

## Investigating the Effect of Integrating a Computer-Based Technique on College Learners' Reading Comprehension Skills in Literary Texts: The Case of IRIS College Pupils, Bejaia, Algeria

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**ABSTRACT:** *This paper is a longitudinal survey, interested in tracing in detail some aspect of foreign language development in the reading comprehension of literary texts by means of the computer-test taxonomies technique. It aims at examining the progress of a set of college learners in comprehension rate, micro-skills, plus macro-skills, before, during, and after the inclusion of the technique. Accordingly, the study is concerned with answering the issue of what impact does the implementation of the computer-test taxonomies technique during literary texts sessions have on college learners' reading comprehension skills? The body of this research project is built upon five further sub-questions: How effective is the teaching of literary texts using the computer-test taxonomies technique? What do learners perceive as the most significant impact of the integration of the technique on their reading comprehension skills? Does the intervention have an effect on how learners process literary texts comparing to the former teaching contexts? What determinants of teacher performance in using the technique to attain better outcomes? Are the results obtained sufficiently convincing to be generalised to other settings and target college pupils? As a presupposed answer for the major question, we hypothesise that 'participants who receive the intervention of the computer-test taxonomies technique will show a significant progress in reading rate, bottom-up, and top-down skills from baseline to post-intervention follow up'. The findings highlight the noteworthy contribution of the technique to learners' reading comprehension skills and reading motivation as well.*

**KEYWORDS :** Reading comprehension , literary texts , computer-test taxonomies technique , comprehension rate , micro-skills , macro-skills

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## **Introduction**

At IRIS College, learners begin studying literary texts in English language from first year middle school till third year secondary school. These literary texts are chapters from novels designed to the different levels of learners. Each level has to deal with two distinct novels during the whole academic year. After various sessions of observation and reading comprehension tests, we have concluded that for the largest majority of pupils, at the different levels, these texts are deemed quite arcane subject areas. In addition, the more these pupils go further to higher levels, the more intricate the novels are, which exacerbates learners' problem of comprehension. As a teacher at the college, this disquieting situation has motivated us to find an inventive remedial solution to our struggling readers by means of ICT tools. From the time when the IRIS College has two well-equipped multimedia laboratories, provided with computers which are ICT tools internationally ubiquitous, we have decided to use an amalgam of computer-based instruction and testing as the groundwork of the solution.

Accordingly, we have developed a computer-based teaching technique to teach literary texts to college pupils, in the Algerian context. To collect adequate and valid data, obtained from learners' authentic experiences, on the effect of the technique on their reading comprehension skills, a questionnaire has been designed to the experimental group. The paper commences with some critical insights into reading comprehension teaching and testing by means of computer-assisted instruction. Subsequently, we proceed to research agenda, interpretation and analysis of the questionnaire, discussion of the results, and finally conclusion.

## **I. A Historical Sketch**

### **I.1. Computers to Improve Readers' Comprehension Skills**

With respect to James' (2014) standpoint, implementing computers in classrooms offers a healthy, prosperous environment that keeps readers engaged in reading activities. Computer-assisted instruction molds the process of learning according to every reader's distinctive needs by means of supplementary practice in reading and implementing individual instruction. Integrating a computer in a one-on-one setting enables English language learners to develop into more active learners and build long-term recall of vocabulary. Hans and Hans (2013) assert that computerised vocabulary devices improve second language learners' comprehension; moreover, computer-assisted instruction teaches basic reading skills to struggling readers. Hans and Hans propound that a key type of interaction which is recurrently attributed to reading is the interaction between the individual reader and the text. Here, the computer plays the role of an assistant tool that supplements the printed page or other teaching material, yet it does not afford the total learning environment. Therefore, computers develop various interactive functions: interaction between man and machine, between people, plus between reader and text.

Kledecka-Nadera (2001) cites a range of benefits when integrating computers during reading comprehension classes. She stresses firstly the individualised instruction that computers offer. Because learners differ in their learning styles as well as their reading skills, computer use permits readers to work at their own space. In such a way, poor readers can catch up while the good ones can immerse themselves in additional tasks. Next, computers display the texts in a plenty of attractive ways such as implementing animation and sound which make both the text and reading more interesting. Computer-assisted instruction during reading comprehension sessions fosters comprehension abilities and boosts reading speed (AlKahtani, 1999; Elkind, 1998; Kulik, Bangert, & Williams, 1983).

The use of computers to teach reading comprehension is also crucial in fostering reading motivation as one of the decisive factors of successful comprehension. In this vein, Liu (2016) has conducted a study in which he has questioned teachers: 'Why did you choose to use technology in your lesson?' Half of the informants have related their choice to the fact that computer-assisted instruction promotes learners' engagement and motivation, plus it aids teachers to make further literature-based connections which are more amusing and appealing to learners. Hairul, Ahmadi, and Pourhosein (2012) state that the perceptible impact of reading

motivation which results from computer use affects all facets of reading comprehension strategies under various conditions. Likewise, Ciampa (2012) states that motivated readers show much more abilities in their reading skills, counting advanced vocabulary use, comprehension ability and critical thinking. Greenlee-Moore and Smith (1996) conclude that learners who read condensed and complex texts presented electronically show higher reading desire and reading comprehension aptitudes.

### **I.2. Computers to Teach Literary Texts**

Literary pieces of writings are not simply sources of valuable authentic material, cultural enrichment, language enrichment and personal involvement, but also motivating material and incentive factor to develop learners' interpretative abilities (Collie & Slater, 1987; Lazar, 1993). In the era of technology, electronic literature which refers to traditional literature converted to e-literature has been brought to the surface (Koskimaa, 2003). E-literature is related to multimedia devices which permit teachers to add sound, images, and videos to animate their written materials by means of computers. According to Kaba (2017), the growth of multimedia which covers hypertext and e-books has engendered a paradigm shift in the field of literature resulting in revolution in the way of writing and reading.

Consequently, teachers of literature can exploit computers in a variety of ways to present their lessons. The crux of using computers to teach literature is in founding a learning environment where a variety of means can be used, such as text, image, sound, plus the possibility of an interaction between the reader and the machine in order for dynamic learning environments to occur. These, in their turn, will contribute to the application of the latest education theories (βακαλούδη, 2003, p. 28).

Teaching literature by means of a computer-based instruction can appreciably contribute to the development of positive conditions for the reception of a literary text in a classroom. Besides, computers can be employed as a tool of exploration and discovery rather than a repository of knowledge from which the learner will learn (Wang & Liu, 2003, p. 121).

### **I.3. Computers to Test Reading Comprehension Skills**

Applying computerised versions of tests in education is increasingly adopted in many schools, colleges, universities, and institutions all over the world. Assessing and testing learners' skills and language competence via computers, including reading comprehension dexterities, is what so-called 'computer-based assessment' is (CBA). This latter aims to invigorate the effectiveness of test administration and scoring as well as to guarantee the standardisation of testing procedures. Moreover, CBAs provide innovations in test administration which cannot be applied with paper and pencil tests, including embedded accommodations and modifications (Parshall, Davey, & Pashley, 2000).

Noyes and Garland (2008) relate the pervasive integration of computer-based tests to their quick and objective results and the effortlessness of comparing the results with others. Noyes and Garland detail the advantages and the shortcomings of employing computers in testing, covering tests of reading comprehension and other language skills, basing on investigations made by other researchers.

Further studies have demonstrated that this type of tests is characterised by cost-effective administration, ease of administration, more accuracy, immediacy of scoring and reporting, plus flexible test scheduling and location (O'Malley, Kirkpatrick, Sherwood, Burdick, Hsieh, & Sanford, 2005; Poggio, Glasnapp, Yang, & Poggio, 2005). Fleming and Hiple (2004) acknowledge that computer-based tests have become inevitable in academic contexts, particularly from the time when the language proficiency standard tests such as TOEFL and IELTS have been changed into computerised formats. Therefore, learners are supposed to have acquaintance with and to practice computerised versions of tests before undertaking such proficiency test modes.

## **II. Research Agenda**

### **II.1. Description of the Technique**

The technique we have developed is termed 'Computer-Test Taxonomies Technique'. It draws on an eclecticism of teaching approaches and models, videlicet: the interactive approach of bottom-up and top-down models, the language-based approach, the reader-response approach, the integrative testing approach, plus the two technology models used to assist struggling readers, that is technology as an integral part of the teaching process and technology as a means to adjust skill shortages happening with at-risk learners and those with mild disabilities. The disabilities can be phonological deficits, processing speed/orthographic processing deficits, or comprehension deficits (Moats & Tolman, 2009). Moreover, the computer-test taxonomies technique is based on the use of computers to display text content and taxonomies of test questions (computerised texts and tests), and to correct learners' answers, except the section of essay writing which is corrected by the teacher. To manipulate the computers according to the experiment criteria and conditions, we have utilised the AceReader Pro 8.2 software. Additionally, this technique is built on:

- a- Regular informal tests on 16 literary texts from the novels *The Phantom of the Opera* and *The Tempest* which are included in the school curriculum. The informal tests serve to check the applicants' strengths, abilities, underlining difficulties, and progress during the application of the technique, with slight learner anxiety feeling. The literary texts comprise eight (N=8) chapters from the novel *The Phantom of the Opera* by Gaston Leroux (1910), adapted by H.Q Mitchell and Marelina Malkogianni (2005) plus eight (N=8) other literary texts from the novel *The Tempest* by William Shakespeare (1623), adapted by H.Q Mitchell (2008).
- b- Timed readings (15 mins at maximum to accomplish reading each text).
- c- Taxonomies of various types of questions that activate bottom-up and top-down comprehension skills.

**Note:** Throughout the whole study, the terms comprehension rate / reading rate, micro-skills/ bottom up skills, and macro-skills/ top-down skills are used interchangeably.

## II.2. Research Approach

Since this study is based on establishing a cause-and-effect relationship between computer-test taxonomies technique and struggling readers' comprehension skills in literary texts, the quantitative approach is the most appropriate in our context. In this paper, a questionnaire as a research tool is employed to collect additional data than that collected during the experimental manipulation. Hence, the need for the quantitative approach which allows us to quantify the candidates' attitudes, opinions, behaviours, and other defined variables and which permits us to generalise results to a larger sample population, then to formulate facts and uncover patterns (DeFranzo, 2011) presented in learners' answers to the questionnaire is requisite.

## II.3. Research Design

This part of our research work is a survey in which a questionnaire is devised for the experimental group with whom the computer-test taxonomies technique has been implemented. The survey follows the characteristics, the changes, and the development in our applicants' comprehension skills in literary texts as well as learners' preferences, opinions, and beliefs before, during, and after the application of the technique. This implies that the current study is a longitudinal research, based on a survey, using quantitative approach and data collection method.

## II.4. Research Method

To amass in-depth data, to reveal new information, and to create better understanding of the issue under investigation, we have devised a questionnaire to the experimental group which has undergone the implementation of the computer-test taxonomies technique. Since this captive audience is our own learners, we have followed the collective administration way to administrate the questionnaire.

## II.5. Sampling Method

The survey we are carrying out throughout this research work is restricted to a representative sample rather than to the whole population or the census. The representative sample includes the pupils in the experimental group to whom we have introduced the computer-test taxonomies technique. The sampling method we have opted for is the probability sampling method, particularly the simple random sampling

method. The sample is group two (2) of first year college pupils, at the IRIS College, wilaya of Bejaia. The group contains twenty (N=20) pupils.

## II.6. Materials

A structured questionnaire that comprises four sections. The three first sections include a mixture of question types, viz.: dichotomous questions (Yes/No), multiple choice questions, scaling questions, plus open-ended questions. However, the last section involves only one single open-ended question.

## II.7. Procedures for Collecting and Treating Data

a- The questionnaire has been divided into three parts that pursue the applicants over stages of progress, scilicet a set of questions before introducing the technique, during the application of the technique, then after the implementation of the technique. The three parts are presented in one questionnaire as it is shown in what comes later. The questionnaire has been administrated during the academic year 2021/2022.

b- All through the three stages, the instructor has administered the questionnaire to the learners of the experimental group face to face, providing details and explanations when required or asked by the participants.

c- The informants have been given enough time to answer the questionnaire anonymously, freely, and appropriately without restrictions.

d- In view of the fact that the subset of informants is small in number (N=20), plus the variety of design and answer sets of the questions, we have opted for the manual analysis of the respondents' answers rather than using the statistical software as SPSS or STRATA.

## III. Analysis and Interpretation of the Questionnaire

### III.1. Learners' Primary Perspectives before the Experimental Manipulation

**Question one, part one:** Do you like reading literary texts in English?

- a. Yes
- b. No

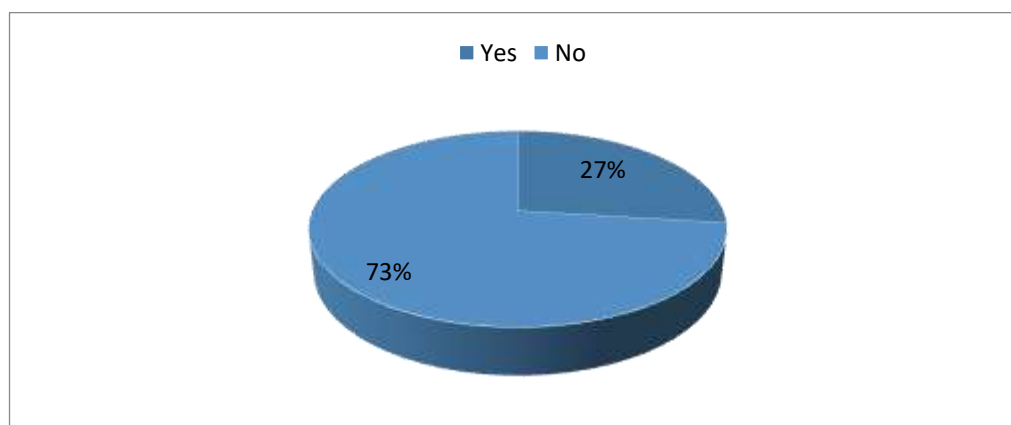


Figure 1. Learners' Attitudes towards Reading Literature in English

This question opens the first section of the questionnaire, which has been administrated before the introduction of the computer-test taxonomies technique. This part, in addition to classroom observations, represents the piloting questionnaire necessary to limit the scope and the nature of the major problem of this study and to amass data about learners' primary profile in the reading comprehension of literary texts. The aim of this question is to find out what beliefs and feelings our participants have towards reading literary texts. The informants' answers show that the largest majority (73%) do not like reading literature



in English while (27%) of them express their positive feelings. This may reflect that most of the experimental group members lack prior readiness and motivation to deal with literary texts in English language.

**Question one, part two:** If “No”, please state why:

- a. Because you do not like literature.
- b. Because you have difficulties in understanding literary texts.
- c. Because the language and the style used in literary texts are difficult.
- d. Because they are not interesting.
- e. Others.....

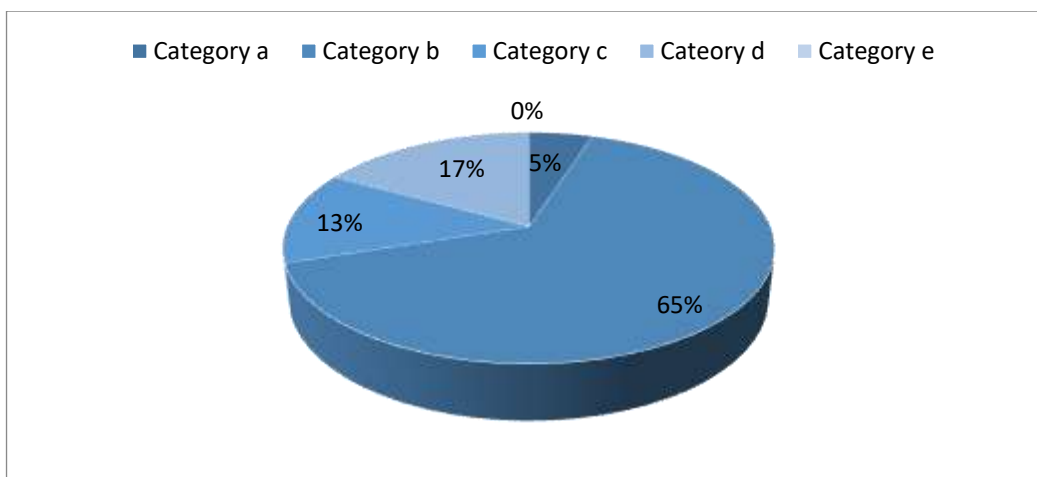


Figure 2. The Reasons behind Learners' Dislike of Reading Literature in English Language

This question is a follow-up of the preceding one. It tries to determine the reasons why a set of learners have opted for the option “No” in the first question. A minority of them (5%) state that they do not like reading literary texts in English since they do not like literature as a subject. More than half (65%) explain that because of the difficulties they have in understanding literary texts, they tend not to like reading literature in English. A percentage of (13%) of the applicants view that the complex nature of the language and the style used in literary texts makes them avoid reading literary texts in English. The rest (17%) consider literary texts in English as uninteresting. However, there is (0%) for the option “Others”. The reasons in general may reflect less efficient teaching methods and learning strategies that need to be boosted.

**Question two:** Have you ever read novels in English or in other languages?

- a. Yes
- b. No

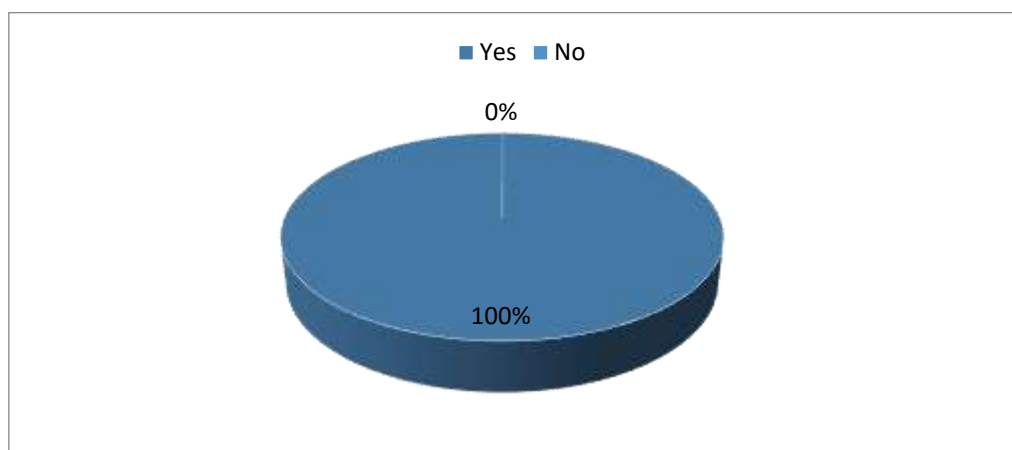


Figure 3. Learners' Background Knowledge on Novels

Question two seeks to reveal whether our informants have general background knowledge about novels and their structure or not. The whole experimental group members (100%) declare that they have already dealt with novels either in English or in other languages. Indeed, this subset of foreign language learners of English treats novels in both French and Arabic languages as part of their syllabi during middle and college school years of study. Hence, the factor of lack of schema on novels and novels plot and organisation which affects learners' reading comprehension may be eliminated.

**Question three, part one:** Have you been taught literary texts in English before this year?

- a. Yes
- b. No

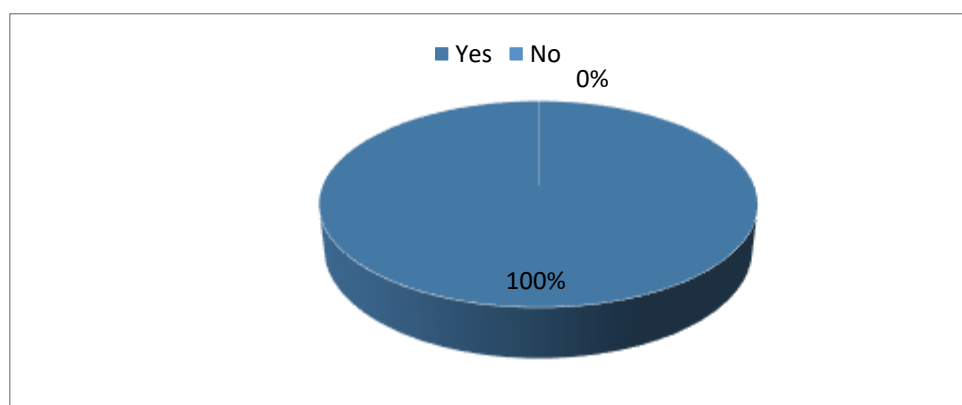


Figure 4. Learners' Previous Lessons on Literary Texts in English

Question three is concerned with whether our applicants have already undergone courses on literary texts in English or not, plus it introduces the second part of this question as well. The whole group (100%) has been taught literary texts in English. It is because pupils at IRIS College have two different syllabu during each academic year of study, the first covers the national programme while the second involves an English programme (Full Blast); therefore, they have undergone a variety of text types including literary texts. This may help the learners to compare between previous methods of teaching and the one they are undergoing this year.

**Question three, part two:** If "yes", please explain how your teachers have instructed the lesson: (you can cross more than one box)

- a. The teacher gives you a literary text to be read with some questions to be answered on the text itself, and on some social, cultural, and ideological aspects as well. Then in classroom, he asks some of you to read the text, he explains, and answers the questions with you.
- b. The teacher asks you to read the text in class, then gives you a set of exercises on reading comprehension, grammar, writing, speaking, and/or listening.
- c. The teacher asks you to read the text at home or in class, then he asks you some comprehension questions on the text, the main idea and supporting ideas, what you like or you do not like in the text, whether you agree or disagree with the author, plus commenting on the text or on a part of the text.
- d. Others.....

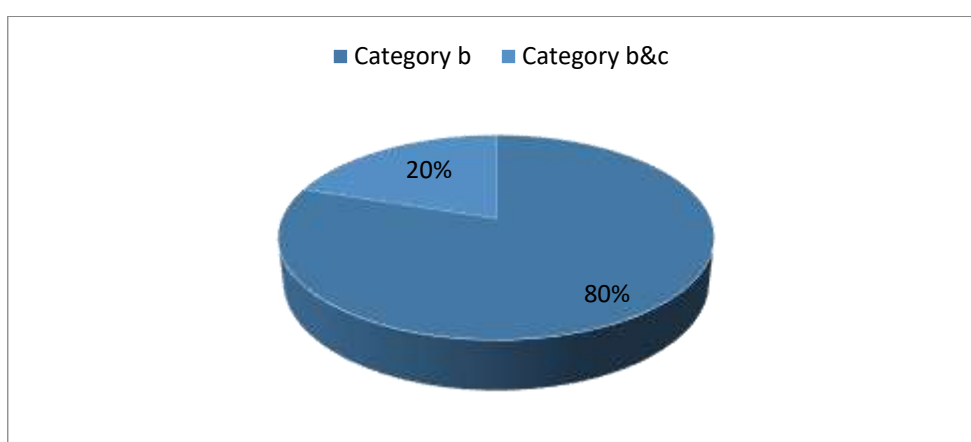


Figure 5. Learners' Earlier Experiences with Teaching Methods of Literary Texts

The objective of this question is to recognise the type of methods in teaching literary texts that our participants have experienced during the preceding years. The responses show that the largest majority (80%) have been taught literary texts using 'language-based method' (category b) whilst the other (20%) have undergone two different methods: 'language-based method' and 'reader-response method' (category b and c). Yet, there is no answer (0%) for the categories (a) and (d). It is obvious then that there is more tendency to teach literary texts via the language-based method wherein the focus is on developing learners' drills in English language rather than on literary skills.

**Question four :** Do you think that the previous teaching method (s) has helped you to develop your reading comprehension abilities?

- a. Yes
- b. No
- c. To some extent



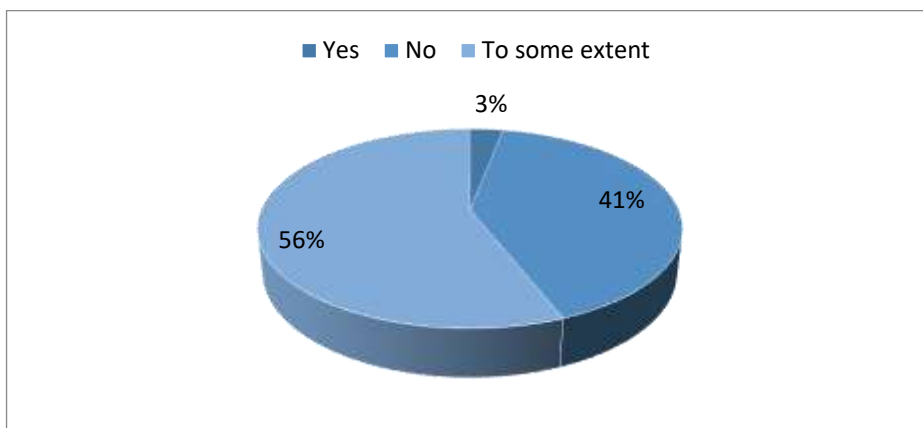


Figure 6. Learners' Beliefs on the Contribution of the Previous Teaching Methods in Developing their Reading Comprehension Abilities

The current question tries to uncover the informants' ideas about whether the teaching methods during the preceding years have contributed to their own progress in reading comprehension skills or not. Only (3%) who admit the contribution; whereas, about the half (41%) express their dissatisfaction with the preceding methods and more than the half (56%) proclaim that there is some kind of contribution. These percentages may reflect deficiencies in the teaching methods which have affected learners' competencies in comprehending literary texts.

**Question five, part one:** According to your answers to questions (3 & 4), would you please give a mark from 0 to 10 to evaluate the method (s) your teachers have used to teach you literary texts?

- Method a: 0 1 2 3 4 5 6 7 8 9 10 (.....)
- Method b: 0 1 2 3 4 5 6 7 8 9 10 (.....)
- Method c: 0 1 2 3 4 5 6 7 8 9 10 (.....)
- Others: 0 1 2 3 4 5 6 7 8 9 10 (.....)

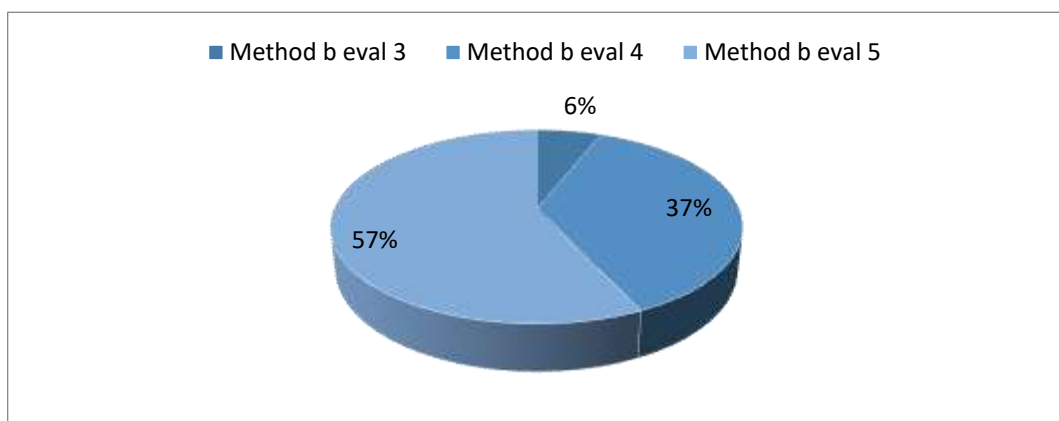


Figure 7. Learners' Evaluation of the Teaching Method (b)

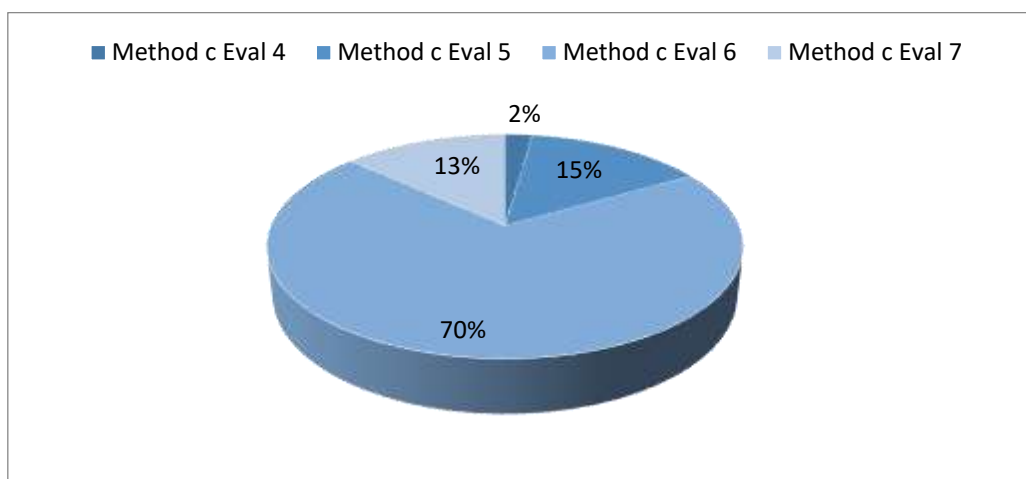


Figure 8. Learners' Evaluation of the Teaching Method (c)

Question five gives our participants the opportunity to evaluate the teaching methods of literary texts that they have experienced before this year. The results are presented in two different pie charts since (80%) of the group has been taught using method (b) and (20%) using methods (b & c) as it is mentioned in question three, part one. In relation to method (b), there are three sorts of evaluation: (6%) of the informants assess the method by the mark (3), (37%) give the mark (4), and (57%) give the mark (5). With respect to method(c), we find four distinct classes: a tiny percentage (2%) who rank the method as (4), (15%) as (5), more than the half (70%) as (6), plus (13%) as (7). Learners' evaluations confirm the results obtained in question four where a large percentage of them has expressed dissatisfaction with the methods of teaching literary texts, mainly when speaking about method (b). Hence, it seems vital to fill the gaps in the teaching methods for successful teaching/learning process.

**Question five, part two:** Please, justify your answer.

The Justifications	The Percentages
1- The methods focus on developing language skills and ignore literary skills.	91%
2- The questions are most of the time limited to specific answers, we cannot express ourselves, our ideas, emotions.	83%
3- The methods are not motivating.	77%
4- The types of questions asked are not enough practical and do not encourage the development of higher comprehension skills.	69%
5- The methods lack regular practice of question taxonomies.	39%
6- The methods do not give importance to reading speed, no time limit to finish reading in most cases.	21%

Table 1. Learners' Justifications of the Factors behind their Evaluation

This item permits us to gather more data about the reasons behind the participants' evaluation of the preceding methods of teaching. The justifications along with their percentages are presented in table (1) above rather than in a pie chart. The table demonstrates that the percentages of justifications overstep the number of participants from the time when most of the informants have provided more than one justification, which cannot be presented in a pie chart. The justifications reflect a variety of deficiencies in the previous teaching methods which explain the applicants' evaluation in the first part of this question.

**Question six:** Has the teaching method (s) encouraged you to enjoy reading literary texts?

- a. Yes
- b. No

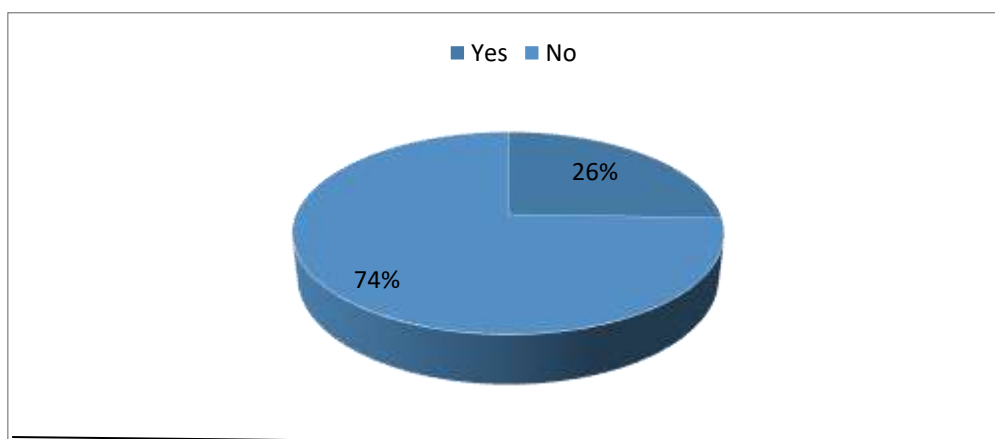


Figure 9. Learners' Views on the Contribution of the Previous Methods to their Enjoyment of Literary Texts

This question is designed to find out the effect of the preceding teaching methods on the participants' enjoyment and willing to read literary texts. Only (26%) of the informants who state that the methods have supported them to enjoy the reading of literary texts. On the other side, (74%) of the applicants assert that the methods have not motivated them to read literary texts. The answers support learners' justifications in question five, part two, where (77%) have claimed that the low evaluation of the teaching methods is due to the fact that they are not motivating.

**Question seven, part one:** Have your teachers limited the time of reading the texts?

- a. Yes
- b. No

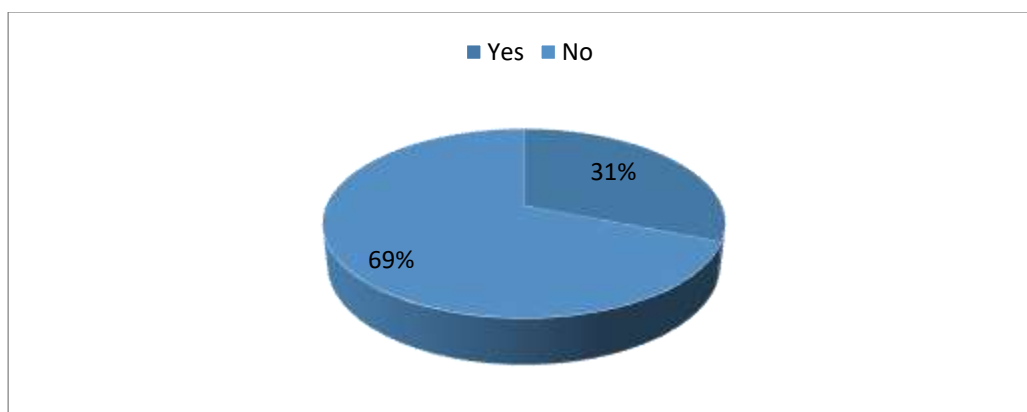


Figure 10. Timed-Readings of Literary Texts in the Previous Methods

Question seven serves to disclose whether the previous methods apply timed-readings of literary texts or not. For (31%) of the informants, they answer by saying “Yes”. For more than half of the applicants (69%), they say no. This maintains learners’ justifications to question five, part two, wherein they have expressed their dissatisfaction with the previous methods of teaching literary texts which, in many cases, ignore limiting the time of reading. Indeed, timed-readings play a critical role in determining the quality of comprehension.

**Question seven, part two:** If “yes”, please explain how?

The Explanations	The Percentages
1-The teacher starts the discussion of the text after all the learners finish reading, without limiting exact time to accomplish the task.	53%
2-The teacher limits the time randomly, according to the time remaining to end the class.	47%

Table 2. Learners’ Explanations of the Ways of Limiting Time in the Previous Methods

This item helps us to have detailed information about the way (s) to limit time for learners to accomplish the task of reading literary texts. The explanations may entail teachers’ ignorance or unawareness of the worthiness of timed- readings to boost their learners’ comprehension abilities. In addition, such practices may be one of the factors behind the difficulties this subset of learners has in dealing with literary texts.

**Question eight:** Would you please evaluate your level in comprehending literary texts?

- a. Excellent
- b. Very good
- c. Good
- d. Average
- e. Poor
- f. Very poor

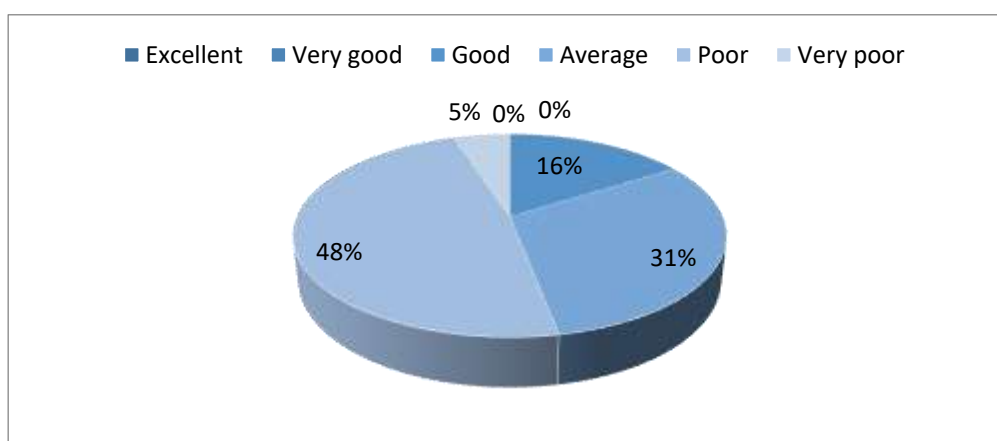


Figure 11. Learners’ Own Evaluation of their Level in the Reading Comprehension of Literary Texts

Question eight allows us to obtain information about the participants’ self-evaluation of their competence in understanding literary texts before the instruction of this year. As it is illustrated in the pie chart, no learner (0%) in the position excellent or very good. There are (16%) of them who assess their

level as good, more than third (31%) evaluate themselves as average readers, about half of them (48%) consider their level as poor, and a tiny percentage (5%) who deem themselves very poor readers. These evaluations may reveal serious troubles that the learners face in comprehending literary texts.

**Question nine:** What do you think your difficulties in comprehending literary texts are? (You can cross more than one box)

- a. You need long time to read and understand the text.
- b. You have problems understanding the meaning of words.
- c. You read slowly.
- d. You cannot relate the ideas in the text to your previous knowledge.
- e. You feel uninterested to read literary texts.
- f. You have problems to determine the structure of the text and the relation between the ideas.
- g. You have difficulties in interpreting, analysing, deducing, and/or synthesising the text.
- h. You cannot engage yourself with the task for a long time.
- i. Others.....

The Difficulties	The Percentages
a. You need long time to read and understand the text.	81%
b. You have problems understanding the meaning of words.	56%
c. You read slowly.	72%
d. You cannot relate the ideas in the text to your previous knowledge.	61%
e. You feel uninterested to read literary texts.	54%
f. You have problems to determine the structure of the text and the relation between the ideas.	69%
g. You have difficulties in interpreting, analysing, deducing, and/or synthesising the text.	86%
h. You cannot engage yourself with the task for a long time.	63%
i. Others: I feel anxious when reading literary texts and when trying to answer the comprehension questions.	43%

Table 3. Learners' Difficulties in Comprehending Literary Texts

Question nine is the last question in the first section of the questionnaire. It aims at divulging learners' real difficulties in understanding literary texts, from their own experiences. The number of answers exceeds

that of the candidates since each learner has mentioned more than one difficulty. Hence, the answers cannot be presented in a pie chart because the total percentage of answers is more than (100%).

The two major difficulties these learners have are the use of higher level comprehension skills (86%) plus comprehension rate (81%). The problem of reading fluency is also frequent among the applicants with a percentage of (72%). Difficulties in determining the outline of the text and the interrelation between the development and the supporting ideas (69%), in engaging themselves with task and making great efforts to understand (63%), then in connecting the text content to their background knowledge (61%) are all critical issues that the participants suffer from. The problems of vocabulary understanding (56%) and lack of motivation to read literary texts (54%) are recurrent as well. Finally, problems of anxiety and stress when treating literary texts and when answering questions of comprehension (43%) need to be resolved.

### III.2. Learners' Perceptions of the Computer-Test Taxonomies Technique during the Experimental Manipulation

**Question ten:** Would you please choose between the options in each case:

- a. Reading without limiting time.
- a. Reading by limiting time without using computers.
- a. Reading by limiting time using computers.
  
- b. Having a set of various types of questions regularly.
- b. Having a set of various questions occasionally.
  
- c. Reading literary texts on computer screen.
- c. Reading literary texts from books.
  
- d. Having reading comprehension questions on paper.
- d. Having reading comprehension questions on computer screen.
  
- e. Answering reading comprehension questions on computers.
- e. Answering reading comprehension questions on papers.

The Options	The Percentages
a. Reading without limiting time.	12%
a. Reading by limiting time without using computers.	0%
a. Reading by limiting time using computers.	88%
b. Having a set of various types of questions regularly.	100%
b. Having a set of various questions occasionally.	0%
c. Reading literary texts on computer screen.	87%
c. Reading literary texts from books.	



	13%
d.Having reading comprehension questions on paper.	5%
d.Having reading comprehension questions on computer screen.	95%
e. Answering reading comprehension questions on computers.	95%
e. Answering reading comprehension questions on papers.	05%

Table 4. Learners' Choice between the Options

This item and all the other items designed during the experimental manipulation have been administrated to learners after finishing with the first stage of the experiment, that is to say after completing with the pretest, six tests, and posttest on the novel *The Phantom of the Opera*. This item permits the applicants to give their opinions on the use of the computer-test taxonomies technique. As the table shows, in each option, the largest majority of informants support the use of the technique to limit reading time (88%), to administrate taxonomies of questions regularly (100%), to display the texts (87%) and the questions (95%), plus to answer the questions (95%). These answers may mirror the efficiency of the technique with its various aspects and conditions under which it is conducted.

**Question eleven, part one:** After eight texts on the novel *The Phantom of the Opera*, do you think that you have made a progress in comprehending literary texts?

- a. Yes
- b. No

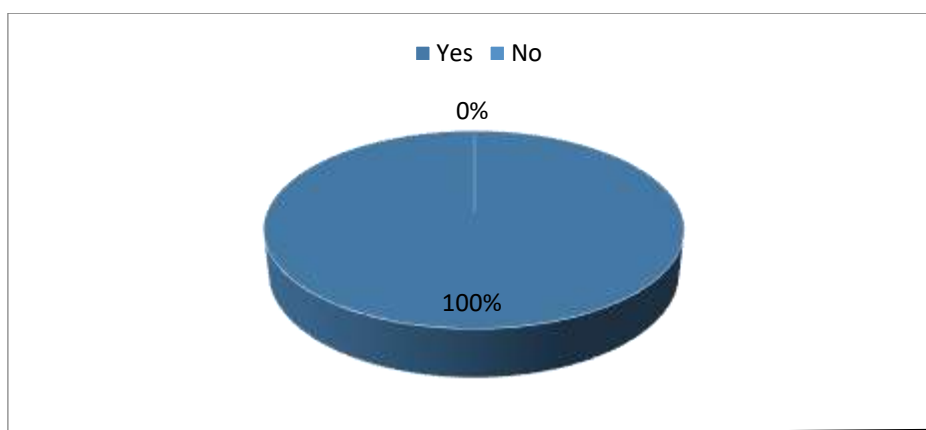


Figure 12. Learners' Beliefs of their Progress in Comprehending Literary Texts after Completing the First Stage of the Experiment

This question permits us to collect data about learners' beliefs of whether the computer-test taxonomies technique has developed their comprehension skills or not, just after completing the first stage of the experimental manipulation. The whole experimental group members (100%) affirm that the technique has assisted them to progress in understanding literary texts. Their answers maintain those in question ten where most of them have supported the use of the technique in the diverse phases of the reading comprehension session.

**Question eleven, part two:** If “yes”, to which extent?

- a. Very advanced
- b. Advanced
- c. Intermediate

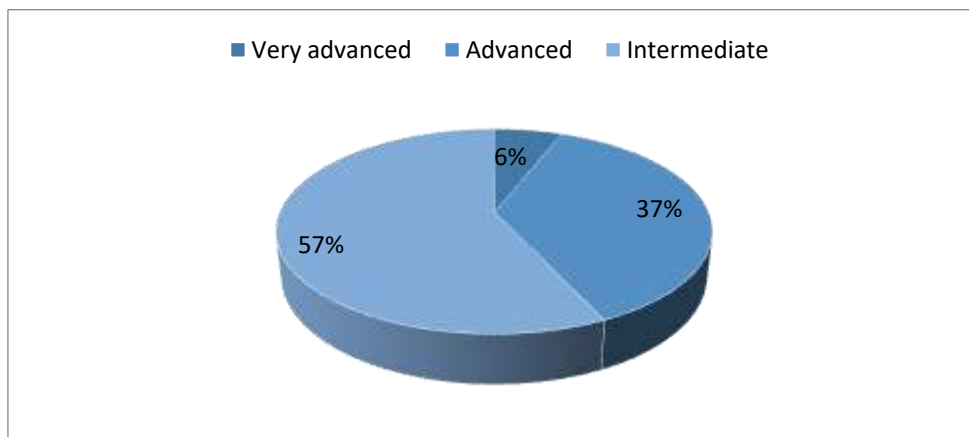


Figure 13. The Extent of Learners' Progress after Completing the First Stage of the Experiment

The second part of question eleven concerns itself with the degree of development the participants have made after the implementation of the computer-test taxonomies technique. A minority (6%) sees that they have become very advanced. This category may denote less struggling readers, more motivated, or more strategic readers. More than third of the informants (37%) view themselves as advanced readers after the assistance of the technique. More than half of them (57%) assert that the technique has helped them to become intermediate readers. The progress made may relate to the fact that the technique harmonises comprehension rate with comprehension skills (both bottom-up and top-down).

**Question twelve, part one:** Do you think that the use of computers during reading comprehension sessions has assisted you to progress in understanding literary texts?

- a. Yes
- b. No

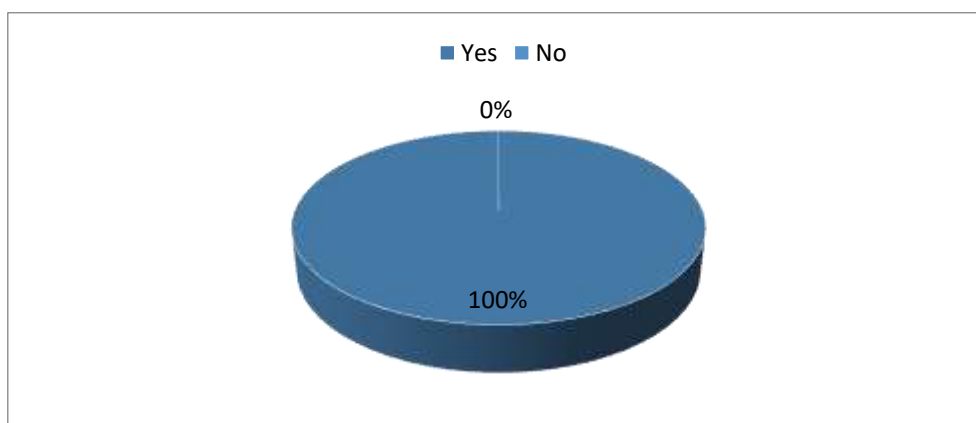


Figure 14. The Contribution of Computers to Learners' "Progress in Understanding Literary Texts

Behind this question, we aim at finding out whether the use of computers in the implemented technique has contributed to the applicants' development in literary texts comprehension or not. The entire group (100%)

avers that integrating computers during reading comprehension sessions is a critical factor in boosting their comprehension skills. The candidates' answers to this question plus questions ten and eleven may imply that the use of computers is of the utmost priority for the efficiency of the new teaching technique.

**Question twelve, part two:** If "yes", how would you classify the following elements according to the extent of influence the computer-test taxonomies technique has contributed to develop your comprehension skills?(Use numbers 1, 2, 3,...9)

- a. Your time spent to comprehend literary texts.
- b. Your abilities to understand words meaning in the text.
- c. Your abilities to understand complete sentences in the text.
- d. Your abilities to understand the deep meaning of the text.
- e. Your abilities to interpret and analyse the content of the text.
- f. Your abilities to relate your prior knowledge and experiences to the content of the text.
- g. Your abilities to predict what will happen next in the text.
- h. Your abilities to summarise the content of the text.
- i. Your abilities to synthesise the ideas in the text.

The Classifications	The Percentages
a-d-e-f-i-h-g-b-c	50%
a-f-d-e-g-i-h-b-c	48%
a-c-b-d-e-i-f- h-g	02 %

Table 5. Learners' Classifications of the Most Influenced Elements by the Implementation of the Computer-Test Taxonomies Technique

The aim of this item is to determine the comprehension constructs which are more influenced by the computer-test taxonomies technique, relying on learners' own experience during the experimental manipulation. The two first classifications which are close to each other in percentages (50%) and (48%) as well as in focus, put the emphasis on macro-skills. This may reflect that these learners are initially suffering from deficits in top-down comprehension skills and that lower level comprehension skills do not represent a problem for them. However, the last classification by only (2%) of the applicants' spotlights on micro-skills (a-c-b-d) which are, according to the informants, the most comprehension skills developed by means of the technique. This classification may refer to a small group of critically impaired readers who are still unable to significantly develop top-down skills and are limited to bottom-up skills.

**Question thirteen:** According to you, the use of computer-test taxonomies technique to teach literary texts is:

- a. Of paramount importance during reading comprehension sessions.
- b. Important during reading comprehension sessions.
- c. Helpful during reading comprehension sessions.

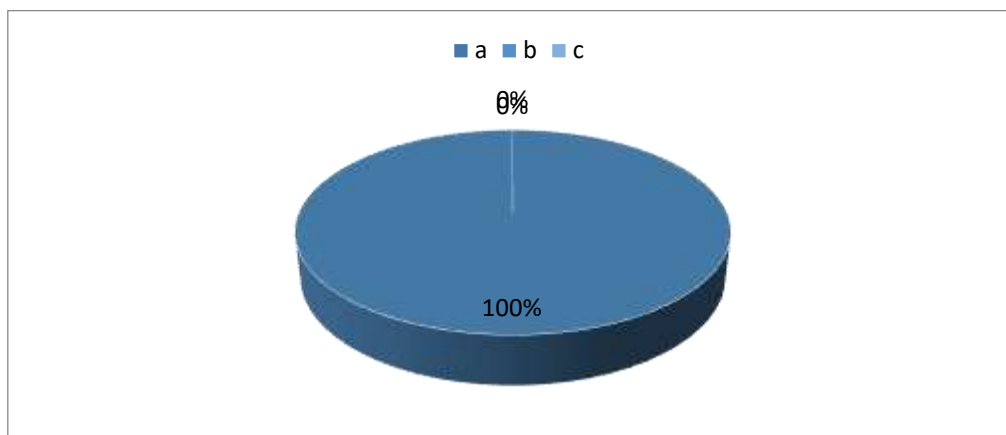


Figure15. The Importance of the Computer-Test Taxonomies Technique in Teaching Literary Texts

The goal of this item is to find out the value of implementing the computer-test taxonomies technique during literary texts sessions, depending on our applicants' views.

All the informants (100%) have opted for the same option (a). Yet, the two other options (b) and (c) have received no answer (0%). The applicants insist on the fact that the technique is of paramount importance. This may be interpreted in relation to their answers to question twelve, part one where they have highlighted the critical role of computer-based instruction in enhancing their understanding of literary texts.

**Question fourteen, part one:** Comparing to the previous method (s) of teaching literary texts, which method do you think to be more effective in developing your comprehension abilities?

- a. The previous one (s).
- b. The current one.
- c. It depends on.....

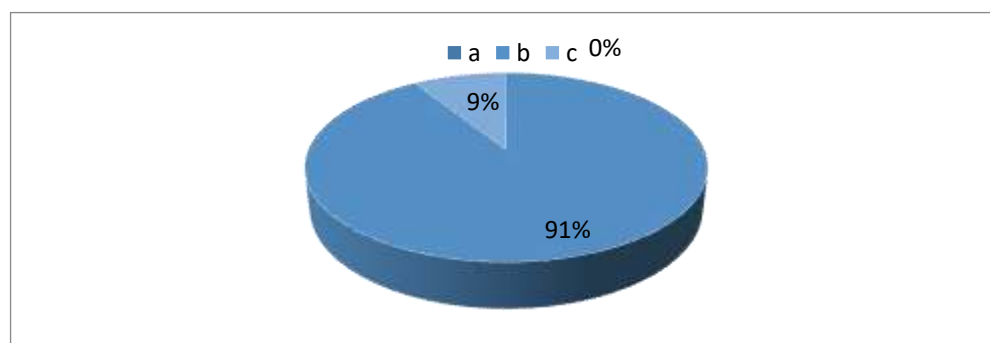


Figure 16. A Comparison of Effectiveness between the Teaching Methods

This question helps in checking the efficiency of the computer-test taxonomies technique comparing to the previous methods. Nearly the entire subset of informants (91%) avows that the current method which is based on the new integrated technique is more efficient than the preceding ones. Such a significant percentage may imply that the technique in its diverse facets has been successful and it has appreciably contributed to learners' comprehension skills in literary texts. A small percentage (9%), however, states that the effectiveness of the methods either the previous or the current depends on whether they fit learners' styles of learning and comprehension abilities or not. Hence, learners' answers may imply the evidence that the computer-test taxonomies technique involves some aspects that make the teaching method more influential comparing to the other methods.

**Question fourteen, part two:** Please, state the reason (s) why in each case.

The Justifications	The Percentages
a- The current method helps us to improve our comprehension skills in literary texts and our English language competencies in general.	96%
b- The diversity in questions fosters the different levels of comprehension. Moreover, some questions give us the opportunity to express our ideas and emotions freely.	97%
c- The use of computers makes the current method more motivating.	97%
d- The current method encourages us to better engage in the task and to make more efforts.	89%
e- The current method provides regular practice, within time limits for each reading comprehension task.	86%
f- Either the previous or the current methods can be efficient depending on the extent to which they respond to learners' needs.	09%

Table 6. Learners' Justifications of the Teaching Methods Choice

This item aims to disclose the reasons behind the applicants' choice in the first part of this question as well as to reveal whether there is a kind of improvement in our instructional method in comparison to the previous ones or not. The reasons are detailed in table (6) above, with their percentages. Roughly all the members (96%) who have opted for the current method of teaching emphasise on that the method enhances both the reading comprehension skills of literary texts and the English language competence. The second justification to choose the current method relates to the nature of questions which are designed in diverse taxonomies. The third justification with a percentage of (97%) and the fourth one with a percentage of (89%) stress on the role of the technique in inspiring motivation and fostering self-engagement during reading comprehension sessions of literary texts. The fifth reason behind learners' choice of the current method is the regular practice based on timed-readings. Finally, the category of informants who has opted for option (c) in the first part of this question refers to how much a given method is efficient in a particular learning environment, without comparison between methods.

**Question fifteen, part one:** Comparing to the previous method (s) of teaching literary texts, is the new method which is based on the computer-test taxonomies technique more motivating?

- a. Yes
- b. No

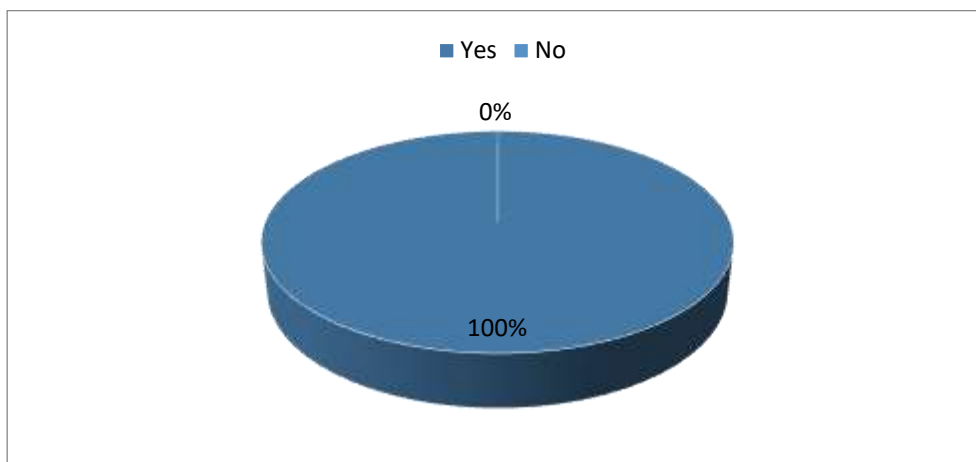


Figure 17. A Comparison of the More Motivating Methods of Teaching

Question fifteen is devised to check learners' viewpoints of the method which creates more motivating learning atmosphere. Though a few (9%) of the candidates in the previous question have not made a comparison between the earlier and the present methods at the level of efficiency, the whole experimental group (100%) agrees on that the computer-test taxonomies technique makes the current teaching method more motivating than other methods. The preceding answer as well as the justifications to question fourteen, part two may imply that generating motivation among learners is one key feature of the technique.

**Question fifteen, part two:** If yes, is it because: (you can cross more than one box)

- a. You feel more interested to read literary texts.
- b. You feel more enthusiastic to do the activities.
- c. You feel having further abilities that you did not know about before.
- d. You feel more relaxed when having reading comprehension sessions of literary texts via the technique.
- e. Others.....

The Justifications	The Percentages
a-You feel more interested to read literary texts.	100%
b-You feel more enthusiastic to do the activities.	100%
c-You feel having further abilities that you did not know about before.	50%
d-You feel more relaxed when having reading comprehension sessions of literary texts via the technique.	100%



e-Others: The technique allows me to discover and apply new technologies to develop my English language proficiency in general and reading comprehension skills in particular.	17%
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Table 7. Learners' Justifications of the More Motivating Teaching Method

The second part of question fifteen is concerned with uncovering the causes that make the teaching method which draws on the computer-test taxonomies technique more motivating comparing to the prior methods. According to all the applicants (100%), the technique prompts interest, engagement, plus relaxation during reading comprehension sessions. Half of the informants (50%) highlight the effect of the technique on recognising their own comprehension skills which have not been exploited before the implementation of the technique. Last of all, (17%) of the learners add that the technique helps them to discover new ways of applying the new technologies to enhance their English language learning.

### III.3. Learners' Views of the Computer-Test Taxonomies Technique after the Experimental Manipulation

**Question sixteen, part one:** You have dealt with sixteen literary texts of two different novels by means of the computer-test taxonomies technique, have you enjoyed them?

- a. Yes
- b. No

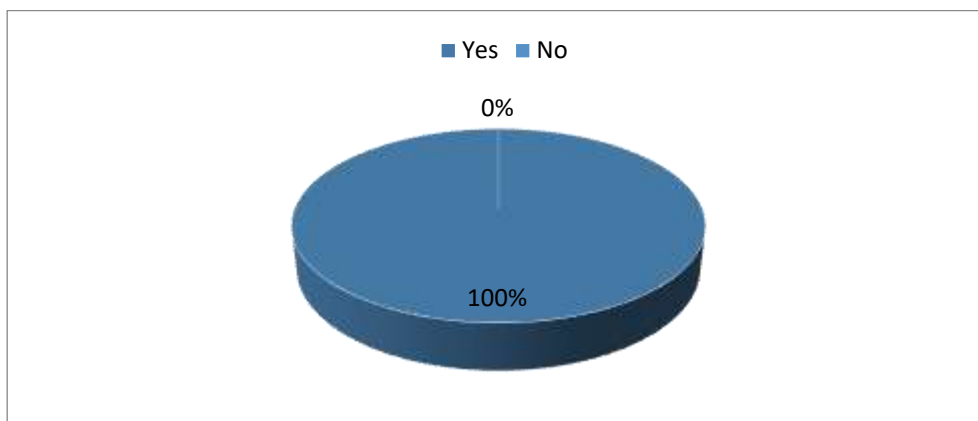


Figure 18. Learners' Feelings about Reading Literary Texts via the Computer-Test Taxonomies Technique

This question permits us to know whether there is a change in learners' feelings about reading literary texts in English after the accomplishment of the experiment or not. Whereas before the application of the new teaching method most of the learners have shown negative feelings towards reading literary texts in English, they all (100%) now express positive emotions. The change in feelings may reflect successful teaching method by means of the computer-test taxonomies technique.

**Question sixteen, part two:** If yes, is it because:

- a. The literary texts are interesting.

- b. The technique is inspiring and it brings revolution into the classroom environment.
- c. The content of the literary texts is easy to understand.
- d. The literary texts change the routine of studies.
- e. Others.....

The Justifications	The Percentages
a. The literary texts are interesting.	45%
b.The technique is inspiring and it brings revolution into the classroom environment.	100%
c. The content of the literary texts is easy to understand.	0%
d.The literary texts change the routine of studies by mixing reality with fiction.	03%
e.Others	0%

Table 8. The Reasons behind Positive Feelings towards Reading Literary Texts

This second part of question sixteen divulges the factors that foster the informants' positive feelings. The factors are categorised into three distinct answers. The entire experimental subset (100%) states that the positive feelings are engendered by the inspiring and revolutionary nature of the computer-test taxonomies technique. Other candidates (45%) relate their feelings to the interesting content of the literary texts. A meagre percentage of learners (3%) refers to the change in classroom atmosphere that reading literary texts introduces. Regarding options (c) and (e), there is (0%) answer.

**Question seventeen:** Would you please describe your process of reading and understanding literary texts now?

- a. Very Easy
- b. Easy
- c. Average
- d. Difficult
- e. Very difficult

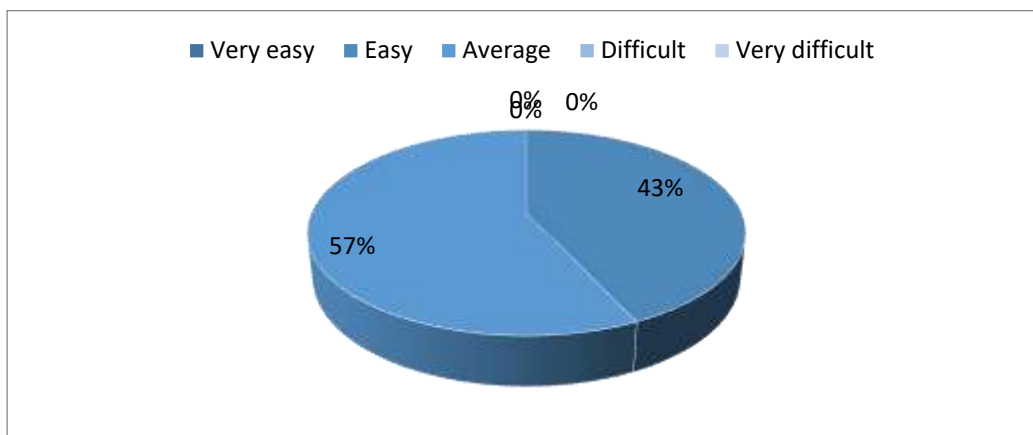


Figure 19. Learners' Description of their Contemporary Reading Comprehension Process

The main objective of this question is to determine the applicants' own progress in the process of comprehending literary texts after completing the experimental manipulation. The answers are limited to two choices from five: option (b-easy) with a percentage of (43%) and option (c-average) with a percentage of (57%). The answers may reflect a paradigm shift in learners' comprehension skills from poor abilities before the use of the technique to more proficient comprehension abilities after closing the experiment.

**Question eighteen, part one:** Do you think that you can now comprehend literary texts effectively without the computer-test taxonomies technique?

- Yes, I can.
- I am not sure.
- No, I cannot.

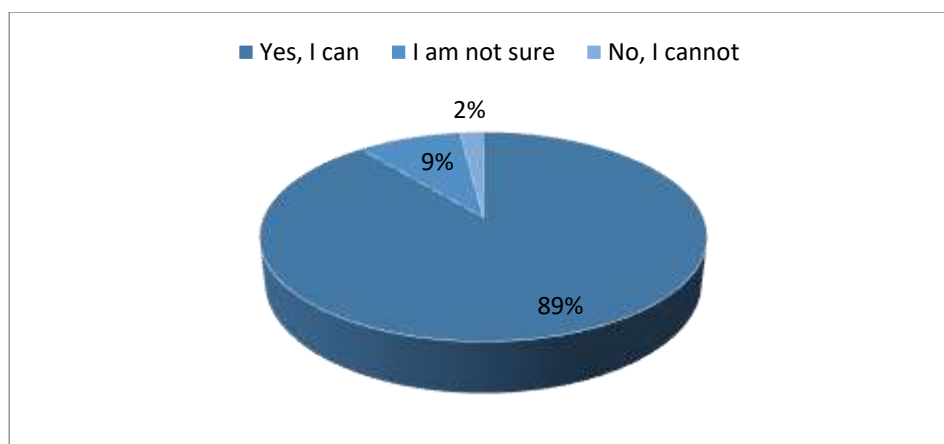


Figure 20. Learners' Beliefs of their Comprehension Abilities without the Technique

This item is critical in the way that it helps in collecting data on whether the applicants have developed comprehension skills and strategies necessary to deal with further literary texts without the intervention of the computer-test taxonomies technique or not. The data collected demonstrate that (89%) of the informants affirm their ability to read and comprehend literary texts successfully, without the intervention of the technique. There are (9%) of the learners who show hesitation on whether they can be independent of the technique when reading further literary texts or they still need it to maintain them. The rest (2%) express their inability for efficient reading comprehension process without the use of the technique. These results may imply that the technique has boosted comprehension abilities and invigorated strategic readings in the

largest majority of learners, which enables them to be independent of the technique. On the other hand, some learners still need more practice by means of the technique to have better control over the requirements of the comprehension process.

**Question eighteen, part two:** Please, justify your answer in each case.

The Justifications	The Percentages
a. The technique has helped me to boost appropriate comprehension skills, to accelerate my reading speed, and to overcome my shortfalls in interpreting literary texts and answering comprehension questions, so I can now rely on myself when treating literary texts without the need for the technique.	89%
b. The technique has aided me to organise my time when reading, to develop more effective comprehension strategies, and to raise previously existing abilities and maintain them either when comprehending the texts or when answering the questions. Consequently, I can now be independent of the technique when dealing with other literary texts.	83%
c. The technique has increased my motivation as well as my interest to read literary texts in English, which makes me now more engaged and active when performing comprehension tasks, either with or without the use of the technique.	75%
d. Though the technique has assisted me to improve an assortment of comprehension skills, I am still not sure if I can comprehend further literary texts successfully without the intervention of the technique the same way as when the technique is employed.	09%
e. Now, I am unable to comprehend literary texts efficiently without the technique since my comprehension skills are still limited and need much more practice.	02%

Table 9. Learners' Justifications of their Own Beliefs

This question enables us to be acquainted with the reasons why our applicants believe they can or cannot comprehend literary texts effectively without the use of the computer-test taxonomies technique. The first justification stated by (89%) of the candidates draws attention to the critical role of the technique in developing learners' comprehension skills, reading rate, plus questions answering proficiency, which makes them able to deal with further texts without the technique. The second justification is provided by (83%) of the informants who believe they can now be independent of the technique since it has significantly contributed to their reading strategies and speed; additionally, it has brought to light some of their personal comprehension abilities which they have not been acquainted with before. The third justification which is

made by (75%) of the applicants emphasises the motivating environment created by the technique, which inspires interest in learners to read various literary texts. Hence, they believe they are no longer dependent only on the technique. In relation to learners who have expressed their hesitation on whether they can or cannot read literary texts effectively without the technique, they represent (9%) of the whole experimental group. They justify their hesitation by being unable to take a final decision. Learners who have opted for option (c) in the first part of this question denote (2%) of the whole experimental subset. They relate their choice to their average comprehension skills, which necessitates the assistance of the technique in future reading comprehension tasks. The preceding analysis raises three chief levels at which the contribution of the technique may have notably influenced learners' comprehension abilities: macro-skills, comprehension rate, plus motivation and engagement.

**Question nineteen:** Would you please order the following factors from the most to the least influential on your comprehension abilities: (Use numbers from 1 to 4)

- a. Timed readings (.....).
- b. Regular test taxonomies (.....).
- c. Various types of questions (.....).
- d. The use of computers (.....).

The Orders	The Percentages
d (1) – c (2) – a (3) – b (4)	52%
a (1) – c (2) – d (3) – b (4)	44%
d (1) – a (2) – c (3) – b (4)	04%

Table 10. Learners' Order of the Influential Factors

Question nineteen serves to get answers on the facets of the computer-test taxonomies technique which are more influential on learners' progress in reading comprehension skills. The majority (52%) underline the factors of computers use and questions categories, followed by timed readings and regular testing. More than the third of learners (44%) focus on timed readings in the first place, the types of questions in the second place, after that the use of computers and regular testing. The minority (4%), however, highlights the influence of computers use, next timed-readings, then questions types and regular testing. These results sustain the major variables on which our hypotheses are built and they may reflect the successful function and contribution of each variable in improving the applicants' comprehension rate and comprehension skills.

**Question twenty:** After completing the application of the computer-test taxonomies technique on numerous literary texts, now you do the following to comprehend a given text: (Cross more than one box)

- a. You limit the time of reading the text.
- b. You try to guess the meaning of unknown words or phrases from the context.
- c. You read quicker than before and without stopping too much.
- d. You try to understand the deep meaning of whole sentences and details in the text.
- e. You make connections between the content of the text and your previous knowledge and experiences.
- f. You read enthusiastically and with great attention.
- g. You try to define the structure of the text and the organisation of the ideas.
- h. You think again about what you have read and you try to summarise the main points in your mind or on paper.
- i. You use your previous knowledge, you interpret, you deduce, you analyse, or you synthesise when you cannot understand the text or a part of it.

- j. You ask yourself questions about the text.  
 k. You try to apply the technique at home when reading literary texts or other types of texts.

The Acts	The Percentages
a. You limit the time of reading the text.	100%
b. You try to guess the meaning of unknown words or phrases from the context.	95%
c. You read quicker than before and without stopping too much.	100%
d. You try to understand the deep meaning of whole sentences and details in the text.	73%
e. You make connections between the content of the text and your previous knowledge and experiences.	88%
f. You read literary texts enthusiastically and with great attention.	91%
g. You try to define the structure of the text and the organisation of the ideas.	91%
h. You think again about what you have read and you try to summarise the main points in your mind or on paper.	63%
i. You use your previous knowledge, you interpret, you deduce, you analyse, or you synthesise when you cannot understand the text or a part of it.	100%
j. You ask yourself questions about the text.	23%
k. You try to apply the technique at home when reading literary texts or other types of texts.	100%

Table 11. Learners' Practices after Completing the Application of the Computer-Test Taxonomies Technique

This question ends the third section of the questionnaire. It is concerned with determining the nature of effect of the computer-test taxonomies technique and its facets on the applicants. In other words, whether the aspects of the effect are temporary and limited to the period of the technique application, or they continue to exist beyond the time limits of the experimental manipulation to be practised by the candidates without the intervention of the technique. As table 11 demonstrates, all the learners (100%) persist in practising timed-readings taking into account reading speed and fluency, in using macro-skills when micro-skills cannot help in understanding parts of the written material, plus in applying the technique outside classrooms with a variety of other texts either literary or not. Almost all the informants (95%) use micro-skills to understand new vocabulary in the text and (91%) to find out the text structure and organisation, plus (91%) who show motivation and deep engagement during reading tasks of various texts. There is conspicuous progress in learners' use of top-down comprehension skills where (73%) of them focus on the deep meaning of the text content, (88%) make connections between their background



knowledge/experiences and the text at hand, in addition to (63%) of the informants who reflect on the text content after reading. However, there are only (33%) who question themselves about the text content. In fact, the results obtained may be indicators of long-lasting effect that keeps on stimulating learners' high motivation and engagement, plus activating interaction between bottom-up and top-down comprehension skills even after the accomplishment of the experiment.

### III.4. Further Suggestions

**Question twenty one:** In the space below, please write any comment or suggestion you would like to add concerning the teaching of literary texts via the computer-test taxonomies technique to promote your comprehension skills in literary texts.

The Suggestions	The Percentages
a. We need to apply the technique on other types of texts and in other language classes as well (Arabic, French).	93%
b. We should have special classes to train us on the use of the new software programs and technologies in education before applying them during reading comprehension sessions.	67%
c. There should be more than one reading comprehension session per week to help us ameliorate our level and have better control of difficult types of texts by means of the computer-test taxonomies technique.	21%
d. We should have as much as necessary practice on each text length and style by means of the computer-test taxonomies technique. We need more than six texts to be practiced.	02%

Table 12. Learners' Suggestions and Comments

The main purpose of this item is to amass pieces of information that cover learners' own suggestions and comments about the computer-test taxonomies technique. The collected data help us to identify the strengths as well as the weaknesses of the technique; consequently, we can take decisions on which aspect (s) of the technique to modify, to delete, or to keep the same. A deep analysis of the suggestions and the comments reveals learners' satisfaction of the efficiency of the computer-test taxonomies in enhancing their comprehension skills. However, they propose some additional elements which they believe are indispensable to ensure more practicality of the technique. Nearly all the informants (93%) underline the need for the technique to be employed in other language classes. Two-thirds (67%) put stress on training periods that introduce the new software programs and technologies to learners and help them have control over the procedures of use. Less than the third (21%) emphasise augmenting the number of reading comprehension sessions each week. Only (2%) of the entire experimental group who suggest practising on more than six consecutive texts of particular length and language style. The suggestions may refer to learners' own needs and wants depending on their self-evaluation of the progress of their reading comprehension skills in literary texts.

#### **IV. Discussion**

In the current research project, a survey questionnaire has been devised in attempt to yield useable data on the contribution of the computer-test taxonomies technique to learners' progress in reading comprehension skills in literary texts. We have employed standardised procedures whose target is to guarantee that each informant is able to answer the questions at a level playing field to avoid biased opinions that may affect the upshot of our investigation. The questionnaire questions center on answering the major problem of this study along with the sub-questions. In addition, the respondents' answers are used to test whether the hypothesis is to be confirmed or debunked.

The questionnaire has been divided into three stages of development to amass longitudinal data that track our sample at different points in time: before, during, and after the implementation of the computer-test taxonomies technique. To start with, before applying the technique, most of the applicants have expressed their reluctance to read literary texts in English. They relate this reluctance to three chief factors: the difficulties they have in understanding literary texts, the intricate nature of literary texts, plus the lack of interest in reading such kind of texts. Consequently, this subset of learners has started with poor reading comprehension assets either at the cognitive or the affective levels. The cognitive factors including the prior knowledge and skills the readers hold during the interactive activity between them and the text denote some of the building blocks of any reading comprehension process (Pardo, 2004). Learners' willingness, need, desire, and compulsion to participate in a given learning activity are further fundamental determinants of successful reading comprehension process (Bomia et al., 1997). Therefore, any sort of deficiency in one of these cognitive or affective entities can deplete learners' comprehension abilities.

With respect to background knowledge on novels, our applicants have been already taught several novels, not only in English classes but also in Arabic and in French classes as well. This background knowledge is one of the basic components in every reading comprehension process as it involves the domain, topical, or cultural knowledge readers bring to texts (McNeil, 2012). It is also the process of integrating activated meanings into the ongoing text representation (Durgunoglu, Nagy, & Hancin, 1991). Hence, we may assume that the candidates' difficulties do not originate from lack of schemata, but rather they are the result of gaps in the instructional methods. Learners' answers to the next question have confirmed our assumption. In most cases, teachers have adopted the 'language-based method' while hardly ever the 'reader-response method' has been applied. This means that teachers may have employed teaching and questioning strategies to scrutinise literary texts in order to achieve particular linguistic objectives (Carter & Long, 1991). In language-based methods, learners are encouraged to probe into the text in depth to recognise the way the language is used in an attempt to enhance their language competence and sensitivity (Ganakumaran, 2002). In such a way, our applicants may have developed language skills by being guided via particular types of questions that limit their choices and do not allow them express themselves freely. Conversely, they may have, most of the time, ignored literary skills including critical thinking, reflective reading and analysis of the text content, selecting key details, plus responding to the text events.

Subsequently in questions four and five, nearly all the informants have shown their total or partial dissatisfaction about the preceding methods of teaching. They have provided low or average evaluations when the language-based method principles have been applied, but they have highly graded the reader-response method. Learners' evaluations arise from a number of reasons: the nature of the aforementioned method which gives more importance to language skills and less attention to literary skills, the type of questions which limit learners' answers and choices and cover more bottom-up skills than top-down skills, the lack of creativity and motivation, the lack of regularity in practice, plus the neglect of comprehension rate. Indeed, the reasons cited by the applicants reflect most of the variables on which the computer-test technique is structured, mainly because it draws upon an eclecticism of principles of the language-based

method, the reader-response method, and the gradual release of responsibility model. Moreover, the technique is computer-based which entails a kind of creativity that may motivate the candidates.

Later, in questions six and seven, the respondents have stressed again two already mentioned deficits in the preceding methods of teaching literary texts, which are: the lack of motivation and of the well-regulated timed-readings. As we have previously discussed in the theoretical part of this study, less motivated learners show apathy, few efforts, and quick disengagement from the task in the case of challenges (Skinner & Belmont, 1993), a factor which may have negatively affected our candidates' reading comprehension abilities and performance. Additionally, there is an interrelation between speed reading and timed-reading activities from one side and reading rate and reading comprehension from the other side. The more the timed-readings are practised and the reading speed is adjusted according to the text requirements, the better the reading rate and the comprehension process are (Jensen, 1986; Anderson, 1999; Chang 2010, Ur, 2012; Tran and Nation, 2014). Thus, in the case of our respondents, the lack of well-managed timed-readings in the preceding teaching methods may have undercut their comprehension abilities.

Then in question eight, the informants' self-evaluations have reflected their levels in the reading comprehension of literary texts, which vary between average and poor in most cases. Such levels may be the result of inefficacious teaching methods, as it has been detailed in the aforesaid questions, which may have not responded to learners' learning styles, needs, and/or wants. Afterward, learners' answers to question nine have reflected the several sorts of difficulties they have suffered from to comprehend literary texts. Primarily, they have stressed their problems in reading fluency, comprehension rate, and macro-skills. Besides, they have highlighted the issues of lack of motivation and engagement plus high anxiety during reading comprehension tasks. These answers confirm the fact that the applicants' deficits in reading literary texts have emanated from cognitive as well as affective factors. They also corroborate that this group of learners has less problems in micro-skills comparing to macro-skills.

All the abovementioned denotes the respondents' profiles before introducing the computer-test taxonomies technique, which has provided us with a priori assumptions on teachers' instructional methods plus learners' deficiencies and requirements. Subsequently, we have resumed our longitudinal investigation by administrating the second part of the questionnaire to our candidates during the application of the computer-test taxonomies technique, namely after the accomplishment of the first stage of the experimental manipulation (The first stage has covered the novel *The Phantom of the Opera*). The aim of the second part of the survey questionnaire is to find out which kind of change may have occurred in learners' comprehension abilities as a result of the implementation of the technique. The answers to the first question in this part have emphasised the worthiness of the use of computers throughout the application of the various steps and procedures of the computer-test taxonomies technique. Besides, they have brought up the subject of regularity in administrating questions that activate diverse comprehension levels. These responses mirror the efficiency of the technique during the first stage of our experiment which has covered particular literary texts, of particular language style, and of a given words number. Learners' answers to question eleven have maintained our claim. The computer-text taxonomies technique has proved its effectiveness in advancing the applicants' comprehension proficiency in literary texts from poor to intermediate and from average to advanced and very advanced, which contrasts their self-evaluations before introducing the technique.

In question twelve, the informants have classified the effects that the technique, which is computer-based, has on learners' comprehension skills, from the most significant to the less prominent. The classifications underline the role of the technique in developing learners' top-down skills and reading speed. These two represent the major gaps in our applicants' comprehension skills prior to the application of the computer-test taxonomies technique. Indeed, the results illustrate the fact that technology-enhanced learning environments, tools, and systems re-establish learning situations wherein complex thinking, problem-solving, collaboration strategies along with generic skills are required. Besides, some of these environments serve at assessing performance, understanding mistakes and learning from them by teachers

and learners as well. Furthermore, computer-based testing is mostly suitable to assess basic literacy, basic mathematical skills, and advanced reading skills (Redecker, 2013). In our context, the enhanced learning environment by means of the computer-test taxonomies technique has helped the candidates to further advance in their comprehension competencies, chiefly in macro-skills and comprehension rate. Next in question thirteen, the whole experimental group has stressed once more the use of the technique since it is of paramount importance during reading comprehension sessions. Its importance raises not only from the fact that it significantly contributes to learners' comprehension abilities in understanding literary texts, but also from the reality that it is more effective in developing learners' skills comparing to the previous teaching methods. What's more, in question fourteen the respondents have strongly supported the new teaching method of literary texts, with persuasive justifications. The justifications take in fundamental concepts that guarantee an influential reading comprehension process which goes beyond the limits of literal and reorganisation levels of comprehension to cover inference, prediction, evaluation, and personal response levels (Day & Park, 2005). The candidates' descriptions of the method during the experimental manipulation oppose those made to the previous teaching method that is before introducing the new technique. Hence, the teaching method which employs the computer-test taxonomies technique fills the gaps existing in the previous methods of teaching literary texts by improving both literary skills and multiple comprehension levels as well.

Question fifteen brings the second part of our longitudinal survey to an end. The informants have avowed that the new teaching method is more motivating than the previous methods. The method has inspired interest, enthusiasm, plus engagement. It has helped in uncovering learners' own abilities and in developing their English language proficiency and skills, and it has decreased their anxiety as well. Actually, the sum of reading motivation- which entails learners' enthusiasm and inclination to read (Department of Education and Training Literacy Continuum, 2010) - determines the quality of understanding, that is, carrying great weight, profound, and internalised, or insignificant (Gambrell, Morrow, & Pressley, 2007). Consequently, we may assume that the computer-test taxonomies technique has been successful all the way through the first stage of the application of the technique. It has influenced the specimen under investigation at several levels which interact and build on each other to ensure effective reading comprehension process.

Finally, we have reached the third and last part of the questionnaire which has been administrated after the completion of the whole experimental manipulation. This part allows us to obtain supplementary necessary data on the way and the extent of contribution of the computer-test taxonomies technique in developing learners' comprehension skills and in overcoming their deficiencies in literary texts for the long term. Question sixteen has demonstrated a paradigm shift in learners' feelings about reading literary texts. While the majority of informants have expressed their unwilling to read literary texts in English before implementing the technique, all of them have shown eagerness to read this type of texts after the application of the technique with sixteen literary texts, from two distinct novels. These positive feelings, as the respondents have asserted, are the result of the healthy learning environment that the computer-test taxonomies technique has generated during the reading comprehension sessions. Such environment may have increased learners' readiness to tackle literary texts, to make more efforts, and to develop learning strategies that fit the requirements of each reading comprehension situation. These, in their turn, may have advanced the applicants' levels of comprehension and made the process of understanding literary texts easy or average as the learners have stated in question seventeen. This implies that the technique has assisted the informants to overcome many of their difficulties in treating literary texts in English, which contrasts the phase before the implementation of the technique where they have referred to the intricate nature of the process of reading literary texts. Additionally, the technique may have helped the candidates to develop comprehension skills and strategies for the long run given that the largest majority of them have stated they can rely on their own comprehension abilities to understand literary texts fruitfully, without the intervention of the technique. They have explained that the technique has invigorated a series of compulsory elements, both cognitive and affective, which interact together during reading comprehension tasks.



The item number nineteen has revealed the most influential facets of the computer-test taxonomies technique on the applicants' comprehension abilities, which comprise: timed-readings, the integration of computers, plus the type of comprehension questions used in each taxonomy. These three facets denote the cornerstones on which our two hypotheses are constructed. Hence, we may suppose that the intervention of the technique has directly touched the major gaps in learners' comprehension skills in literary texts and filled them to a certain degree from the time when the respondents have referred to problems of comprehension rate, nature of comprehension questions, and reading motivation before the application of the technique. Next, the data collected from question twenty are evidence for the perceptible change in the applicants' comprehension abilities, behaviours, and practices after the accomplishment of the experiment. The candidates have started to apply the various procedures of the computer-test taxonomies technique by their own, even out of the classroom contexts, to treat diverse types and genres of texts, focusing on those aspects of the technique which address their main deficiencies in comprehending literary texts. Moreover, they have improved several important macro-skills and connected them with micro-skills in an interactive process. Besides, they have developed comprehension strategies that good readers use when reading a given written material. The foregoing progress is based on the informants' high motivation and deep engagement in the reading tasks as a result of the motivating nature of the computer-test taxonomies technique.

In question twenty one, the informants have provided us with some constructive suggestions and recommendations to ameliorate the technique's course of action. They have stressed the use of the computer-test taxonomies technique in other language classes, which reflects learners' approval to the technique in boosting their comprehension skills. Yet, they have also mentioned three issues related to its application. The first issue is the need to have trainings on each new technology before applying it in classroom, which may entail that some learners have faced certain difficulties to manage the technique though the instructor with the help of an expert have coached them, right from the beginning. The second and the third issues are close in their concepts, wherein some of the respondents have asked for more reading comprehension sessions per week and for more practice on each type of texts. These issues need a revision of the whole syllabus of English language classes by both the administration and the teachers, not only the teachers of English but also the teachers of other credits to have equilibrium in the distribution of hours.

## **Conclusion**

In a nutshell, these results provide confirmatory evidence that the computer-test taxonomies technique has helped our applicants to overcome their deficiencies in comprehending literary texts and to enhance their comprehension skills. The technique has improved learners' comprehension rate through regular informal tests which make use of computer-based timed readings. It has also activated the interaction between bottom-up and top-down comprehension levels and promoted learners' reading comprehension proficiency in literary texts by means of regular informal tests that draw on computer-based taxonomies of questions. The technique has engendered a paradigm shift in learners' reading comprehension skills. The impact is more apparent at the levels of reading speed and macro-skills which denote the main deficits in learners' comprehension competencies before integrating the technique, along with a significant increase in learners' reading motivation and engagement. Comparing to the former teaching contexts, the participants have shown worth mentioning development in the ways of processing literary texts in addition to efficacious long-run comprehension strategies.

The efficiency of the technique lies not only on the procedures and the conditions under which it has been conducted, but also on a range of determinants of teacher performance in using the technique to attain better outcomes. These include: well-trained teachers in the use of ICTs to teach literary texts, training learners on the use of ICTs and any new technology before implementing it in language classes, applying the technique on various genres and types of literary texts as well as on different text length, with adequate practice on each. The outcomes of our investigation entail the fact that the technique has been the

springboard to a whole set of accomplishments our sample has achieved. Hence, we encourage teachers to practise the computer-test taxonomies technique with college pupils, during reading comprehension classes of literary texts.

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