

# Web Based Application for Reading Comprehension Skills

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## Abstract

The use of the web in languages learning has been developed at very high speed these last years. Thus, we are witnessing many research and development projects set in universities and distance learning programs. However, the interest in research related to writing competence remains relatively low.

Our proposed research examines the use of the web for studying English as a second foreign language at an Algerian university. One focus is on pedagogy: therefore, a major part of our research is on developing, evaluating, and analyzing writing comprehension activities, and then composing activities into a curriculum.

The article starts with the presentation of language skills and reading comprehension. It then presents our approach of the use of the web for learning English as a second language. Finally a learner evaluation methodology is presented. The article ends with the conclusion and future trends.

**Keywords:** *Reading comprehension, E-learning, Assessment, Online Platform, Paper Submission.*

## 1. Introduction

This article describes a web based approach, where the web is used for educational activities. The main focus of this article is on reading comprehension of foreign language.

A new approach on the use of the web technology and how it was used in language learning, especially writing, is presented.

One of the main goals in our research work is to explore what are the best web learning practices and activities are in terms of assisting and supporting learning to become a more meaningful process. Another goal is to explore from a pedagogical perspective the innovative future learning practices, which are related to the new forms of studying.

## 2. Language Skills and Writing

In order to understand the problem being considered in this article, it is of primary importance to know what are the capacities concerned during a learning process of a foreign language. We point out that the capacities in learning a language represent the various mental operations that have to be done by a listener, a reader, or a writer in an unconscious way, for example: to locate, discriminate or process the data. One distinguishes in the analytical diagram, basic capacities which correspond to linguistic activities and competence in communication that involve more complex capacities.

### 2.1 Basic Language Skills

The use of a language is based on four skills. Two of these skills are from comprehension domain. These are oral and written comprehension. The last two concern the oral and written expression (see Table 1). A methodology can give the priority to one or two of these competences or it can aim at the teaching/learning of these four competences together or according to a given planned program.

On one hand, the written expression paradoxically is the component in which the learner is evaluated more often. It is concerned with the most demanding phase of the learning by requiring an in depth knowledge of different capacities (spelling, grammatical, graphic, etc.). On the other hand, listening comprehension corresponds to the most frequent used competence and can be summarized in the formula "to hear and deduce a meaning". Chronologically, it is always the one that is confronted first, except in exceptional situations (people only or initially confronted with the writing, defective in hearing, study of a dead language (a language that is not in use any more), study of a language on the basis of the autodidact writing).

|               | Oral      | Written |
|---------------|-----------|---------|
| Comprehension | Listening | Reading |
| Expression    | Speaking  | Writing |

Table 1: Basic languages skills

## 2.2 Reading Comprehension

Reading comprehension can be defined as the level of understanding of a passage or text. It can be improved by: Training the ability to self assesses comprehension, actively test comprehension using questionnaires, and by improving met cognition. Teaching conceptual and linguistic knowledge is also advantageous. Self assessment can be conducted by summarizing, and elaborative interrogation, and those skills will gradually become more automatic through practice.

Reading comprehension skills separates the "passive" unskilled reader from the "active" readers. Skilled readers don't just read, they interact with the text. To help a beginning reader understand this concept, you might make them privy to the dialogue readers have with themselves while reading. Skilled readers, for instance:

- Predict what will happen next in a story using clues presented in text
- Create questions about the main idea, message, or plot of the text
- Monitor understanding of the sequence, context, or characters
- Clarify parts of the text which have confused them
- Connect the events in the text to prior knowledge or experience.

## 3. Related work

There has been much work on online reading focusing on new interaction techniques [1] and [2] to support practices observed in fluent readers [3] and [4], such as annotation, clipping, skimming, fast navigation, and obtaining overviews. Some work has studied the effect of presentation changes like hypertext appearance [5] on reading speed and comprehension.

The findings support what other studies have found in terms of positive influence of online environment on students' performances [6], [7], [8] and [9], but cannot be a substitution for them. The characteristics of online environment can increase students' motivation, create highly interactive learning environments, provide a variety

of learning activities, offer independence to users in the process of learning, improve learners' self confidence, and encourage learners to learn in a better way with technology-based tools.

Nowadays, most of the universities are asked to enhance of their personals' skills in order to utilize the new technologies in their teaching activities in an efficient way [10]. One of the modern technologies is online learning environment which is a software application to be used to integrate technological and pedagogical features into a well-developed virtual learning environment [11], [12] and [13]. Students have easy access to course materials, take online tests and collaborate with class mates and teacher.

## 4. Web-based application

### 4.1 Software architecture

The course management system is a web-based application with server-side processing of intensive requests. The environment provides the three principal users (teacher, learner, and administrator) a device, which has for primary functionality the availability and the remote access to pedagogical contents for language teaching, personalized learning and distance tutoring. The e-learning platform allows not only the downloading of the resources made available on line (using a standard navigator).

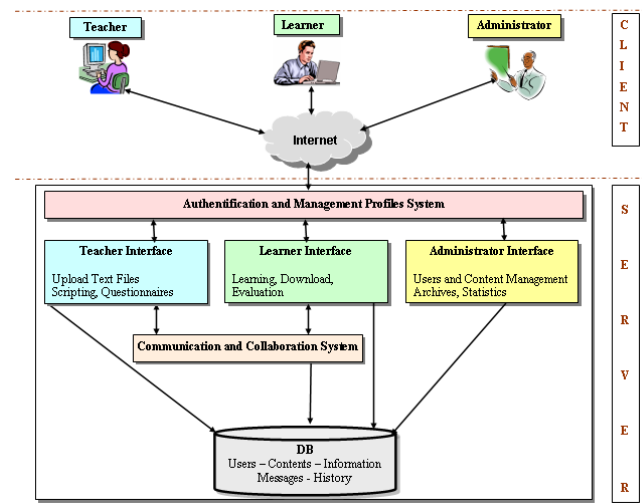


Fig. 1 Basic architecture of the environment

### 3.2 Teacher's interface

The Environment requires appropriate models for structuring and delivering content to be used. Different needs of learners require specific approaches. Then, we propose a model for structuring content that allows rendering for different users as well as presentation of the content in different levels of details according to didactic concepts like case study, definition, example, interaction, motivation, and directive. This approach allows adaptation of content (granularity of content, content selection based on didactic concepts) at run time to specific needs in a particular learning situation.

The environment allows the teacher, via a dedicated interface, to make at the learners' disposal a considerable large amount of textual documents, of excellent quality to read to. These documents are created by the teachers or recovered from Internet. The interface also makes it possible to the teacher to describe in the most complete possible way the files. Relative information to each file is: the name, the language, public concerned, expected pedagogic objectives, the period of accessibility, the source, copyright, etc. Thus documents prepared by the teacher are loaded in the database located on the platform server. If the learner can put his/her own techniques and strategies to understand the reading comprehension, then the instructor role consists in helping him/her to develop and enrich the learning strategies.



Fig. 2 Teacher interface

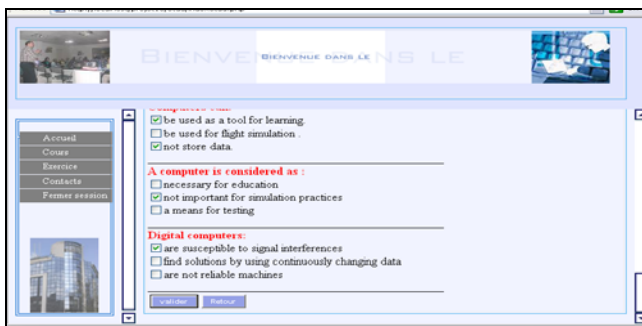


Fig. 3 Learner interface

### 3.3 Learner's interface

Learners with laptops can enter the learning space, see published courses and take part in them via their browser. Users can collaborate with other learners or teachers via discussion forums and Chat areas. Web content is dynamically adapted to the small screens.

- Collaboration Module locates people and provides for the transfer of documents and files between people logged into the environment.
- Course Access Interface provides for updating lessons, homework, and other assignments as well as the transfer of documents between learners and teachers.
- Communications tool launches a variety of communications options including text, audio and provides for 1-to-many, many-to-1, and 1-to-1 communication.
- Interactive Logbook a variety of service options including history access, and editing of user profiles

### 3.4 Interactive Logbook

The goal of the logbook is to set up an automatic book keeping information related to the learner's activity while he/she carries out a scenario on a teaching object (date and duration of each connection, exercises for self evaluation, etc). This requires an effort of information structuring and an implementation within the platform. An exploitation of this information by learners can guide them through their training plan.

The metaphor of the Interactive Logbook was conceived from the very traditional personal learning environment – a logbook, kept by learners to record lectures, laboratories, project notes and more besides. Although in many subjects, especially in the science disciplines, logbooks are still an integral part of courses, they are not well used by learners. Since many learning activities are taking place digitally: writing essays, analyzing data, browsing the web, online discussions - it doesn't make sense to print or copy out the output for a paper based logbook.

Although the interactive logbook extends to network capability and digital search, the name 'logbook' gives an impression of the flexibility and purpose of the tool. The Interactive Logbook seeks to provide a place in which personal information can be stored completely, privately and for all time.

By being integrated with the environment in which much of the learner's activity takes place, physical time and effort barriers can also be reduced, made even lower by automated logging of basic documents and events (emails, documents, diary entries, etc.) [14]. Finally, a statistical analysis of logbooks of a group of learners that have done the same activity would give a synthetic vision of the group's learning, and would be useful to all people involved in the learning.

### 3.5 Communication and collaboration using mobile devices

In the environment, learners have to find the same classical environment as they have in real life. In this environment learners can ask for all questions whenever they need and they discuss a lot together of interesting or pointless subjects.

The environment also support group communications by offering discussions, forums and shared workspaces where learners can exchange documents using podcasting tool. We distinguish between asynchronous and synchronous communication facilities. Social contacts are a crucial point in learning situations. Learners should therefore be able to present themselves in a personal homepage with a photograph, a list of hobbies and other personal aspects. Such personal presentations are not toys, but they can help the learners to get into contact even more easily than in live classroom situations. There is a great potential in using mobile terminals for communication services.

The communication and collaboration system launches a variety of communications options including text, audio, video, and whiteboard and provides for 1-to-many, many-to-1, and 1-to-1 communication. It provides a powerful architecture for the development of new educational tools to enhance different modes of teaching and learning. It is ideally suited to mobile learning and able to integrate tools developed explicitly for mobile contexts. The opportunity is to leverage the platform to develop innovative tools that are applicable to (1) synchronous formal learning (e.g., classrooms) and (2) asynchronous informal learning (e.g., discussion in the cafeteria).

There are a number of learning activities in formal educational environments (such as teacher-led classroom scenarios), which are ideally suited to mobile learning tools. Synchronous learning activities such as polling/voting and question and answer (where the system immediately collates all responses and presents an aggregate view of votes or answers to all learners) are ideal for pedagogically rich learning.

Features which are unique to the system and which would enhance the learning include:

- The ability to easily sequence activities into re-usable lesson plans (using a simple visual "drag and drop" lesson planner).
- Recording of learner responses for later review by learners/teachers and the option for teachers to create "question & answer" activities with either anonymous or identified answers from learners (which provides a basis for more honest answers due to the lack of peer pressure).

Informal learning scenarios (such as student discussion in a cafeteria) provide environments where mobile devices can support flexible, "on the fly" learning opportunities. Valuable learning activities in these contexts could be supported by a content sharing tool, and discussion forums and live chat/instant messaging for questions and responses to other learners or the teacher.

Again, the environment provides unique features to support these activities by providing an environment to manage and deliver these tools in the context of asynchronous (and synchronous) informal learning, including recording of activities for later learner/teacher review, and creation of re-usable lesson plans (based around informal student learning using flexible toolsets).

## 4. Experimentation

In Algeria, we evaluate the reading ability of student's university by giving them reading comprehension tests. These tests typically consist of a short text followed by questions. Presumably, the tests are designed so that the reader must understand important aspects of the text to answer the questions correctly. For this reason, we believe that reading comprehension tests can be a valuable tool to assess the state of the art in natural language understanding.

The main hypothesis of the present research study is as follow: the ongoing integration and utilization of the computer within the English language reading comprehension will firstly enhance the learners' affect exemplified by high motivations, and self-confidence. Consequently, when learners are motivated, they learn better and acquire more knowledge.

Secondly, empower the English teachers' roles and responsibilities as active agents of pedagogical and technological change.

The main objectives of the current work are to investigate, firstly, the validity of computer-assisted comprehension

reading and secondly, to attract both teachers and learners' attention as to the crucial relevance of the urgent integration the computer in English language learning in Algerian university. This study was conducted in intranet-based English language classroom with student of fifth year preparing the engineering degree of Computer Science Department in the Faculty of Engineering of the University of Batna, Algeria. Therefore, any obtained conclusions or results will apply of them.

There is a myriad of appropriate methodologies for the study of different learning problems. The selection of one and the avoidance of other is not a simple task at all. The nature and purpose of the investigation and the population involved will help the research to which method to be dealt with. In our present research work which investigates the possibility to adopt and adapt the computer in English language as instructional means and the way it can affect positively the learners, we found it more convenient to opt for the experimental research methods.

The Reading comprehension has come to be recognized as an active rather than a passive skill and its importance acknowledged in the acquisition of language. With the emergence of multimedia as teaching tools, it is being given renewed attention.

To verify if comprehension is reached, the learners are invited to answer to short instructions written in English language, without required that they write them in the sentences forms. The tasks of comprehension credited on the marks-scale, which appears on the specific grid, provide for each support and are distributed to the learners [15].

#### 4.1 Material

Text has been used in an exploratory study with similar students, the findings of which showed the texts as suitable in terms of content and level.

The text is general enough to be understood by students and do not require a deep specialist's knowledge of the topic discussed.

A set of multiple-choice comprehension questions was prepared for the text. All the questions were conceptual, focusing on main ideas and purpose of the writer, organization of the text. The multiple-choice format was chosen, despite much of the criticism on this method of testing, after a preliminary study with the open-ended format of questions which yielded too many divergent responses.

#### 4.2 Procedure

Every student participated in two sessions separated by 2 weeks. In the first session, the "Computer" text was used; in the second session, the "Network" text was used. In each session, the students of one group received the "computer" condition and other the "paper" condition. Thus, every student was exposed to the two contents (Computer and network), each content in one of two processing conditions ("paper" and "laptop"). In the first session, one group of the students used the paper sheets like support of work (reading and answering) for the "Computer text"; the other one used the laptops as work support for the "Network" text. In the second session, those students who had received the "laptop" condition in the first session received the "paper" condition for the "Computer" text, and those that had received the "paper" condition in the first session received the "laptop" condition for the "Network" text. The information concerning every session are summarized in the table 2.

The test condition involved the following instructions:

Read the following text. You have fifty minutes for this task. The conditions were explained to students who asked for clarification. The set of multiple-choice questions was distributed to the subjects with the text on their desks.

After 50 min, all the materials were collected. The students has a good or a very good knowledge of computing and didn't know at all or a few about the principle application (two persons out of five knew a little its principle of working).

The choice deliberated of this kind of people was conclusive because, contrary to beginners, they proved to be cooperative, and looked for testing the system, what helped us to identify the limits and weakness of this first version of the application.

In our project, we proceeded to the experimentation of the understanding of English language by using our developed system. In other words, we submit a text in English language to read, followed by exercises of Multiple Choice Question (MCQ) and True/False type on sheet of paper (classical method) for a group of users, and on a laptop for another group of users. The text to read and the exercises are elaborated by a specialist teacher at the department of English language of Batna University.

The set of the proposed exercises are marked on 20 points.

Our population is constituted of 20 students' 4th year computing engineer distributed in two groups:

- 10 students participate in this experimentation on sheets of paper.
- 10 students participate in this experimentation on laptop.

The interest of this experimentation is to answer the following question: Does the use of sheet of paper in written comprehension is more efficient than the use of the laptop (H0 hypothesis)? To answer this question (H0 hypothesis), Fisher statistical method is adopted.

Among the 10 students, 5 students work in an individual way, two groups (formed of 2 and 3 students) work together, i.e. they collaborate to read and to understand the text and solve the proposed exercises together. The same thing is made for the experimentation on sheets of paper, but in that case, the students find the text and the exercises on a laptop and are marked in an automatic way.

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Table 2: The groups of work

|           |  |
|-----------|--|
| Group 1   | 5 students working separately on laptop                          |
| Group 2   | 5 students working separately on sheet of paper                  |
| Group 1.s | 2 groups of students (2 or 3) working in collaboration on laptop |
| Group 2.s | 2 groups of students working in collaboration on sheet of paper  |

### 4.3 Statistic study

Our main objective is to try to answer the following question: "Is the traditional use of paper sheets as work support in the reading comprehension more effective than the use of the laptop concerning this population (assumption H0) ? "

By applying the Fisher method, one calculates the sum of square method, SS meth, and the sum of the residual,

SSres to reach the factor Fisher F. The results are available in figure 3 with: Degree of freedom = 3 and the critical point of Fisher  $F_{3,16}(0.05) = 3.23$ :

From the obtained results we have  $F > F_{3,16}(0,05)$ , therefore, one rejects  $H_0$  i.e. the use of laptop is more effective than the use of traditional paper sheets.

One can note starting from the Fisher's result that the use of microcomputer by our learners helped us obtain a higher performance than working on the traditional paper sheet and we noted the collaborative learning with a help of a micro portable provided us with the better performances.

| Variance Analysis: (Fisher) factor |                   |                   |                 |          |             |                     |
|------------------------------------|-------------------|-------------------|-----------------|----------|-------------|---------------------|
| Groups                             | Number of samples | Sum               | Average values  | Variance |             |                     |
| Paper=individually                 | 5                 | 58                | 11.6            | 4.3      |             |                     |
| Paper+collaboratively              | 5                 | 58                | 11.6            | 0.3      |             |                     |
| Laptop=individually                | 5                 | 72                | 14.4            | 2.3      |             |                     |
| Laptop+collaboratively             | 5                 | 77                | 15.4            | 0.3      |             |                     |
| Variance Analysis                  |                   |                   |                 |          |             |                     |
| Variation sources                  | Sum of squares    | Degree of freedom | Mean of squares | F        | Probability | Critical value of F |
| Between Groups (SSmeth)            | 56.95             | 3                 | 18.98333        | 10.5462  | 0.00045258  | 3.2388              |
| Among groups (SSres)               | 28.8              | 16                | 1.8             |          |             |                     |
| Total                              | 85.75             | 19                |                 |          |             |                     |

Fig. 4 Fisher results

By applying the Fisher method, one calculates the sum of square method, SS meth, and the sum of the residual, SSres to reach the factor Fisher F. The results are available in table 3 with: Degree of freedom = 3 and the critical point of Fisher  $F_{3,16}(0.05) = 3.23$ :

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#### 4.3 Limitations

The present study deals with four year learners' poor reading performances at the department of Computer Science at Batna University. Any conclusion drawn from

the experiment will be limited to the targeted population only.

## 5. Future Trends

We have started experimenting with the use of the environment in real teaching/learning situation. This experimentation allows us to collect information on the effective activities of the users. We can thus validate or question certain technical choices and determine with more precision the adaptations that have to be made to the integrated tools Feedback from a panel was very positive and the mobile aspect of environment was seen as a novel and interesting approach as a research tool. A detailed evaluation of the effectiveness of the learning environment has yet to be completed. In prospect, the approach aims at developing in the learners other language skills, so that they can express themselves in foreign language.

## 6. Conclusion

We presented in this paper an original approach for reading comprehension of English second foreign language by using web-based application. According to the study of the experimentation result, we can conclude that learning by computer doesn't stop evolving, and the learner finds a simple method of education.

The obtained results supported our hypothesis that claims that the use of web based application can contribute in improving the students' reading comprehension. Henceforth, we recommend the generalization of this new technology in our schools and universities to allow students take a maximum advantage of it.

## References

- [1] J., Graham, "The reader's helper: a personalized document reading environment", Proceedings of CHI '99, 1999, pp. 481-488.
- [2] B. N. Schilit, G. Golovchinsky and M. N. Price, "Beyond paper: supporting active reading with free form digital ink annotations", Proceedings of CHI '98, 1998, pp. 249-256.
- [3] G. B.Duggan, S. J., "Payne: How much do we understand when skim reading?!", Proceedings of CHI '06, 2006, pp. 730-735.
- [4] K. O'Hara, A. Sellen, "A comparison of reading paper and on-line documents". Proceedings of CHI '97, 1997, pp. 335-342.
- [5] D. Cook, "A new kind of reading and writing space the online course site", The Reading Matrix, Vol.2, No.3, September, 2002.
- [6] V. Fernandez, P. Simoa, J. Sallana : "Podcasting: A new technological tool to facilitate good practice in higher education", Computers & Education, Volume 53, Issue 2, September,2009, pp. 385-392.

- [7] W. Tsou, W. Wang and H. Li, "How computers facilitate English foreign language learners acquire English abstract words", *Computers & Education*, 2002, pp. 415–428.
- [8] Y.L. Chen, "A mixed-method study of EFL teachers' Internet use in language instruction", *Teaching and Teacher Education*, 2008, pp. 1015–1028.
- [9] M. Rahimi, S. Yadollahia, "Foreign language learning attitude as a predictor of attitudes towards computer-assisted language learning", *Procedia Computer Science Volume 3, World Conference on Information Technology*, 2011 Pages 167-174.
- [10] Turan, "Student Readiness for Technology Enhanced History Education in Turkish High Schools", *Cypriot Journal Of Educational Sciences*, 5(2). Retrieved, from <http://www.worldeducationcenter.org/index.php/cjes/article/view/75>, 2010.
- [11] S. Zidat, S. Tahy and M. Djoudi, "Système de compréhension à distance du français écrit pour un public arabophone", *Colloque Euro Méditerranéen et Africain d'Approfondissement sur la FORMation A Distance,CEMAFORAD 4*, 9, 10 et 11 avril, Strasbourg, France, 2008.
- [12] S. Zidat, M. Djoudi, "Online evaluation of Ibn Sina elearning environment", *Information Technology Journal (ITJ)*, ISSN: 1812-5638, Vol. 5, No. 3, 2006, pp. 409-415.
- [13] S. Zidat, M. Djoudi, "Task collaborative resolution tool for elearning environment", *Journal of Computer Science*, ISSN: 1549-3636, Vol. 2, No. 7, pp. 558-564.
- [14] O. Kiddie, T. Marianczak, N. Sandle, L. Bridgefoot, C. Mistry, D. Williams, D. Corlett, M. Sharples. and S. Bull, "Logbook: The Development of an Application to Enhance and Facilitate Collaborative Working within Groups in Higher Education". *Proceedings of MLEARN 2004: Learning Anytime, Everywhere*, Rome, 5-6 July.
- [15] J.-F. Rouet, A. Goumi, A. Maniez and A. Raud. "Liralec : A Web-based resource for the assessment and training of reading-comprehension skills", In C.P. Constantinou, D. Demetriou, A. Evagorou, M. Evagourou, A. Kofteros, M. Michael, Chr. Nicolaou, D. Papademetriou & N. papadouris (Eds.), *Multiple Perspectives on Effective Learning Environments*, 2005, (pp. 113).

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