skills. Typically, critical thinking is believed to include the component skills of analyzing arguments, making inferences by using inductive or deductive reasoning, judging or evaluating, and making decisions or solving problems. Although the concrete definition of critical thinking remains elusive, common aspects are covered among various approaches: philosophical, cognitive psychological, and educational approaches. Furthermore, critical thinking entails cognitive skills, or abilities, and dispositions. These dispositions are believed to refer to a numerous habits of mind, include open-mindedness and flexibility. Critical thinking skills are linked to particular learning outcomes, such as metacognition, motivation, and creativity. The assessment of critical thinking skills seems a bit challenging for researchers in terms of both reliability and validity of existing measures. Despite the displayed barriers, researchers have recommended well-designed tests to evaluate critical thinking skills such as open-ended problem types that make use of authentic, real-world problem contexts.

Chapter two: Bloom's Taxonomy of Educational Objectives

2.1. Introduction

Bloom's Taxonomy of Education Objectives is a classification system by an educational psychologist, Benjamin Bloom who created it in 1956. The taxonomy aims at making students aware of what they are learning. It focuses on developing thinking abilities which involve simple information acquisition to more complex processes. In this sense, the taxonomy involves six (06) categories ordered as following. The first category is "knowledge", entails foundational cognitive skills that require students to recall specific pieces of information. The second category is "comprehension", which requires the students to paraphrase the content of knowledge gained using their own words. The third one is "application" which refers to the use of knowledge, skills, or techniques in new situations. The fourth category is «analysis" which requires the students to make the distinction between facts and opinions and how to identify clues upon which an argument is built. The fifth category is "synthesis" which brings about the need for a new product in a specific situation. The sixth and the last category is "evaluation" which encompasses the appraise of the validity of a study and judge the relevance of its results for application.

2.2.The Taxonomy and The Illustrative Materials

2.2.1. Knowledge

Knowledge refers to the set of behaviours which focus on the remembering of ideas, materials, or phenomena(Bloom, 1956). In fact, students are expected to store in their minds what they have learned, and the behaviour expected later is the remembering of the stored information. In this regard, Bloom(1956) stated that, *«in the classification of knowledge objectives, the arrangement is from the specific and relatively concrete types of behaviours to the more complex and abstract ones"*(p.62). That is to say, the specific knowledge represented in a form of isolated and separated information, however, the knowledge of abstractions focus on patterns in which information can be structured and designed. The main distinction between the knowledge category and the other categories is that remembering is the major psychological process involved here, while in the other categories the remembering is only part of such more complex cognitive processes (Bloom, 1956). Thus, the mentioned category has been classified into three major illustrative materials: knowledge of specifics, knowledge of ways and means of dealing with specifics, and knowledge of the universals and abstractions in a field.

2.2.1.1. Knowledge of Specifics

It is believed that the knowledge of specifics refers to the heart of facts in each field of knowledge. These specifics are symbols which have a concrete significance and are at a low level of abstraction (Bloom, 1956). There exists a plenty of specifics for each particular field and the student's mission is to select what is appropriate for their educational purposes. The specialists also face obstacles and difficulties in keeping up with all the new specifics developed in a certain field. That is, "*specifics can be isolated as elements or bits which have some meaning and value by themselves*"(Bloom, 1956, p.63).

2.2.1.2. Knowledge of Ways and Means of Dealing with Specifics

Generally, ways and means refer to *«the ability of organizing, judging, and criticizing ideas and phenomena*"(Bloom,1956,p.68). This includes the use of chronological sequences, methods of inquiry, and the standards of judgment within a field in addition to the patterns of organizations. Each field is composed of a body of techniques, criteria, classifications and forms which are used to deal with specifics once they are discovered. Even though it is hard to make the distinction between knowledge of ways and means and knowledge of specifics, several characteristics will be discussed to make it clear. First, ways and means refer to processes rather than products. Second, they indicate operations rather than the results of these operations. Third, they focus largely on the results of agreement and convenience rather than the results that target matters of observation, experimentation, and discovery. Finally, they commonly reflect how workers in a field think and solve problem rather than the results of such thought or problem solving.

It appears that students will find it difficult and challenging to learn the knowledge of ways and means due to their abstractness and their forms might be meaningful only to the specialist who recognizes their value as tools and techniques in his work(Bloom, 1956).

2.2.1.3. Knowledge of The Universals and Abstractions in A Field

The notion denotes the knowledge of *«the major ideas, schemes, and patterns by which phenomenon and ideas are organized*"(Bloom, 1956, p.75). They represent the collection of theories, structures, and generalizations which are basically used in tackling an idea or solving a problem. This type of knowledge is classified at the highest level of abstraction and complexity. The mentioned concepts create a storm of specific facts and events and describe the processes among these specifics. It is believed that these plans are rather challenging for students to comprehend

because they are not familiar with the issues that are summarized and organized using universals. So, in order to get acquainted with these matters, students should have more insight into the field as well as greater remembrance for it (Bloom, 1956).

2.2.2. Comprehension

It is stated that comprehension encompasses "*objectives, behaviours, or responses which represent an understanding of the literal message contained in a communication*"(Bloom, 1956, p.89). In this context, communication includes those oral or written forms through which students are expected to know and to make use of the ideas contained in it. Here the term comprehension is related to a greater variety of communication. Precisely, the use of the term is somewhat limited since it is not associated with the full grasp of a message (Bloom, 1956). In the following sections, Bloom (1956) demonstrates the illustrative materials linked to comprehension: translation, interpretation, and extrapolation.

2.2.2.1. Translation

Bloom (1956) defines the notion translation as a way of communication in another language that involves giving meaning to the different parts of communication, although they may be determined by the context where the ideas appear. It is true that the individual is unable to be engaged in more complex thinking due to the fact that s/he can give the denoted meaning that symbolizes a general concept of relevant ideas to each of the various parts of communication. To clarify more, there should be a transformation of an abstract idea to a concrete term to be useful in solving problems presented by communication (Bloom, 1956).

2.2.2.2. Interpretation

According to Bloom (1956), the process of interpretation goes through the following steps. First, *«the reader must be able to translate the major parts of communication*"(p.93). This includes words and phrases. Next, s/he must go deeper to grasp the relationships between its parts in order to reorder it in his/her mind for the sake of shaping a general view of what communication involves and to make a strong link with his/her previous knowledge and experience. Thus, the core of interpretation is that *«the student can identify and comprehend the major ideas which are included in it*"(p.93). This ability does not come from nonsense, but it requires a strong sense of judgment and caution as well as recognition of the limits within which interpretations can be drown (Bloom, 1956).

2.2.2.3. Extrapolation

Bloom (1956) has defined extrapolation as the ability to draw conclusions and state them effectively. When the writer prepares a communication, s/he has to take into account two main things; stating what s/he believes concerning the matter and some of the consequences of it. Furthermore, s/he reaches the summit only when s/he has detailed the possible conclusions and consequences of his ideas or material. In this regard, accurate extrapolation requires the ability to extend the trends beyond the given data and findings of the document for the sake of establishing implications, effects, and consequences (Bloom, 1956). In addition to the previous conditions, extrapolation also requires *«the reader to be aware of the limits within which communication is posed as well as the possible limits within which it can be extended*"(Bloom, 1956, p.95). In other words, the reader must come up with a conclusion that the extrapolation can only be an inference which has some degree of probability.

2.2.3. Application

Bloom (1956) argued that the cognitive abilities of the taxonomy are arranged in a hierarchy, each classification requires skills with are lower in the classification order. In this sense, the application category follows the same rule in that to apply something, there must be a full comprehension of the methods and the principles applied. The present category differs from the comprehension one in some ways. In the comprehension category, the student has to know the abstraction so that s/he can correctly demonstrate its use, however, in the application category; s/he will apply the appropriate abstraction without showing how to use it in that situation. That is, *«comprehension shows that the student can use the abstraction when its use is specified, but application shows that s/he will use it correctly, without having any specified solution* "(Bloom, 1956, p.120). All in all, comprehension focuses on the grasp of meaning and intent of the material, in contrast, application focuses on remembering and bringing the appropriate generalization or principles of the given material.

2.2.4. Analysis

According to Bloom (1956), analysis is the process of breaking down the material into its constituent parts and the way they are organized. He stated that the skill in analysis can work as an objective of any field of study due to the fact that teachers work to develop in students *«the ability to*

distinguish fact from hypothesis in a communication, to identify conclusions and supporting statements, and noting how ideas are related to each other"(p.144). Then, He draws clear lines between analysis and comprehension. The emphasis of comprehension is on the content of the material, however, analysis focuses on both content and form.

It is believed that in the process of analyzing a form of communication, the analyst may express opinions about it. This ability considered as being abstracted and useful. For instance, someone who grasps the meaning of communication may not be able to analyze it effectively; in contrast, the one who is skilful in the analysis of the material may evaluate it badly (Bloom, 1956).

2.2.4.1. Analysis of Elements

Bloom (1956) stated that the elements of communication can be stated explicitly by the writer, so the reader may face difficulties in recognizing it and may fail in determining the conclusions the writer drown. Moreover, the reader may have difficulty in fully comprehending and evaluating the material. Thus, to solve this issue, writers made unstated assumptions which are extracted from an analysis of a series of statements within the document. He added that *«It is also of value to the reader if he can detect the nature and function of particular statements in the communication"(*p.146).

2.2.4.2.Analysis of Relationships

After identifying the different elements of a communication, the reader moves to the next stage to determine the major relationships among these elements. As a starting point of this journey, s/he has to highlight the relationship of the hypotheses to the evidence and the relationship between the conclusions and the hypotheses as well as evidence. The target of analyzing relationships is to show how the elements are consistent and relevant to each other in the sense of how the elements or parts are relevant to the central idea or thesis in the communication (Bloom, 1956).

2.2.4.3. Analysis of OrganizationalPrinciples

It is considered to be the hardest level in which the mission of the reader is to detect the structure and organization of a communication. The producer of communication may explicitly show the organizational principles s/he has used. That is, his/her purpose, point of view, attitude, or general conception of a field may appear in the writing and the reader may unable to comprehend or evaluate the communication unless s/he determines them. In the other way around, *«the producer of*

communication selects some form, pattern, or structure and organizes his arguments, evidence, or other elements around these"(Bloom,1956,p.146).

In summary, students are expected to breakdown the material into small constituent parts to classify the elements of communication which represent the first level. At the second level, they are supposed to identify the relationships among the elements to determine their connections. At the third level, they recognize the organizational principles, the arrangement, and structure which hold together the material as a whole.

2.2.5. Synthesis

Bloom (1956) has defined synthesis as the process of putting together elements and parts to constitute a pattern or a structure.On the level of this category, learners are more creative but to some extent since they are expected to work within the limits set by particular problems or materials. It is remarkable that synthesis emphasizes more on uniqueness and originality than in the other classes; comprehension, application, and analysis. Basically, the distinction between synthesis and the other mentioned categories lies in "*the possibility that they involve working with a given set of materials or elements which constitutes a whole in itself* "(Bloom, 1956, p.162).

It seems best to distinguish between the different kinds of synthesis on the basis of the product. The first sub-category classifies the product as a unique communication. For instance, the author tries to communicate certain ideas to the audience but sometimes s/he is interested in the expression itself for the purpose of informing, describing, persuading, or entertaining. The outcome of synthesis can be considered as unique in terms of not representing the operations or specifications to be carried out and not contributing to the store of tested knowledge. The second sub-category classifies the product as a plan or proposed set of operations to be accomplished. These operations are uncompleted until they are translated into actions. The third sub-category views synthesis as a set of abstract relations. The set of relations may be derived from an analysis of an observed phenomenon or an analysis of relations among propositions. These latter are not explicit but they are deduced from the context (Bloom, 1956).

2.2.5.1. Production of A Unique Communication

Under this umbrella lies the controlling factors related to communications as following: the kind of effects to be achieved; the nature of the audience in whom the effects are to be achieved; the particular medium(means of communication)through which students express themselves; and the

particular ideas students wish to communicate(Bloom,1956). Here, the word "effects" is used repeatedly to indicate *«the response or change in response desired in some audience. This would include outcomes such as the acquisition of information, the acceptance of an idea, and change in attitude or belief*"(Bloom, 1956, p.168).

2.2.5.2. Production of A Plan, or Proposed Set of Operations

The main purpose of this sub-category is the production of a plan of propositions which constitutes the act of synthesis. It is a must that " *the product or plan of operations satisfies the requirements of the task*"(Bloom, 1956, p.170). Usually, the requirements represented in a form of data that should be considered by the student. Here too, students are given a chance to put their own ideas into the product, even in the most limiting kinds of purpose, such as testing a hypothesis; they are permitted to conceive it from their point of view.

2.2.5.3. Derivation of A Set of Abstract Relations

This sub-category seems to target the objectives that require the student to produce or derive a set of abstract relations. Based on this perspective, there appear two kinds of tasks. First, tasks in which the student begins with concrete data where s/he has to explain or classify. Second, tasks in which s/he begins with some basic propositions where s/he has to produce other relations (Bloom, 1956). Concerning the first type of tasks, the student is supposed to *«study a phenomenon, then come up with a logically consistent scheme for classifying the reached facts*"(p.171). This scheme should account for the relations exist among a range of phenomenon. This type may also take the form of explaining certain observed phenomenon. The job of the student is to formulate a hypothesis that will account for a wide range of phenomena and must fit the facts as well as be internally consistent. In the other hand, the second type of tasks *«begins with abstract symbols, prepositions, rather than with concrete data*"(p.172). Here, the student has to reason in terms of some theoretical frameworks.

2.2.6. Evaluation

Bloom (1956) has defined evaluation as *«making judgments about the value of ideas, works and methods*"(p.185). It involves the use of criteria and standards to indicate the extent to which the materials are accurate and effective. Evaluation took that room in the hierarchy of the taxonomy due to the fact of being a complex process which involves the combination of all the other behaviours of knowledge, comprehension, application, analysis, and synthesis. Although evaluation is placed at the end in the cognitive domain, *«this does not necessarily indicate that it is the last stage in*

thinking or problem solving"(p.185). It is believed that people are egocentric in terms of judging things from their points of view. That is, they evaluate highly ideas and objects which are useful for them, while things which are not useful for them are evaluated less highly.

2.2.6.1. Judgments in Terms of Internal Evidence

Generally speaking, "*Logical accuracy and consistency are classified to be internal criteria used in evaluating communication*"(Bloom, 1956, p.188). Studies found that it is extremely hard to evaluate materials linked to social sciences and natural sciences. It seems obvious that the individual, after s/he has comprehended and perhaps analyzed a work, s/he jumps to the next stage which is the evaluation of the work on the basis of certain internal criteria. It is also possible to judge a work to determine whether the manner in which the writer cites documents is of a high probability of accuracy (Bloom, 1956).

2.2.6.2. Judgments in Terms of External Evidence

Once we talk about the evaluation of a material in terms of external evidence, we fall in the gap of"*the evaluation of material with reference to selected or remembered criteria*"(Bloom, 1956, p.190). Techniques, rules, and standards are meant to be criteria by which works are generally judged. For example, a historical material can be judged by criteria relevant to the historical works rather than to works of fiction. That is, each phenomenon is a member of class and is to be judged by criteria which are appropriate to that class. There are certain studies found that the external criteria are originated from a member of a class which is considered to be a model member in some aspects. As a result, the judgment focuses on the comparison of the two members of the class rather than on the extent to which one member satisfies selected abstract criteria (Bloom, 1956).

2.3. A Critical Appraisal of Bloom's Taxonomy

In 1999, Dr. Lorin Anderson, a former student of Bloom, and his colleagues published an updated version of Bloom's taxonomy. This revised taxonomy attempts to correct some of the problems with the original version. Soozandefar and Adeli (2016) presented in their article that the revised taxonomy differentiates between (knowing what) and (knowing how). Knowledge is considered as the (knowing what). It consists of four categories as following. First, factual knowledge which includes isolated bits of information, such as vocabulary definitions. Second, conceptual knowledge which entails the systems of information, such as classifications. Third, procedural knowledge which encompasses techniques and methods and knowledge about when to use these procedures.

Fourth, metacognition knowledge which refers to knowledge of thinking processes and information about how to manipulate these processes effectively and successfully.

The revised taxonomy classifies the cognitive processes from simplest to the most complex. It consists of six skills: remembering, understanding, applying, analyzing, evaluating, and creating. Soozandefar and Adeli (2016) presented the definition of each skill. First, remembering which refers to *«the ability to recognize and recall relevant information for long-term memory"(p.2).*Second, understanding, which is about *«making your own meaning from educational material*"(p.2) such as reading. Third, applying process. It refers to the use of a learned procedure in different situations. The next process is analyzing, which is about breaking knowledge down into parts and thinking how these constituents are related to the overall structure. At the top of the original taxonomy, there exists evaluation which is the fifth process in the revised version. It deals with checking and finding knowledge. The last process is creating, which is not included in the original version. It involves putting things together to produce something new. In this context, Anderson (2001) adds that "*the meaningful learning provides students with the knowledge and cognitive processes they need for successful problem solving*"(p.2).

Several cognitive psychologists have worked to make the basic concept of the taxonomy more relevant and accurate. In developing his own taxonomy of educational objectives, Marzano (2000) criticized the taxonomy saying that it is not supported by research because of the process of moving from the simplest level of knowledge to the most difficult level of education. That is to say, each higher skill is composed of the skills beneath it; comprehension requires knowledge; application requires comprehension and knowledge, and so on. This, as Marzano (2000) stated, is simply not true of the cognitive processes in Bloom's taxonomy. Anderson (2000) argues that all complex learning activities require the use of different cognitive skills. To sum up, the revised taxonomy has not brought a radical change onto Bloom's original classification, though has provided some significant innovations. Thus, the subcategories of all levels in the original taxonomy have been made just wider and more comprehensible in the revised one.

2.4. Criticisms on Bloom's Original Taxonomy

The original taxonomy received several indepth criticismsfrom scholars and educators. New theories and approaches, such as constructivism and metacognitive skills, have been involved in the literature since the date Bloom's taxonomy was published (1956). These theories and approaches called for the necessity of the taxonomy revision (Amer, 2006). According to Startalk (2009), today’s world is

different from Bloom's taxonomy that reflects features of 1956. In this regard, educators have more knowledge about how learning takes place and how teachers lecture. In this case, the shortcoming of the taxonomy and the need for an appropriate structure to become a learner- centered becomes conspicuous.

Another criticismis provided by Krathwohl (2002) when he stated that the taxonomy classified the cognitive skills that are different from each other in terms of difficulty. However, this strict classification between categories was later softened up and overlapping between them was provided. Moreover, the taxonomy lakes constructivist integration. Constructivism focuses on how students create knowledge while they are busy with learning process. It entails both comparing new information with old ones. In this taxonomy, students may not be able to select the information themselves and form their own meaning. Today, it is expected that every student should make progress on an integrative basis. For this reason, combining program objectives, teaching, and assessment is more crucial than ever merged (Pickard, 2007).

Krathwohl (2000) classified the knowledge category in the taxonomy as being unilateral (independent). Basically, knowledge level consists of both noun and verb forms. Whereas, the noun form is situated in the bottom step of knowledge and the verb form describing conditional process is defined as the students' remembering of knowledge. As a result, knowledge step becomes unilateral in which it fails within the scope of the cognitional process. In the knowledge category, students are asked for both knowing the knowledge and remembering it.

Bloom's Taxonomy is broadly cited in teacher training programs in reference how students learn and how to teach. Booker (2007) believed that *«Bloom's taxonomy has been used to devalue basic skills education and has promoted «higher order thinking" at its expense*"(p.248). That is, knowledge and comprehension are considered to be less and lower order skills. Referring to lower order skills does not make both levels less important. Ultimately, the criticismlies with the intention behind the application of the taxonomy and not with Bloom himself.

The original taxonomy is widely used in the whole world; however, the revision for it has become inevitable with the proceeds of the new millennium. In this regard, Anderson and Krathwohl (2001) must be acclaimed and thanked for their studies. In contrast, it must be taken into account that the revised version might not be reliable source since it is required to be made more comprehensible at higher levels. Thus curriculum developers must be informed to be more careful in the implementation of this revised version (Soozandefar and Adeli, 2016). Bloom's taxonomy is

often misinterpreted and misapplied by educators. It is observed that educators interpret the lower levels of thinking to be appropriate for college courses and that the higher order skills are appropriate for advanced and graduated courses (Soozandefar and Adeli, 2016).

2.5. Conclusion

To sum up, Bloom's taxonomy of educational objectives is regarded as one of the crucial models that contribute to the curriculum development in the 21st century. Basically, the taxonomy is believed to include six levels of thinking: knowledge, comprehension, application, analysis, synthesis, and evaluation. Each level is composed of different illustrative materials. In 1999, Anderson and his colleagues updated a new version of this taxonomy in which they tried to cover some of the drawbacks of the original version. This revised taxonomy has been criticized as being not supported by research because it moves from simplest level of knowledge to the most difficult level of education. The original taxonomy of Bloom also received some criticismsconcerning the issue that it reflects the features of the time when it is published due to the fact that the world develops and educators have become aware about how to teach. Thus, the curriculum developers rely more on the original taxonomy as being more authentic and reliable source.

Chapter Three:

Methodological Framework, Fieldwork Data analysis and Discussion

3.1. Section One

3.1.1. Introduction

The purpose of this chapter is to introduce the research methodology for this study regarding the impact of implementing Bloom's taxonomy of educational objectives to assess critical thinking skills among students. To achieve that, we have applied the mixed method re1search design. In this regard, the major tools for collecting data were two questionnaires, one is addressed to third year LMD students of English at Abbes Laghrour University and the other addressed to teachers of English at the same institution in order to collect more information and answer the research questions.

3.1.1. The research design

The present study employed the mixed methods design which is a procedure for collecting, analyzing, and mixing both quantitative and qualitative data within a single study (Creswell, 2000). The rationale for mixing is that neither quantitative nor qualitative methods are sufficient by themselves to capture the trends and details of the study; however, when used in combination, they complete each other and allow for more complete analysis (Green, Caracelli& Graham, 1989, Tashakkori&Teddlie, 1998).

In quantitative research, Charles and Martler (2002) claimed that the researcher relies on numerical data which can be analyzed using statistics. In this approach, the researcher typically begins with a research question or hypothesis that is quite specific. Further this research involves objective data gathering to arrive at findings that are systematic, generalizable, and open to replication by other investigators. Alternatively, in qualitative design, the researcher develops complex picture, analyzes words, reports detailed views of participants and conducts the study in natural settings (Creswell, 1998).In this approach, the researcher collects data from those immersed in everyday life of the setting in which the study is framed. The intended result is a narrative report that is based on the values that these participants perceive from their world. Ultimately, it seeks to arrive at results and findings only fitting to the context in which it is carried out (Miller, 2002).

3.1.3. Instruments for data collection

The researcher designed two questionnaires, one for the teachers of Abbes LaghrourUniversity and the other one is for third year students of English at the same university. The questionnaire of the teachers is composed of two sections. The first section is about Bloom's taxonomy and the second one targets critical thinking skills. Each section contains eight (8) questions which are ranked from general to more specific and are a mixture of list, category, rank, and open questions. The questionnaire is administered online and is sent via emails to the teachers of English.

In the other hand, the questionnaire designed for students is composed of two sections as well. The first one is about critical thinking skills which are composed of eight (8) questions and the second one is about the six level of Bloom's Taxonomy and it contains six (6) questions. The questions are a collection of different types: list, category, rank, and open questions. This questionnaire is administered online and shared via Facebook in Third Year Students of English group. It is presented in a clear, systematic, and practical way that enables the participants to answer the questions easily. Finally, It is emphasized to the participants that the questionnaires are designed to help the researcher reach the findings that are going to answer the proposed questions and to confirm or reject the hypothesis.

3.1.4. Participants

The target population for this study includes third year LMD students of English at Abbes Laghrour University in Khanchela province. From the whole population of 70 students, we randomly selected 30 students their age between 22 and 23 years old. The participants are selected through simple random sampling. We specified this sample for two main reasons. First, we assume that they tackled the topic of critical thinking especially in the oral expression sessions over the three years at university. Second, they had a lecture in didactics under the title of critical thinking.

The reason behind choosing Abbes Laghrour University as a location for our study is that there were no better alternatives to secondary school as university because of Corona virus pandemic, we failed to carry out our investigation and administer our questionnaires at secondary school.

3.1.5. Procedures of collecting data

After preparing two questionnaires, one addressed to teachers and the other to students; we have typed them on Google forms website on the internet. Then, we sent the first questionnaire via emails to the teachers of English at Abbes Laghrour University. Concerning the second questionnaire, we shared it via facebook in Third Year Students of English group. The answers of both questionnaires were received via emails of the researchers. The possibility of retrieving back all the answers of students was one month, as a result of waiting for the specified number of the sample(30 students) to complete answering the questionnaire and the answers of the teachers were retrieved back three weeks from the day of sending the questionnaire designed for them. Finally, the obtained data from both questionnaires will be discussed and interpreted in the coming chapter in order to check the validity or invalidity of the relationship between the variables under investigation.

3.2. Section Two

3.2.1. Introduction

In this part, we will report the data obtained from the students' and the teachers' questionnaires. Mainly, data will be analyzed quantitatively and qualitatively through those questionnaires. We will solely focus on presenting the gathered data in a meaningful way to facilitate the discussion, which will be presented in the coming section. Finally, charts have been used to simplify reading those data.

3.2.2. Students' Questionnaire Analysis

The results that were attained from students' questionnaire analyzed as following:

- Q1: The chart below represents the importance of critical thinking skills in the learning process where answers of this question are given as the following distribution, 82.8% of students agreed that those skills are necessary for the learning process, 10.3% claimed that these skills are of high importance, while the last choices with 3.45% for each excluded the possibility that those skills are unnecessary in the learning process.

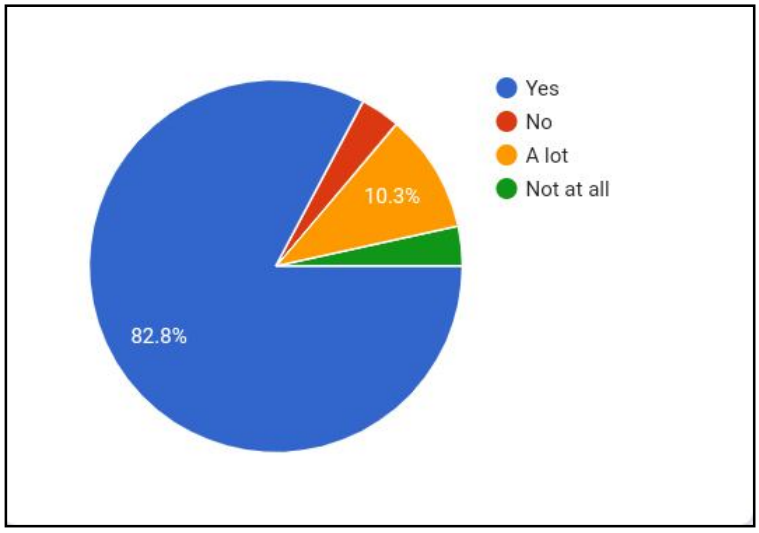

Chart1.1. The Importance of Critical Thinking Skills in The Learning Process.

- Q2 : It was found that 44.8% of students claimed that they were given more than three chances to answer questions in one session. Then 24.1% of them were given just one chance, and 20.7% were given two chances, however, 10.3% of them were never given a chance to answer questions, this is well explained in the chart below :

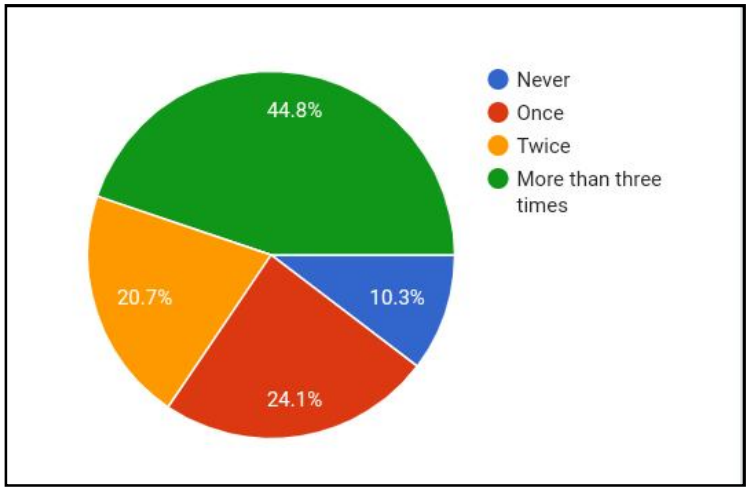

Chart1.2. Answering questions in one session .

- Q3 : This question shows the different strategies used when solving a problem. Results reveal that 79.3% of students classified the classroom interactions at the first rank, 58.6% of themput group discussions at the second position, and 31% of them classified the individual work at the last rank.

Q4 : This question indicates the extent to which students understand questions asked by their teachers, where 62.1% of students were fully understand the questions, and 34.5% of them reported that they do not understand at all, while a small percentage of 3.4% indicated that the extent of understanding is partial. The statistics are shown in the following chart :

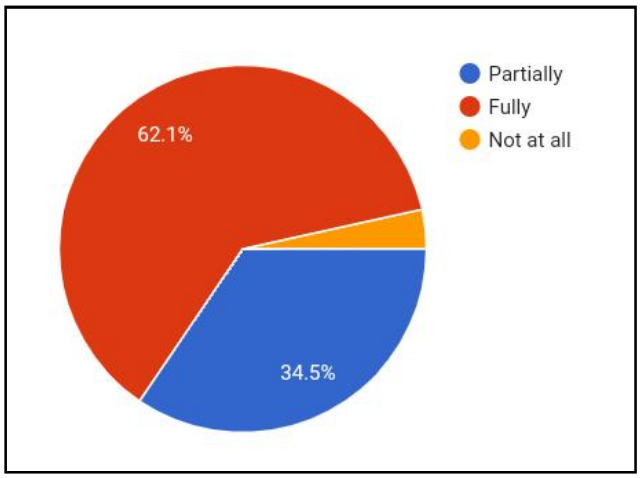

Chart1.3. The extent of understanding questions.

Q5 : The chart below exhibits how often students take part to express their thoughts when the teacher explained the lesson. Findings reveal that 55.2% of students were sometimes given chances to express their thoughts, 24.1% of them said that they never had chances. However, 13.8% of them were often engaged in the lesson, and 6.9% were always took part to express their thoughts.

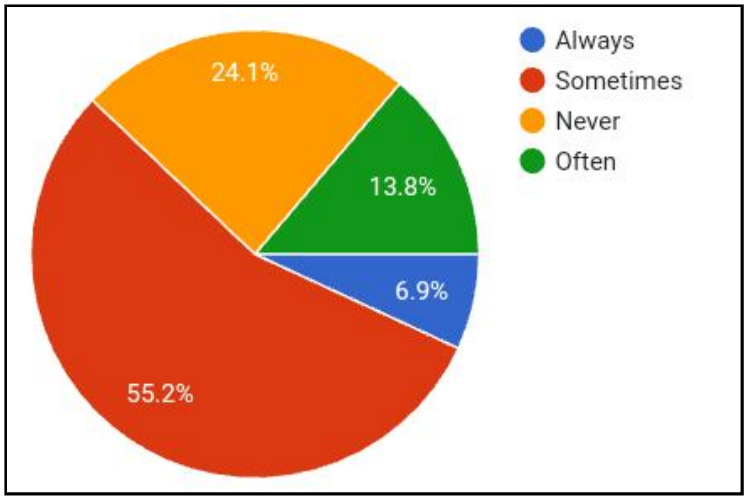

Chart1.4. Engaging Students in The Lesson.

- Q6 : Concerning the most useful techniques to develop critical thinking skills, the percentages were distributed as following: The majority of the students 75.9% relied on real conversations as most important technique, 69% of them put reading books at the second degree, and 34.5% of them selected free writing as one of the most helpful technique to develop critical thinking skills .

Q7 : The following chart represents whether critical thinking abilities create a link between teachers and students. Based on the statistics, It was found that 65.6% of students said yes, there exists a relationship, and 34.5% claimed that there a kind of relationship, however, no one said "No".

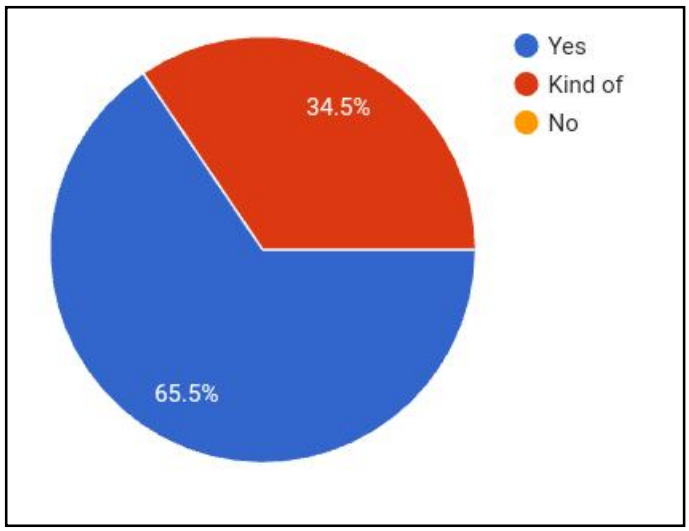

Chart1.5. Critical Thinking and The Relationship Teacher/ Student.

- Q8 : When the participants were asked about the role of critical thinking skills in their studies, the answers were positive. That is, It strengthens the relationship between the teachers and their students. Also, It develops the four skills which are necessary in the learning process. In addition, It helps them when solving problems so that they can interact quickly and respond in a very accurate way. Moreover, It allows them to analyze, decode, and dig deeper to understand the material to be studied. Finally, It boosts their capacities to do better even in mathematical reasoning tests.

- Q9 : When students were asked to choose the chronological markers, the answers were as following: 60.7% of students chose "First", and 21.4% of them selected "Next" as the second chronological marker, while, 10.7% failed and chose "But", and 7.1% selected "After that" as the last chronological marker.

  Q10 : Concerning this question, findings show that 100% of students succeeded in turning the sentence into reported speech as following: They claimed that junk food is harmful for health.

- Q11 : In this question, students showed divergent attitudes concerning the way the teacher explains the lesson. In that sense, some students claimed that the way their teachers use to explain the lesson is acceptable, quite helpful, and effective due to the fact that they use clear vocabulary and give their students a chance to take part during the explanation of the lesson. However, other students claimed that there are some teachers who do not really explain the courses rather they keep reading from papers. In addition, they think that their way is a bit complicated due to the varying levels of understanding since not all students are really competent in English.

- Q12 : Results reveal that the majority of students 100% succeeded in relating both clauses with if conditional as following: If you eat rotten food, you will have a serious indigestion.

- Q13 : It was found that the majority of students 100% reordered the segments correctly in a full sentence as following: Homemade food is healthier than fast food.

- Q14 : Concerning this question, students agreed upon the necessity for establishing English language as the first foreign language in Algeria due to three main reasons. First, It is popular among languages and establishing it as the first foreign language will be a great opportunity to cut the cord linking French language with our educational system. Second, they believe that it is an important step to cope with the whole world, despite the fact that it is a bit late but it reflects a real willing to change the political, social, and educational life in Algeria. Finally, when the establishment occurs, this will increase the chances of getting good jobs in multinational companies in Algeria as well as abroad.

3.2.3. Teachers' Questionnaire Analysis

The following results were achieved from the teachers' questionnaire.

- Q1 : In the first question, the findings concerning the purpose behind applying Bloom's taxonomy show that 50% of teachers claimed that the purpose is to enhance the students' knowledge, 37.5% of them said it is about recognizing the level of the students, while, 12.5% of them claimed that it is about directing teachers to achieve the designed goals of the course.

- Q2 : The following chart indicates whether Bloom's taxonomy is misused by teachers. Results reveal that 66.7% of teachers confirmed that it is totallymisused, and 22.2% claimed that it is somehow misused, while, 11.1% of them said that it is not misused.

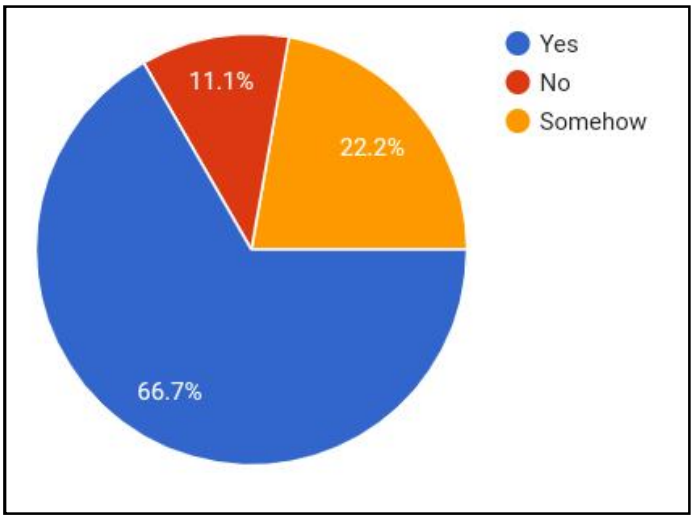

Chart2.6. The Misuse of Bloom's Taxonomy

Q3 : The findings show that 66.7% of teachers are a little bit applying Bloom's taxonomy. Moreover, 11.1% claimed that they apply it too much, and 11.1 % said that it is somehow applied, however, 11.1% said that they never apply it. This is shown clearly in the chart below:

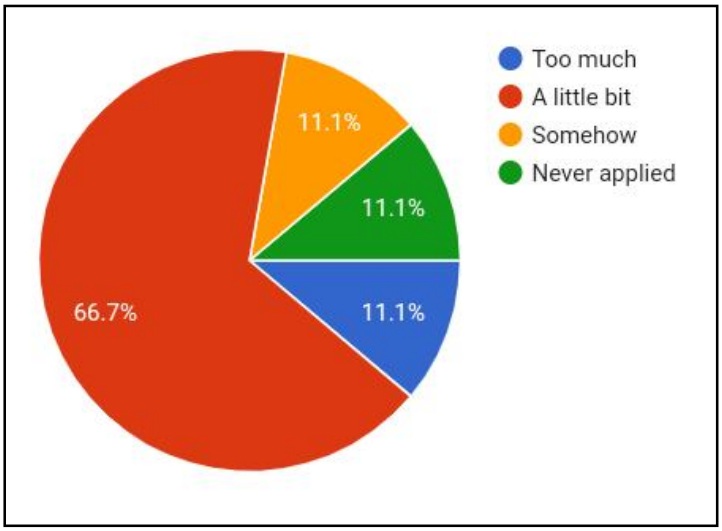

Chart2.7. Applying Bloom's Taxonomy

Q4 : This question is concerned with the effectiveness of using Bloom's taxonomy where all teachers agree upon its effectiveness because it is based on critical thinking and collaboration which are important for the learning process. In addition, It helps students to become more aware of the different cognitive skills such as reasoning, comprehension, and brain training. Moreover, It allows them to communicate and share their thoughts concerning different issues.

Q5 : The present chart exemplifies whether teachers consider the lower order skills and the higher order skills when preparing lesson activities. 88.9% of them claimed that they consider both skills, and 11.4% of them said that there is a little consideration, however, no one claimed that s/he do not take it into account.

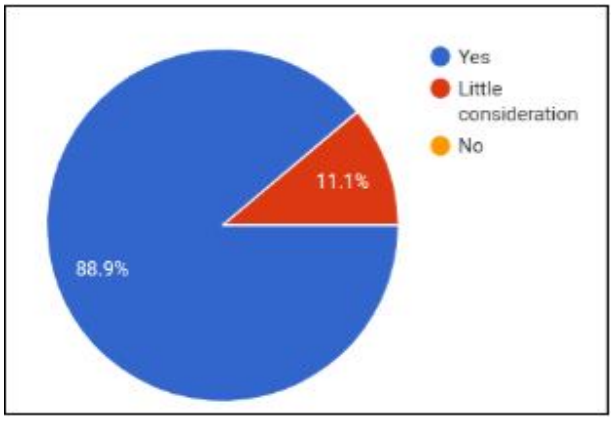

Chart2.8. The Lower Order Skills/Higher Order Skills of The Taxonomy .

Q6 : Concerning the factors that are considered by teachers when designing course activities, at the first position, teachers take into account the students' capacity of understanding. Then, they consider the level of students, and at the last rank they account for the time devoted for the course.

Q7 : It was found that 55.6% of teachers said that Bloom's taxonomy and critical thinking skills are interrelated, and 44.4% of them claimed that both variable, to some extent, are interrelated. These percentages are well explained in the following chart:

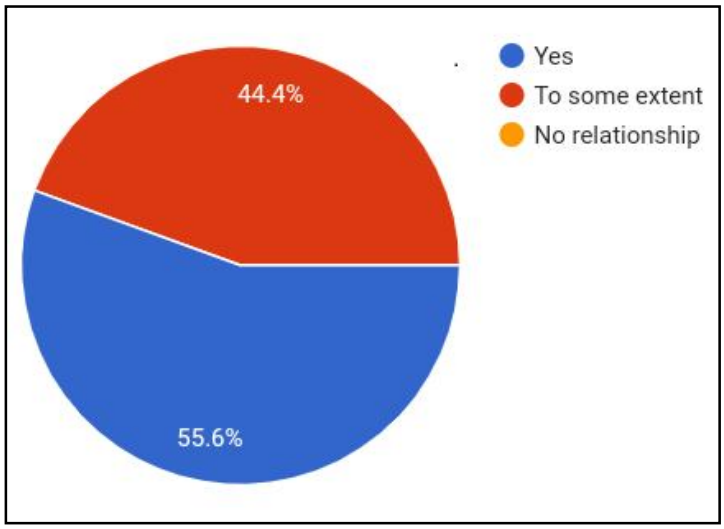

Chart2.9. Bloom's Taxonomy and Critical Thinking Skills Relationship.

Q8 : Results reveal that 75% of teachers use other additional approaches to enhance the learning process, while, 25% of them claimed they do not use any other approaches.

As examples of these approaches, they use the eclectic approach that is based on different methods to teach language. Moreover, they rely on Krashen and Vygotsky's theories of social interactions, in addition to the humanist approach that is based on the individual experiences.

Q9 : Concerning the definition of critical thinking, teachers have proposed different meanings. Some of them defined it as set of skills that form a well structured thinking. Moreover, others used the following terms, observation, inference, students' intelligence to indicate critical thinking. In addition, some others defined it as the use of logical thinking in the appropriate time, as well as, criticizing and not absorbing or memorizing rules.

Q10 : Results show that 62.5% of teachers claimed that their students are sometimes practicing critical thinking in the classroom, 25% said that they are not really practicing it , and 12.5% their students are often practicing it, whereas, none said they never practice these skills, this is well explained in the following chart :

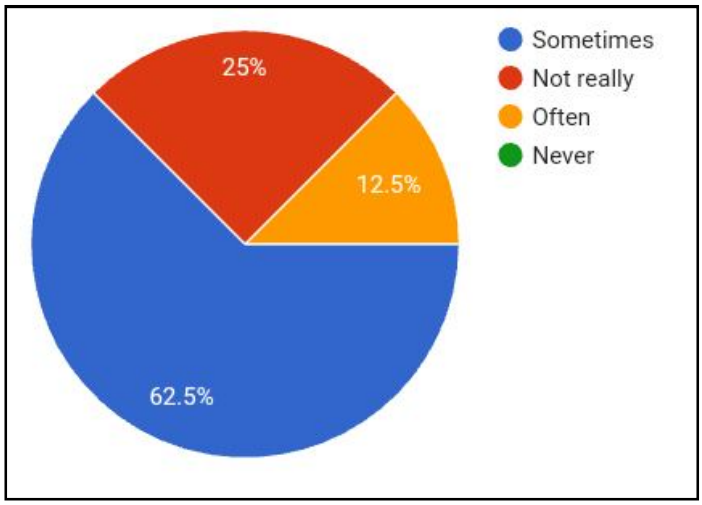

Chart2.10. Practicing Critical Thinking in The Classroom

- Q11 : It was found that 57.1% of teachers agreed upon the need for teaching critical thinking skills for students, and 42.9% of them strongly agreed, whereas, none showed disagreement for the necessity of teaching critical thinking skills for students.

- Q12 : Concerning this question, statistics show that 83% of teachers believed that their students give sound and logic answers with evidence which let them guess they use critical thinking skills. 50% claimed that their students defend an argument from their point of view, whereas, none chose posing relevant questions.

- Q13 : In this question, mainly all teachers agreed upon the positive influence that critical thinking plays in the classroom. Critical thinking develops judgment and allows students to defend their ideas logically with strong arguments. In addition, It helps them to be autonomous, so they can learn by themselves outside the classroom. Finally, It improves problem solving abilities and helps in decision making.

- ❖ Q14 : Results reveal that 77.2% of teachers give their students instructions to read texts then answer questions about comprehension in order to enhance their critical thinking abilities, 55.6% of them engage their students in role plays, while, 22.2% provide their students with keywords or guidelines, and 22.2% give them preference to choose the topic they want to study.

- ❖ Q15 : The chart below indicates the necessity for highlighting critical thinking skills in the course, where 66.7% of teachers supported the idea. However, 22.2% rejected it, and 11.2% chose to highlight critical thinking abilities a lot in the course.

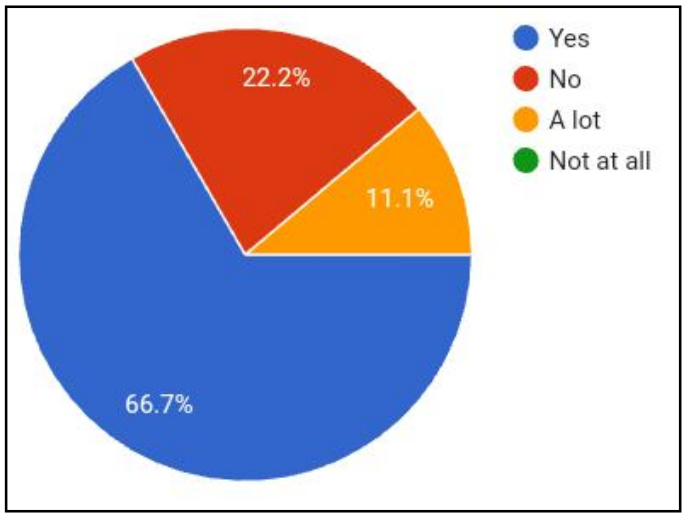

Chart 2.11. Highlighting Critical Thinking Skills.

- Q16 : Concerning this question, there are certain factors why students cannot show their abilities in the context of critical thinking. At the first rank, teachers believe that the lack of language mastery is the major factor. In the second position, comes shyness then the lack of understanding and application skills. At the last rank, there is a little engagement in classroom discussions.

3.2.4. Discussion

The primary underlying concern of this study is whether the implementation of Bloom's taxonomy can best help to assess the students' critical thinking skills. Based on the questionnaires analysis, both students' and teachers findings may be summarized as follows:

The students' questionnaire results have revealed that the majority of students agreed upon the importance of critical thinking skills in their learning process. That is, they took chances to express their thoughts in the classroom in which they practice their abilities of analyzing, decoding, and digging deeper in the constituents of the material to be studied, as well as , they could solve a problem through classroom interaction which enable them to build set of skills such as appraising arguments and being open-minded as a result of practicing their critical thinking abilities. This result goes in parallel with Mc Peck (1981) who found that critical thinking skills can be obtained through drills, exercises, and problem solving.

In the second part of the questionnaire, the majority of the students succeeded in applying the six cognitive skills of Bloom's taxonomy through the tasks provided. The first question indicates knowledge which is the foundational cognitive skill. The aim behind this question is to recall specific piece of information that students have previously studied. The second question refers to the second level of the taxonomy that is comprehension. Here, students are expected to demonstrate an understanding of facts and ideas. Moreover, the third question is about application. At this level, they are required to use pre-learned information in a slightly different way, perhaps by applying it within a variety of new circumstances. Moving to the fourth question that indicates analysis. Here, they are expected to break down an information needed into its component parts in order to identify the most appropriate structure. The fifth question identifies synthesis. Here, It is demanded that students use their own ideas to provide solutions to problems or create novel products in specific situations. Finally, the sixth question refers to the highest level of the taxonomy which is evaluation. This typically involves criticizing the other people's ideas and making judgments based on theories and statements. In this context, it is essential that students defend certain issues and provide reasons for and against. Thus, Bloom's taxonomy should be applied effectively in order to reach the designed objectives.

The optimist result achieved through the teachers' questionnaire indicates that most of the teachers are aware of the effectiveness of implementing Bloom's taxonomy in the classroom. In the

same direction, Rodney (2003) suggested that students approach organic chemistry classes try to just manage or memorize the material rather than understand it. The study recommends the use of Bloom's taxonomy as a way to increase comprehension and gives an example of how to use it in an organic chemistry classroom.

Moreover, teachers emphasized on the crucial need to teach students the different critical thinking skills due to its great importance in their learning process and even in their professional life in the future. Finally, they strongly affirmed that there exists a strong relationship between Bloom's taxonomy and critical thinking skills due to the fact that Bloom's taxonomy is based on critical thinking skills such as reasoning and comprehension. This result goes under the light of the study conducted by Athanassiou & Harvey (2003) on critical thinking in the management classroom through applying Bloom's taxonomy as a learning tool. The study discussed the use of Bloom's taxonomy as a metacognitive framework for the students centered management class. Results emphasized the necessity of using Bloom's taxonomy to reach the designed objectives.

4. Conclusion

This chapter focused on data gathering and analysis, it provides a brief analysis and discussions of the collected data from questionnaires with a comprehensible analysis of the results obtained. Based on this result, it is proved that critical thinking skills are very essential for students in their learning process. In addition, the effective application of Bloom's taxonomy helps in developing, as well as, assessing the students' critical thinking skills.

General Conclusion

The current study is conducted to analyze the application of Bloom's taxonomy as a model to assess and develop the students' critical thinking skills.

This work was divided into four chapters to reach the aims that have been designed. For reviewing the literature, two chapters have been included. From one hand, in the first chapter, we reviewed the previous studies about the definitions of critical thinking according to different disciplines and the main obstacles faced when it comes to assessing it. In the other hand, we reviewed what have been said by scholars in the second chapter concerning Bloom's taxonomy and the major criticisms that have received. However, the third chapter was about gathering relevant data through both questionnaires. Then the last chapter was about analyzing the obtained data, in addition to interpreting the results.

Based on this, results helped us to confirm the proposed hypothesis that claims that the effective implementation of Bloom's taxonomy by teachers helps in developing, as well as, assessing the students' critical thinking skills due to the strong relationship that exists between thosevariables. Thus, teachers emphasized on the necessity of using Bloom's taxonomy in the classroom to teach students the basic critical thinking abilities.

This study comes across some difficulties that limit the process of investigation. At the beginning of the research, the case study was oriented towards Third year students of foreign languages stream at Secondary School and the questionnaire that have been designed for this specific population was translated into Arabic in order to help them understanding the questions because they are not competent enough in English. When we were about administering the questionnaire, the quarantine have started. Due to this reason, we made the questionnaire online but students did not really answer it and they left many questions without answers. This process took approximately two months of waiting for answers.

In fact, the continuous term of Corona pandemic led us to change the case of study. We have chosen Third year LMD students of English at Abbes Laghrour University as a sample and we have reshaped the questionnaires and made few changes then we shared them online.

Another limitation is the lack of the personal computer, thus we have faced problems especially with typing. Moreover, the lack of means of transportation prevents us from going to the cyber coffee in order to solve the problem of typing our dissertation.

To conclude, we recommend that the topic of the implementation of Bloom's taxonomy to assess the students' critical thinking skills should be replicated using the experimental design because the mixed method design did not really help us to get our goals accomplished and we did not attain the wished results. Also, we suggest that teachers should use Bloom's taxonomy largely and encourage students to use it when it comes to teaching the basic cognitive skills needed for students due to the positive impact that have on them in their learning process.

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Appendix A : Students' Questionnaire

To help us with our research, we would like you to answer some questions concerning our study: **the Implementation of Bloom's Taxonomy of Educational Objectives to Assess Students' Critical Thinking Skills.** Bearing in mind that all information collected will be held in strictest confidence. The questionnaire will take approximately 10 minutes to complete. Thank you for your time and participation.

Part one:

Critical thinking skills refer to the ability of understanding, solving problems, making decisions and expressing thoughts about an issue.

1/Do you think the mentioned skills are necessary in your learning process?

☐ Yes ☐ No ☐ A lot ☐ Not at all

2/How often does your teacher give you a chance to answer questions in one session?

☐ Never ☐ once ☐ twice ☐ more than three times

3/Which of the following strategies do you think are helpful when solving a problem:(you can choose more than one option).

☐ Classroom interactions

☐ Group discussion

☐ Individual work

4/When your teacher asks a question, to what extent do you understand?

☐ Fully ☐ partially ☐ not at all

5/When your teacher explains the lesson, do you take part to express your thoughts?

☐ Always ☐ Sometimes ☐ Often ☐ Never

6/According to you, which of the following items are most important in developing critical thinking skills? (You can choose more than one option).

☐ Free writing ☐ Reading books ☐ Real conversations

7/ From your regard, do you think critical thinking abilities create some sort of relationship between you and your teacher?

☐ Yes ☐ No kind of ☐

8/Based on the previous answers, how can critical thinking skills help you in your studies?

.....

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PART TWO:

Bloom's Taxonomy is a series of cognitive skills that are used to teach critical thinking skills.

9/ According to your previous knowledge, which of the following are chronological markers?

☐ First ☐ But Next ☐ After tha ☐

10/Turn the following sentence into reported speech:

They claimed: "junk food is harmful for health"

……

11/What do you think about the way your teacher uses in explaining the lesson?

……..

……..……

……..

……

12/Relate the following sentences using if conditional:

A. Eat rotten food. B. have a serious indigestion.

……..

13/Reorder the following segments to have a meaningful sentence: is healthier / fast food / homemade/ food / than

……..

14/Write a small paragraph to express your opinion towards establishing English as the first foreign languagein Algeria.

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Appendix B : Teachers' Questionnaire

To help us with our research, we would like you to answer some questions concerning our investigation which is about: **The Implementation of Bloom's Taxonomy of Educational Objectives to Assess the Students' Critical Thinking Skills.** Bearing in mind that all information collected will be held in strictest confidence. The questionnaire will take approximately 10 minutes to complete. Thank you for your time and participation.

Part one:

1/According to you, why is it important for teachers to apply Bloom's Taxonomy? you may choose more than one option

☐ Recognizing the level of students

En☐ncing their knowledge

☐ Directing teachers to achieve the designed goals of the course

2/From your perspective, do you think that Bloom's taxonomy is misused by some teachers?

☐ Yes ☐ No ☐ somehow

3/To what extent do you apply Bloom's taxonomy in your courses?

☐ Too much ☐ little bit ☐ somehow ☐ not used

4/How would you describe the effectiveness of using Bloom's taxonomy?

……..

……..

……..

5/Do you take into account, when preparing activities, the lower order skills and higher order skills of the taxonomy?

☐ Yes ☐ Little consideration ☐ No

6/How could you classify the following factors from 1 to 3 when designing course activities:

☐ The level of students

T☐capacity of understanding

☐ The time devoted for the course

7/According to you, do you think critical thinking skills and Bloom's taxonomy are interrelated?

☐ Yes ☐ To some extent ☐ No relationship

8/From your perspective, are there other approaches or models used in addition to Bloom's Taxonomy to enhance the learning process?

☐ Yes ☐ No

- Would you explain more?

……..

……..

……..

Part two:

9/From your regard, what is critical thinking?

……..

……..

10/Do your students practice critical thinking in the classroom?

☐ Sometimes ☐ Not really ☐ Often ☐ Never

11/From your perspective, students need to be taught critical thinking skills:

☐ Agree ☐ Strongly agree ☐ Disagree ☐ Strongly disagree

12/How do you guess that they use critical thinking skills?

a. Giving sound and logic answers with evidence. ☐

b. Defending an argument from their point of view. ☐

c. Posing relevant questions. ☐

13/According to you, what role does critical thinking play in your classroom?

……..

……..

……..

14/From your experience in teaching, which of the following ways are used to enhance critical thinking skills in your lesson .

a. Provide students with keywords or guidelines. ☐

b. Using role plays. ☐

c. Reading texts and answering questions about comprehension. ☐

d. Giving them preference to choose the topic they want to study. ☐

15/According to you, do you think that critical thinking skills should be highlighted in the course?

☐ Yes ☐ No ☐ A lot ☐ Not at all

16/Please rank the following factors from (1-4) concerning why students cannot show their abilities in the context of critical thinking.

☐ Shyness

☐ Lack of language mastery

☐ Little engagement in group discussions

☐ Lack of understanding and application skills

تلخيص

تهدف هذه الدراسة الى تقصي وتحليل التغيرات في تطوير مهارات التفكير النقدي لدى الطلاب كرد فعل لتطبيق تصنيف بلوم للأهداف التعليمية. لهذه الغاية، استخدم الباحث استبيانين كأداتين لجمع البيانات. يهدف الإستبيان المصمم للطلاب بشكل أساسي إلى إختبار المهارات المعرفية المختلفة للطلاب بناءًا على المستويات الستة لتصنيف بلوم، بالإضافة إلى اسئلة أخرى متعلقة بقدرات التفكير النقدي، مع ذلك، فقد تم تصميم استبيان للمعلمين من اجل التحقق من مدى تطبيق تصنيف بلوم في الفصل الدراسي من أجل الوصول إلى الأهداف المُسطرَة للدرس و إشراك الطلاب في عملية التعلم من خلال ممارسة مهارات التفكير النقدي الخاصة بهم. تم تحليل البيانات التي تم الحصول عليها كميا و نوعيا. كشفت نتائج الدراسة انه عندما يتم تطبيق تصنيف بلوم للأهداف التعليمية بشكل أفضل و استخدامه بشكل فعال من قِبل المعلمين، سيساعد ذلك في تقييم وتطوير مهارات التفكير النقدي لدى الطلاب و هذا راجع إلى العلاقة القوية القائمة بين المتغيرات المذكورة.

الكلمات المفتاحية : بلوم، المهارات المعرفية، معارات التفكير النقدي، التنفيذ، عملية التعلم.

Abstract.

The present study intends to investigate and analyze the changes in the development of the students' critical thinking skills as a reaction to the implementation of Bloom's taxonomy of educational objectives. For this purpose, the researcher used two questionnaires – one administrated to students and the other to teachers - as instruments for collecting data. Basically, the questionnaire designed for the students aimed at testing their different cognitive skills of the students based on the six levels of the taxonomy, in addition to the questions which are related to critical thinking abilities. However, the questionnaire designed for the teachers was for the sake of checking the extent to which they apply Bloom's taxonomy in the classroom in order to attain the underlined goals of the course and to engage students in the learning process through practicing their critical thinking skills. The data obtained were analyzed quantitatively and qualitatively. The results of the study revealed that when Bloom's taxonomy of educational objectives is better applied and used effectively by teachers, it helps in assessing and developing the students' critical thinking abilities due to the strong relationship that exists between the mentioned variables.

Keywords: Bloom's taxonomy, Cognitive skills, Critical thinking skills, Implementation, The learning process.