Aleksandra Kledecka-Nadera

Application of Computer Assisted Language Learning in the Development of Reading Comprehension Skills

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prof. Włodzimierza Sobkowiaka
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Chapter 1
Theories and approaches to reading skills

The division of language skills into speaking, listening, reading and writing has been known for centuries. What has been changing throughout centuries, however, was the emphasis on particular language skill in a particular period. During the Middle Ages, for example, speaking was of paramount importance, as monks needed to have a good command of spoken language, Latin at that time, to conduct masses. After the classical period, Renaissance, the main focus of foreign language learning was on grammar. With the development of printing in the middle of the 15th century and the dissemination of books on which both teachers and students had to rely, the need to develop reading and writing skills came to light. Though throughout the centuries a lot of emphasis was put on the development of reading skills in schools, nowadays it is unfortunately neglected, which leads to hindering the development of other language skills, writing particularly. But also a learner’s vocabulary suffers, as well as the ease of constructing complicated sentences.

Reading exercises were practiced already in the Middle Ages. At that time teachers concentrated on intensive reading, as opposed to extensive reading which has been trained from the nineteenth century. H.E. Palmer was probably the first person to distinguish, in 1964, between the two types of reading:

Reading may be intensive or extensive. In the first, each sentence is subjected to a careful scrutiny – in the latter book after book will be read through without giving more than a superficial and passing attention to the lexical units of which it is composed (Palmer, 1964:131)

Intensive reading derived from praelectio, the classical exercise of parsing all the words in a sentence and translating them. The technique was applied in the Grammar-Translation Method, which was mainly based on praelectio. Such a deep grammatical insight into the constituents of a text began to be criticized only at the end of the eighteenth century “as a danger to English because it encourages the
misuse of words and idiom and fosters the habit of writing nonsense” (Rouse, 1908).¹ With the advent of the Direct Method extensive reading took the place of the disapproved intensive type. Extensive reading does not imply translation and it focuses on ideas rather than on grammar. Moreover, reading behaviour to be developed is to be an approximation of the reading behaviour of a native speaker – foreign words should be immediately matched with their denotation without prior translation into the learner’s native language. The majority of the activities involved in reading are based on the extensive reading model, some of them being: reading to gain an overall impression of a text, to find information on a topic in question, to answer questions concerning a text, to comprehend denotations, as well as connotations of words constituting a text, and to expand upon information previously supplied.

Until the beginning of the twentieth century not many teachers applied, or even heard of, silent reading. Learners used to read aloud to the teacher and the reading behaviour the teacher could observe might be helpful in improving strategies for teaching L2 reading (Wallace, 1987:165). Reading aloud, however, was gradually replaced by silent reading as words did not have to be parsed any longer, but comprehended in the minds of readers. Thus, silent reading has begun its reign as the main reading technique.

Nowadays, the ordering of language skills tends to assign the paramount importance to listening and talking, and only then to reading and writing. Derrick Sharp is one of the advocates of such a division. He proposes a diagram which represents the suggested balance of language activities (Sharp, 1980:19):

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A similar division is also suggested by David Harding who writes that “The natural order in which language activities should be taught is (i) aural comprehension, (ii) oral expression, (iii) reading comprehension, (iv) expression in writing”.

Before embarking on various approaches towards the development of reading comprehension skills, the notion of reading readiness should be explained. According to Marcelle Kellermann there are two stages in the foreign-language reading process. In the first stage, the teacher’s help is indispensable, as he needs to lead learners through a text. In the second one, the bulk of work is done by students with a minimum help on the side of the teacher. In between these two stages, there is the literacy break-through (Kellermann, 1981:57), when pupils display their reading readiness. Not all students, however, show the readiness simultaneously. Some students are likely to be able to read before they are able to speak. Thus, they find a way to exercise their skill in reading tasks. Being aware of their poor spoken performance such students are satisfied to have ready-made materials for reading given to them.

Traditional theories approach reading as a process of comprehending words, then comprehending the relations between the words in a sentence, and finally uttering them or realizing them in silent speech. Methods like ‘look-say’, ‘whole word’ or phonic method are based on the presented view. Such techniques are very often equated with meaning-emphasis approaches. Words which are supposed to be new for the reader are displayed on flash cards before embarking on reading. Such a

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2 For the ease of formulating the ideas, the pronoun “he” instead of “they” will be used in the course of the treatise to indicate the teacher, the student or reader. It will refer, however, to both sexes.
process is considered to facilitate text comprehension. But at the same time it is also heavily criticised, as the words on flash cards are devoid of context, which is the key to proper understanding and then using the words.

For information theorists, on the other hand, the reader’s task is not merely to utter a text, but rather to think or predict what a text may unfold to him. Only then does the reader use his language skills to reduce their uncertainty about the text. As the reader’s knowledge conditions his success with a text, it seems reasonable to predict that the greater the reader’s knowledge of the world, the more proficient a reader he will be. Thus, the learner should be taught to make use of his background knowledge and of all the cues contained in a text, such as audiovisual support. As it is stated in an HMI document from 1980, “Once children have acquired the early reading skills, they should begin to learn to predict what may appear next in a piece of writing, to use various contextual clues…” (Wallace, 1986:115). Readers should take into consideration the context in which words or sentences appear, as disregard for the contextual aspect may lead to misanalysis of the meaning. Marcelle Kellermann gives a nice example of such a sentence: *The police were ordered to stop drinking after midnight.* The appropriate meaning of such sentences can be recovered only from the context. The significant influence of background knowledge can be easily observed in situations when the reader can define all the words in a sentence, nevertheless he is not able to interpret the sentence itself. This phenomenon can be explained by what might be called *cultural competence*, which is a mixture of our beliefs, knowledge, feelings, attitudes and behaviour. As far as reading goes, cultural competence helps readers predict, recognise and interpret content of a text (Kellermann, 1981:33).

Two currently distinguished approaches to the development of reading comprehension skills are Reading Component Approach and Metaphoric Approach. The first perspective subdivides reading into six “component skills and knowledge areas” and pinpoints the cognitive processes involved in reading as having an influence on comprehension. The six suggested skills and areas are:

(a) automatic recognition skills;
(b) vocabulary and structural knowledge;
(c) formal discourse structure knowledge;
(d) content/world background knowledge;
(e) synthesis and evaluation skills/strategies;
(f) metacognitive knowledge and skills monitoring (Chun & Plass, 1997).

“Automatic recognition skills” stands for recognizing letters, characters and words. Being the first stage of the foreign language reader development, the discussed skills involve lower-level processing.

Next comes the knowledge of vocabulary with whose help the reader tries to match written words with their mental representation and construct the meaning of the whole sentences. The words having mental representation, thus denoting objects, events or states are called content words. But there are also so called function or structure words performing grammatical functions, and not referring to any objects or events. Words like that, so, and, are some of the examples. They are infamous for posing serious problems for early readers who cannot memorise them as easily as content words, which hinders the process of text comprehension (Wallace, 1986:24). With the help of the structural knowledge, however, the meaning may be recovered even if the reader does not know some of the words, as on the basis of grammatical and syntactic rules the reader may speculate on some of the meanings.

Formal discourse structure knowledge is readers’ knowledge of the genre, which helps to predict the general organisation of the text. Thus, this is the knowledge of typical structures of texts (Wallace, 1986:43). As for the notion of content, it should be noticed that written texts must be about something, not just perform general functions of informing, persuading or ordering. The content should also be selected adequately to the kind of the reader. Thus, young learners should be presented with fairly easy texts not handling any serious ‘adult’ topics. Adult readers, on the other hand, would benefit from texts referring to events and situations which are of their interest. And such topics are mainly connected with politics and social life. The example given by Catherine Wallace could illustrate the case. She describes comprehension exercises on an article about Mao Tse Tung’s death, or on the role of the Health Service (Wallace, 1986:14).

The significance of the background knowledge of the world has already been described on page 3 and 4. Next on the list, namely synthesis and evaluation skills help the reader put the component parts of the sentence into a logical and meaningful utterance and evaluate which constituents are redundant for the overall meaning of the sentence. Metacognitive knowledge helps in fluent synthesizing of “textual subsystems (e.g. content, context, intent, language) into a larger metasystem of
meaning”. “(...) readers comprehend a text when they construct a mental representation for incoming pieces of verbal information” (Chun & Plass, 1997:61).

Skills monitoring, the last component to describe, is inseparably connected with the reading process, because it may be both conscious and subconscious. The reader may consciously or subconsciously monitor the reading process, examining the correctness of comprehension process.

The second of the aforementioned current approaches is Metaphoric Approach, which describes reading in terms of metaphors. The bottom-up approaches, the top-down approaches, and the interactive approaches are the most common metaphors found in literature. The first processing model, the bottom-up one, gives paramount importance to textual decoding which involves lower-level processes such as recognizing letters and words. The top-down models, on the other hand, emphasise the reader interpretation and prior syntactic and semantic knowledge which helps in predicting the content and aids interpretation. There are also models which incorporate both two models mentioned above. Their advocates suggest that linguistic knowledge of orthography, lexicology, syntax and semantics, interacts in the reading process. As the interaction involves all the mentioned sources of linguistic knowledge at the same time, poor knowledge of one of them may be compensated by greater reliance on one of the remaining three. The third metaphor, the interactive processing, can be interpreted as either the general interaction between the reader and a text or the interaction of many component skills that work together simultaneously in the process of reading. In the former interpretation, the reader makes use of his background knowledge to reconstruct the information conveyed by the text. The latter interpretation of the interactive model takes into account the influence of both lower-level (decoding) and higher-level processing (comprehension and interpretation of the text). “Simply stated, reading involves an array of lower-level rapid, automatic identification skills and an array of higher-level comprehension/interpretation skills” as Grabe puts it (Chun & Plass, 1997:62)³. What should be stressed, however, is the fact that the two arrays of skills operate simultaneously in the reading process.

³ As Chun & Plass do not provide in their references the pages on which Grabe’s quotes appear in the original source, they shall be quoted here as Chun & Plass, 1997.
The last two hypotheses concerning L2 reading that shall be presented are the Linguistic Threshold Hypothesis (LTH), also called “short circuit hypothesis”, and the Linguistic Interdependence Hypothesis (LIH). The first one states that: “In order to read in a second language, a level of second language linguistic ability must first be achieved”. Thus, to be a successful reader, one must also be a successful learner of a foreign language. According to the LIH, “reading performance in a second language is largely shared with reading ability in the first language” (Chun & Plass, 1997:63). It transpires that L1 reading performance is an indicator of L2 reading performance. Thus, the ability to read in one’s mother language could be applied in attempts to read foreign language texts. According to Buck, for example,

there is considerable evidence to demonstrate that people learn to read only once, whatever the language of their first literacy, and learning to read a second language is an extension of that literacy. So, though specific reading strategies may vary from language to language the basic processes of deriving meaning from systematised graphic shapes seems to be the same process (Wallace, 1986:70).

The ability to read and respond to a written text is significant for the overall communication, whether in a native or foreign language. It should not be neglected, as it may hinder the development of linguistic competence. Bullock report from 1975, for example, recommends that

Flexible reading strategies, i.e. the ability to skim, scan, or read intensively as the occasion demands, should be acquired at school and should be exercised throughout the curriculum (Bullock, 1975:524).

The development of reading skills should not be mechanical, as these skills condition general progress at school, as well as the effectiveness of the use of other language skills like writing, speaking and listening. By getting used to reading from the early stage of foreign language acquisition, learners get unconsciously accustomed to target language structures and phrases, thus generally to the way of constructing utterances. Reading enriches vocabulary, widens the knowledge of idioms and set phrases, because, as it was proved, new words and phrases are best memorised when they are provided in a context. While reading, the reader
encounters ready-given usage of words, which prevents him from inappropriate application of these words in subsequent stages of language use. The awareness of foreign language structures stemming from the beneficial influence of reading also facilitates comprehension of foreign language speech, thus, helps listening skills develop. Underdevelopment of reading skills, however, has the greatest impact on writing performance, as the writing skills are taught after reading skills have been developed well enough to proceed further. It seems obvious, thus, that inadequacies in reading comprehension skills affect the learner’s writing performance.

Moving back to reading as a purely mechanical process, a few words should be devoted to the importance of going beyond such an approach. Perceiving reading as a mechanical phenomenon focuses on already described lower-level processing, while not accounting for such activities as selecting information relevant to a particular topic, expanding on information previously provided, following sequence of instructions, identifying answers to questions concerning a given text, detecting information implied in a passage, interpreting and evaluating writer’s intentions, and showing awareness of the variety of literary genre. Realising the importance of reading skills development, Kellermann proposes four assumptions concerning methods of their teaching. According to her, “reading in a foreign language
1. must be taught according to a defined pattern;
2. must be taught in well-defined stages;
3. should occur frequently, regularly, and at first intensively;
4. should be accessible to all pupils literate in the native language” (Kellermann, 1981:9)

To conclude, as many researches revealed, people have an innate capacity to understand more than they actually know, and that understanding increases considerably with practice; put bluntly, with regular and extensive reading. Lack of practice and stimulation, on the other hand, may result in the reduction of understanding. Thus, good reading instruction and development of reading skills should become an educational priority for foreign language teachers.
Chapter 2

Reading comprehension, concomitant processes, and reading strategies

“The reader rather than the text is at the heart of reading process” (Nunan, 1995:65). Thus, the focus of all language teachers and linguists carrying research on reading behaviour should be on the reader’s mental processes, rather than solely on processes which a text undergoes. What is of paramount importance here, is the way the reader arrives at the meaning.

1. The process of text comprehension

The process of text comprehension is a combination of many sub-processes which shall be described in detail in the course of the chapter. The first stage of text comprehension comprises the learner’s active selection of relevant information from a passage and construction of mental representations of its linguistic contents, which entails the interaction of linguistic features of the text and the reader’s language proficiency. To construct coherent mental representations, the reader has to first create propositional representations which are based on the semantics of the text. In the next stage, mental representations are integrated into the existing mental model of the subject matter, which is aided by cognitive schemata. Additionally, the text comprehension can be facilitated by multimedia aids such as pictures, animations and other visual or auditory cues. Though they are independent of the presentation mode of the text, multimedia aids support the process of text comprehension (Chun & Plass, 1997: 71). To make the above described process more explicit, each of the mentioned phenomena shall be closely looked at.

1.1. Propositional representation

One of the terms provided in the description above, namely propositional representation, is used to describe subject matter in a mental language, thus in our mind or imagination. Statements which constitute the description can be either true
or false for a reader, as they reflect the content of the text, which does not have to reflect the reality or the reader’s mental representation of the world.

1.2. Mental representation

According to Stanford Encyclopaedia of Philosophy (http://plato.stanford.edu/entries), mental representation “is a mental object with semantic properties”. Thus, real objects have their reflection in the human mind, and moreover they acquire semantic characteristics of the real objects. The Computational Theory of Mind (CTM), for example, tries also to explain all psychological states and processes in terms of mental representation. According to CTM, the brain is a kind of computer, and “mental processes are computations on mental representations”. The theory also claims that “cognitive states are constituted by computational relations to mental representations of various kinds, and cognitive processes are rule-governed sequences of such states”. Thus, when the reader comes across a new concept during reading, he tries to compare it and to match it with mental representations stored in his mind. If no existing mental representation can account for the concept, then a new mental representation is created. The reference to mental representations is necessary for comprehending a reading passage.

1.3. Cognitive schemata

While reading a passage, the reader makes some assumptions about the contents of it and predicts, on the basis of his background knowledge, the events that are going to happen. David E. Rumelhart gives a very nice example of the above process. He provides a brief fragment of a story to be considered. It begins with: “Mary heard the ice cream man coming down the street. She remembered her birthday money and rushed into the house...” (Rumelhart, 1977:265). These few words are enough for most readers to suppose why Mary rushed into the house. The interpretation seems to be obvious – she wanted to take the money and buy an ice cream. Such information is not contained in the text, but readers will consider it plausible until it is contradicted by some other information. After all, Mary could have been afraid that the ice cream man could steal her money and she wanted to hide her possession.

Such concepts, which help the reader interpret the text, are called cognitive schemata. The term was first used by Barlett in 1932 (Nunan, 1995:68). According
to schema theory, the reader’s background knowledge and linguistic cues contained in the text are organised into interrelated patterns which are made use of in reconstructing meaning (Nunan, 1995:68). The reader makes connections which do not exist in the text, but which are provided by his schematic knowledge activated by linguistic cues. The schemata are particularly important to a second and foreign language learner, as they may be culturally dependent, which may hinder the process of text comprehension. It must be noticed, however, that more than one schema can be activated to draw a meaning from the text. Such a situation is often encountered in ambiguous texts which can be understood in many ways. Then, various interpretations of the text, provided by various schemata, are plausible without being mutually exclusive. It happens, however, that only one interpretation agrees with the author’s intentions. More complicated texts with only one intended meaning can serve as an example here. If the reader fails to activate an appropriate schema while digesting such a text, it may result in inability to comprehend the author’s message. Failure to comprehend the text may also be caused by the reader’s lack of the schema intended by the author. To sum up, the text is considered to be highly comprehensible, if only a single schema is needed to account for its overall meaning. Thus, the more different schemata are necessary, the less comprehensible the text is. (Rumelhart, 1977; Thompson:1987)

It was also discovered that schematic knowledge can both facilitate and inhibit the process of text comprehension. In his book Nunan mentions an experiment made by Aslanian (Nunan, 1995:69)\(^4\), in which subjects were to complete a multiple choice/gap test of a reading passage. Next, subjects were asked to explain why they had given a particular answer. It occurred that correct responses were often provided for the wrong reasons, and that subjects who had an adequate grasp of the text sometimes chose incorrect answers. Such a situation may occur due to the influence of schematic knowledge, as explained by Aslanian:

If readers rely too heavily on their knowledge and ignore the limitations imposed by the text, or vice versa, then they will not be able to comprehend the intended meaning of the writer. Whether one has understood the text or not depends very much on text variables such as sentence structure or length, vocabulary intensity,

\(^4\) As Nunan does not provide in his references the source of the quote concerning Aslanian’s experiment, it shall be quoted as Nunan, 1995:69.
number of new concepts introduced, the difficulty and novelty of the subject matter, etc. (Nunan, 1995:69)

1.4. Mental model

According to Mayer, a “mental model” is “a mental representation consisting of parts that interact with one another according to principle-based rules” (Chun & Plass, 1997: 64). When the learner reads a story, he constructs mental models of actions in which characters are involved. During reading the reader simply imagines the course of the action, which aids the comprehension of the text. Later, when he is to recall the story, he remembers his own mental model created during reading, rather than the contents of the text. What is interesting to note, the reader mostly remembers causal events, not incidental ones, as the former ones dictate the course of a story. [5]

According to Gerd Sommerhoff there are three categories of internal representations – mental models:
“Category A: representations of actual objects, events, or situations;
Category B: representations of imagined objects, events, or situations;
Category C: structures which combine these, plus sundry individual stimuli, into a fully integrated functional unit…” [5]

1.5. Multimedia aids for comprehension

The description of comprehension process provided at the beginning of the chapter also mentions multimedia aids for comprehension. Three types of the aids can be distinguished, first of them being aids for selecting information, second, aids for building internal connections, and third, aids for building external connections. Due to the first type of aids, the reader’s attention is drawn to certain aspects of the target information which is then processed. It subsequently results in the creation of a propositional representation of information.

The next type of aids, aids for building internal connections, help to organise ideas contained in the text into a coherent structure by providing the reader with clues concerning internal connections among the units of presented information. In this process, propositional representations are set in a coherent structure based on cognitive schemata. The last type of listed aids, aids for building external connections, helps to find connections between the ideas presented in the text and an
existing mental model. As a result, the mental model based on the propositional representations can be constructed and extended (Chun & Plass, 1997:64-5).

The aids for text comprehension can be presented not only in textual form, but also in visual or auditory form, or in their combination. Additional visual information can aid text comprehension, because it is generally an analogous representation of the information contained in the text. Thus, the connection between the visual information and the mental model can be directly established, which can bolster the process of text comprehension. There is, however, a difference between learning from the text and learning from pictures, as the information is provided in different ways. In the text, knowledge is presented in symbolic structures of a language and is processed sentence by sentence, that is, sequentially. Information conveyed by pictures, on the other hand, is presented in “visuo-spacial structure” (Chun & Plass, 1997:64), thus analogy can be made directly, based on common structural properties of visual representations. To put it bluntly, text comprehension entails the construction of propositional representations without which the construction of a mental model would not be possible. The comprehension of an image operates only on the establishing of the direct connection between the picture and the corresponding mental model. Being less complicated, and thus a faster process, the comprehension of images seems to greatly aid the comprehension of the corresponding text. With reference to this claim, Paivio proposed the so called dual coding theory (Paivio, 1986) which claims that verbal and nonverbal information is gathered and processed in two different storage systems: a verbal system and a nonverbal system. Though these systems are independent, they cooperate when it comes to the arriving at a meaning, providing, however, that the information is coded dually – in both systems.

2. The role of memory in the reading process

In the discussion of sub-processes constituting the reading comprehension process, some attention should also be devoted to the role of memory. Memory is, for example, responsible for remembering information which has been read and recalling it in an appropriate moment. This role, however, is a basic one, while memory is also accountable for more complicated processes. One of them is correlated with the activation of cognitive schemata, and constitutes the so called Minsky’s “frame”
theory. According to Minsky, human memory is a store of stereotypical situations (frames) aiding comprehension by providing a framework for interpreting new information (Nunan, 1995:67). Those frames are nothing else, but the already discussed cognitive schemata. Thus, it is memory that is responsible for activating them. Apart from stimulating the use of schemata, memory also compares new information with old information stored in the reader’s mind. New experiences are then processed in the light of the old recalled ones, which consequently leads to arriving at the meaning of the presented material (Estes, 1977:3). The new experiences are stored in so called short-term memory, while the old recalled ones in so called long-term memory. Long-term memory is responsible for permanent storage of information, though some of the information gathered in long-term memory may be forgotten and lost after some time. The knowledge governed by this type of memory influences people’s perception of the world, as it provides a particular framework to place new items of information (Easton, 1994). Already discussed schemata, which are responsible for the framework, are stored in long-term memory as well. Also perception through top-down processing is influenced by long-term memory, as the way in which new information is decoded is affected by background knowledge stored in long-term memory. Moreover, pre-reading questions, pictures or video clips accompanying texts activate schemata, thus long-term memory which is intimately related to comprehension and meaning. Short-term memory, on the other hand, is responsible for remembering new information for a short time - up to 20 seconds. Also the amount of information which can be stored in short-term memory is limited, the limit being established as 7 items, either numbers or words (Pastor, 1994). As far as reading is concerned, short-term memory is activated when the reader has to answer detailed questions about the text. Then the relevant information is kept until it is used, e.g. until a particular question is answered. Obviously, it happens that information from short-term memory is transferred to long-term memory.

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5 As Nunan does not provide in his references the source of the quote concerning Misky’s theory, it shall be quoted as Nunan, 1995:67.
3. Vocabulary knowledge, automatic and controlled information processing

Another factor having great influence on success in reading comprehension is vocabulary knowledge. According to Grabe, “virtually all second language reading researchers agree that vocabulary development is a critical component of reading comprehension” (Chun & Plass, 1997:70). The more proficient the reader, the faster access to the vocabulary item and its recall he will have. The way in which the reader perceives vocabulary items in a text may, however, differ significantly. He may process them either automatically or with control. Automatic processing comprises the automatic detection and recognition of visual information contained in the passage. What is vital, this processing disregards other kinds of information provided by the text. In automatic processing, visual recognition of words constituting the text occurs automatically, without any attention and control on the side of the reader, and thus, a parallel sequence of associative connections can occur simultaneously without interference. Since this process does not require any attention of the reader, the associative connections must be stored in long-term memory to be easily activated. Instinctive activation of automatic processing can, thus, occur only after extended practice.

Another way in which the reader may approach the text, namely controlled processing, refers to detection and recognition, but in a careful, feature-by-feature manner. What is characteristic for the whole process, the reader controls its activation and course. In case of controlled processing, only one sequence of associative connections can be activated at one time, as it requires the entire attention of the reader. However, the process does not entail extended practice to be used effectively (Schneider & Shiffrin, 1977:127,148). Automated and controlled processing may account for so called ‘miscues’, errors made by readers when reading aloud. Such miscues as misreading a sentence “My feather speaks Spanish” for “My father speaks Spanish” is possible if the decoding of what is written is purely mechanical, automatic. If, however, the deviation occurs but the semantic meaning is retained, controlled processing is certainly at work. Referring to the example above, the reader could read it, for instance, as “My Dad speaks Spanish” (Nunan, 1995:65).
4. Intensive and extensive reading

The literature on foreign language teaching frequently presents two subskills of reading: intensive and extensive, also called cursory, reading.

Intensive reading is a slow reading of a text aimed to explain every unknown word, grammar structure and style. It also very often involves translation of the read passage. As the main emphasis is on features of the text, rather than on its semantic context, the reader’s interest in the story may be reduced. The main goal of intensive reading, however, is complete and detailed understanding of the text, thus it is made use of when the reader encounters a more difficult foreign language text. Though intensive reading requires a lot of patience and attention, it helps strengthen the reader’s knowledge.

Extensive reading, on the other hand, focuses on the essence of the story, and very little attention is paid to details. The reader guesses the meanings of words and uses a dictionary only to translate key words indispensable for the overall meaning of the text. This subskill helps to obtain the feeling of the language. While intensive reading deals with shorter texts, extensive reading is generally associated with reading large amounts of material. Until, however, students read in quantity only, they will not become fluent readers. Thus, both intensive and extensive reading should be applied in the learner’s reading skills development.

According to Van Parreren, the training of the two subskills of reading is impossible without the training of more elementary skills. The most vital subskills for intensive and extensive reading are:

- “recognising the type of text (fictional, informative, etc.);
- recognising different types of text structure (story scheme, etc.);
- predicting and summarising the content of the text or of passages from it;
- making inferences with respect to information that is only alluded to, but not explicitly mentioned;
- determining the meaning of unknown words from the context;
- analysing the word form of unknown words;”

(Van Parreren & Schouten-Van Parreren, 1981:236)
5. Reading strategies

To understand the reader and the nature of the act of reading more clearly and comprehensively, one needs also to find out and describe the reader’s strategies and reactions with regard to the reading task, and to see how the reader copes with the reading task and solves the problems. (Aslanian, in: Nunan, 1995:69)

Success in reading comprehension is not an inborn capacity and it can be learnt. Thus, to learn how to read successfully, four variables conditioning the course of reading process have to be taken into consideration. The variables are: the reader, the text, the strategies, the goal. As far as the reader is concerned, his reading skills are vital, as well as his interest in the topic. Such factors as sleepiness or hunger play a significant role as well. All these factors influence the success in reading. Also the type of the text has an impact on the reading process, as there is a certain degree of difference in difficulty between various types, e.g. between a novel and a scientific text. The most important factor, however, are reading strategies, as they affect reading in the most significant fashion. Unsuccessful language learners can either use too few reading strategies, or they can apply them in a chaotic way, which obviously impairs reading effectiveness. Also the reader’s purpose for reading is vital, as various purposes condition the use of particular strategies. If the reader only needs to gather general information, he will employ strategies appropriate for this goal, e.g. skimming. If, for example, he looks for more specific information, the best strategy to apply would be scanning.

There are many different reading strategies, but they are all based on the same basic assumptions. First, before reading, the reader should think about the purpose for which he is going to digest the text. Second, the reader should look at the title, headings, pictures, or any other visual cues accompanying the text. Third, the reader is advised to read the introduction and conclusion, or to read the first line in every paragraph, and only then the whole text. Fourth, the entire reading should be scanned to look for the most important parts to focus on during detailed reading. Fifth, the reader should take notes as he reads. Sixth, when the reader has problems with understanding a passage, he should stop and reread it once more. Seventh, long texts ought to be divided, as the longer the reader works with the text, the less he can focus on it entirely. Finally, the reader ought to retell difficult material in his own words, and possibly answer the questions concerning the contents of the text. After the
reading has been completed, the text should be considered in three ways. The reader ought to think about the basic information provided on the printed page, then he should draw additional information from between the lines, and finally, ponder on the meaning of the text referring it to his own experience (King, 1999).

The description of some reading strategies shall be provided in the subchapters below to illustrate particular steps they entail.

5.1. Skimming and scanning

If the task of the reader is merely to get an overall idea of the passage, he is most likely to use the strategy called skimming. This strategy enables the reader to say what kind of text it is and what kind of information it contains. Thus, the learner can expect what the passage is about and, consequently, he can activate appropriate schemata. Skimming is also helpful in deciding whether a text is relevant for particular reader’s purposes, as the reader can quickly estimate the relevance of the text by skimming it. Since this technique provides the reader with the main ideas of the text, it affords a logical framework for details to be fitted into it during more intensive reading. What is significant to add, during skimming the reader does not pay attention to details and can skip new words providing the text can still be understood.

If the reader’s task, however, is to quickly look for specific facts or key words and phrases, scanning should be applied. During scanning the reader runs his eyes down the page in search for particular information. If unfamiliar words are encountered, the reader should look them up in a dictionary, as they can be key words in the text. Scanning is also very helpful if the reader needs to search out statements, definitions etc.

To sum up, the use of both skimming and scanning improves retention of important details contained in a reading passage, as well as the speed of completing a reading task. [1]

5.2. SQ3R, SQ4R and PQ4R strategies

SQ3R, SQ4R and PQ4R strategies refer to particular advised steps to be taken during reading. ‘S’ stands for survey, ‘Q’ for question, ‘P’ for preview or purpose, and ‘R’ can stand for read, recite, review, reflect or write. All the listed methods
mainly differ as far as the number of ‘R’ factors is concerned, though some other differences also occur.

5.2.1. SQ3R strategy

SQ3R method, also called a reading study system, includes Survey, Question, and three times ‘R’: Read, Recite, Review. Each of the mentioned factors shall be closely looked at. The first factor, namely Survey, refers to gathering the information necessary to define goals and concentrate on the text. At this stage, the reader is advised to read the title and think of the topic it may suggest. To get more information concerning the author’s purposes, the reader is then recommended to read the introduction and summary. Also boldface headings and any graphics should be noticed and paid attention to, as they built a framework into which details will be fitted during intensive reading. The second factor, Question, helps the reader focus on the reading passage and get involved in the work with the text. It is the reader’s task to form as many questions concerning the text as possible, as such a procedure makes the reader engaged in the reading task. The third factor, Read, implies filling the earlier-built mental framework with detailed information. If possible, some additional questions regarding the text should be made up. Next, the reader should Recite, so after reading each section he ought to stop and try to answer his questions from memory. If he cannot do it, he should look back in the text again. Review factor is very similar to Recite one, but the former is applied after the whole text has been read, and the latter is employed after each small section of the text. [2]

5.2.2. SQ4R strategy

Similarly to the previous method, the reader should first briefly survey the text for the same purposes as described above. Question formation is also present for the same goals. SQ4R strategy contains, however, one ‘R’ more, namely writing. At this stage, the reader should write answers to all the questions he has made up. The answers, however, ought to be stated in the reader’s own words, which excludes mindless rewriting of sentences from the text. The learner can, thus, see that he has comprehended the text if he is able to meaningfully rephrase what is written in the text. The remaining two ‘R’s are Recite and Review which correspond to the ones from SQ3R strategy. [3]
5.2.3. PQ4R strategy

The first factor in this strategy is Preview. At this stage of reading the reader determines a general topic of the text and divides the text into units needed later at the Recite stage. Question formation is again present also in PQ4R strategy. This time, however, the four ‘R’s refer to Read, Reflect, Recite, Review. As the first, third and fourth factors have already been discussed, some attention shall now be devoted to Reflect factor. While the reader reads the text, he should ponder on it, look for its reflection in reality, his own experience and background knowledge. Thus, the main aim of reflecting on the text is to understand it. [3]

6. Speed reading

The aim of speed reading is to improve the speed at which a text is read and understood. The second aim is also to improve text comprehension itself. Owing to speed reading more information can be acquired in a shorter period of time. To enhance the pace at which the reader reads and comprehends the text, one should take such steps as reducing skip-back, reducing fixation time, and expanding the fixation zone.

During reading the reader does not process a text letter by letter, or word by word, but rather blocks of words by blocks of words. To read blocks of words effectively, the reader’s eyes should be fixed on blocks as long as possible. Thus, the larger the fixation zone, the more effective speed reading will be. The fixation time during which the eye is focused at a given fixation zone, is also very important, as the shorter fixation time, the more reading speed will improve. Since the reader processes the text in blocks of words by blocks of words manner, it may happen that at some point he will fail to understand a block of words, thus, he will have to move back to it. Such ‘returns’ are called ‘skip-backs’. The aim of speed reading then is to reduce skip-backs to a minimum, as they slow down the process of reading. [4]

Conclusion

As it transpires, the reading process can be influenced by many factors. All of those factors, however, are reader-dependent. Very important is the reader’s proficiency, and what results from it, his knowledge of vocabulary. As vocabulary is stored in the learner’s memory, also memory plays a very significant role in the whole process. Its additional task is to activate cognitive schemata. Appropriate
reading strategies, however, are of paramount importance, as they condition the success in the overall comprehension of a text.
Chapter 3
The advantages of CALL and the significance of its incorporation into language learning and teaching

1. A brief history of Computer Assisted Language Learning

The beginnings of Computer Assisted Language Learning can be dated in the 1960s, when, one day, "the Department of Modern Languages… was visited by representatives from IBM… who explained that they were convinced that the computer could be used as an instrument to help in education and specifically in language education" (Sanders, 1995). As a result, computers were introduced to language classrooms, and the new approach to language learning turned out to be very popular among students. As Sanders reports, "The computer proved very popular, more popular than the classes, I would say; students simply did not miss the computer; they like it, they felt they learned from it" (Sanders, 1995). She also adds that after introducing computers the students’ performance was significantly better, both in reading and writing. In the 1960s and 1970s, computers started to be used on an experimental basis for adult literacy instruction.

At the beginning mainframe computers were hooked through telephone lines to terminals which were connected to computers located in other rooms. In the 1970s, computers continued to be made use of for educational purposes. First institutions to launch the project concerning the use of computers in foreign language learning were the University of Illinois, Harvard, and Pennsylvania State University. In 1975 the first commercial program PLATO to teach basic skills was released. In 1979, Dr. Frank Otto began the development of the idea of ‘English as a Second Language course’ with the help of a computer. In his search for federal funding, he established contacts which resulted in the creation of CALICO in 1982/3, a significant organisation nowadays. From then on, the rapid development of CALL
has begun. During this most prolific period of development, many important events took place, and the most significant ones deserve mentioning. One of the aforementioned events happened in 1993, when John Higgins launched a postgraduate degree course in CALL with such components as e-mail and web for language learning, software writing, concordancing and data-driven learning. Students from all over the world eagerly joined the course. Another important event took place in 1997, with the first issue of the e-journal, ‘Language Learning & Technology’. The journal is a rich source of information concerning the vast range of topics on the application of technology in language learning. The journal is published by the University of Hawaii, which also offers training in CALL and produced a notable database of software and courseware. In July 1998, the inaugural WorldCALL conference was held in Australia at the University of Melbourne, attended by many distinguished linguists and scientists working in the CALL field all over the world. First materials for foreign language learning appeared on the Web in the early 90s, and they were quickly discovered and appreciated by the Internet users being both learners and teachers. The materials were not only cheaper, but also offered real possibilities for authentic interaction in the case of software for foreign language learning. Moreover, the Internet began providing free software such as Hot Potatoes by Half-Baked Software.

One might ask how it is possible that a computer program can take into consideration all the processes by which a human being acquires knowledge. The answer is quite simple. According to the underlying philosophy of learning, knowledge is sequential, incremental, and can be broken into parts. Such a learning theory is a perfect match for programmers who need to write software that follows a logic that can be understood by a machine which itself is based on sequences of tasks (Delcroque, 2000).

As far as pedagogical approaches to Computer Assisted Language Learning are concerned, the history of CALL can be divided into three stages: behavioristic CALL, communicative CALL, and integrative CALL (Warschauer & Healey, 1998). Behavioristic CALL implemented in the 1960s and 1970s was mainly based on language drills constituting the so called drill-and-practice exercises. The computer was perceived here as ‘a mechanical tutor’ (Warschauer & Healey, 1998). Next
stage, communicative CALL, was introduced in the late 1970s and early 1980s, and it emphasized the importance of exercises on using forms rather than on the forms themselves; it gave the students the opportunity to generate their own utterances and sentences, not only repeating ready-made ones. Communicative CALL worked on the assumption that learning was a process of discovery, expression, and development. Some software designed on the principles of communicative CALL included text reconstruction programs where, for example, words were mixed and students had to arrange them into a meaningful text (this type of program will be described in more detail in chapter 4). The advocates of the third stage, integrative CALL, criticized previous stages as they separated basic language skills. The basis of the third stage was integration of various skills like reading, writing, speaking and listening. Programs were mainly task-based and sought to place language learners in an authentic language context.

Technology has been developing constantly giving birth to newer and newer products and projects which prove successful among students, motivating them and keeping them interested in the work. According to Warschauer, ‘The multimedia networked computer (...) now potentially at the fingertips of every student (...) provides possibilities for such use as learning to read, write(…)’ (Warschauer & Healey, 1998). Since the Internet and software market witness the influx of such products, it is a sign that a new era of foreign language teaching has already begun, thus the traditional teaching approaches need rethinking.

2. The significance of the incorporation of CALL into language learning and teaching

The significance of the incorporation of CALL into language learning and teaching was noticed in 1983, during one of the annual TESOL conferences held in Toronto where more than ten percent of presentations concerned CALL and also some software was demonstrated.

Unquestionably, the idea of the application of a computer in foreign language learning and teaching was brought about by the rapid advent of overwhelming computerisation. Though the use of computers was, until recently, restricted only to specialists, nowadays it is more and more common and accessible for ordinary people, and more and more often incorporated into language instruction curricula. Thus, many teachers around the world have had to face the problem of adapting their
teaching methods to the new, promising and potentially successful ways of foreign language instruction with the help of a computer. The role of the computer seems to be more significant when compared to the role of ordinary textbooks and tapes with listening comprehension checks. As Nelson puts it:

The unique property of the computer as a medium for education is its ability to interact with the student. Books and tape recordings can tell the student what the rules are and what the right solutions are, but they cannot analyze the specific mistake the student has made and react in a manner which leads him not only to correct his mistake, but also to understand the principles behind the correct solution (Kenning & Kenning, 1983:2).

The computer focuses on its user’s progress, his mistakes and problems and guides the student through the learning process adapting its pace to the student’s abilities and learning results he has achieved. The advantage of the computer is, moreover, visible in the way in which the text is presented. The computer offers combination of a large range of multimedia aids like sound, graphics, photographs, animation and moving video, direct links and references to dictionaries, and glossary. All the mentioned applications serve to enhance learning, and comprehension of texts in the case of reading comprehension. “They help to make the language come alive to students for whom it is largely a distant abstraction” (Warschauer & Healey, 1998). Being able to manipulate learning materials, learners recreate language for themselves. Text manipulation programs, which will be described in details in the following chapter, can serve as a good example here. Activities provided by such programs encourage students to explore language, to become active learners rather than passive ones as it is often in the case of students using printed textbooks. There was much research carried out to assess the learners’ attitudes towards computer-mediated language acquisition. It turned out that students were strongly in favour of the method as it “delivered a high quality independent learning experience” (Brett, 1996). This and other examples of similar research will be described in the following parts of the chapter.
3. Advantages of CALL and its benefits for the learners developing reading skills

One of the most significant advantages of using CALL in the development of reading comprehension skills, often mentioned by many CALL specialists and teachers like Dangerfield, Kenning, Kitao, and Warschauer, is individualised instruction offered by the computer. It is widely known that learners’ learning styles, pace of learning can vary significantly even if the students are assigned to the same language learning group. Learners can also vary as far as the level to which they can develop particular language skills is concerned. Thus, in one class, there can be students good at speaking, but having problems with reading comprehension and students having their reading skill well developed, but being unable to speak fluently. Consequently, during classes dealing with reading, learners good at this field cannot further develop their skills, as they have to wait for their colleagues until they complete the task assigned to all the students. Using computers allows students to work at their own pace. Slower learners can catch up, and advanced students can do extra assignments. The computer records the work of each student which allows the teacher assess the needs and problems of individual students. Thus, he can guide the learners through the process of their reading comprehension skills development at various paces. Students can, moreover, choose the type of reading comprehension test according to their preferences, and they are not forced to do the types of exercises printed in the textbook. Computerised activities are also more challenging, interesting, motivating and they demand a lot of attention and full participation on the part of the learner.

Computers can present the text in a variety of ways apart from a plain printed one. The text can be accompanied by animation and sound which make both the text and reading more interesting. It can also be accompanied by direct references to a dictionary. By clicking a word with a mouse, the student receives the definition of the word, or its native language equivalent. In the case of so called glosses, which are also very often applied in reading comprehension tests, it is enough to point with a mouse at a word to receive its translation. With such help, student save much time they would normally spend on tedious skimming through a dictionary in the search of each word they do not understand. Glosses may, thus, encourage many students who are too lazy to browse through a dictionary to do reading comprehension exercises. Glosses may take various forms, they may be explanations both in target
and in native language, they may be pictorial or audio representations of the meaning of the words or phrases. Thus, multimedia glosses offer much more than traditional forms of glossing. “Through hypermedia-annotated text, readers will be able to approach the text more globally, rather than linearly. To achieve a more global understanding of the text, other multimedia annotations such as images, sounds, cultural, historical and geographical references, and guiding questions could enhance comprehension” (Lomnicka, 1998:42).

Some glosses appear in a new window on a computer screen, and some open within the window containing the text, which allows the reader to see the text while consulting the annotation. As the reader sees as many glosses as he wants and needs, they are not as obtrusive as the printed ones.

The usefulness of multimedia cues accompanying a text could be proved by quoting some examples of the research done in this field. One of the studies carried out by Lyman-Hager showed that a group which had access to multimedia-annotated text performed better than a group with a printed text with printed glossary (Lomnicka, 1998:42). A very similar research with similar results was also carried out by Chun and Plass (Lomnicka, 1998:42). Martinez-Lage even suggests that “students interaction with text facilitates understanding because students learn not only about language, but with language, thus promoting active reading” (Lomnicka, 1998:42). Glosses may, thus, encourage many students who are too lazy to browse through a dictionary to do reading comprehension exercises.

Computers always provide answers to the questions concerning the text in a task, which is often not the case as far as printed tests are concerned. Not all textbooks have a key with answers, and students very often come across copies of tests without a key. When learners cannot check if the answers they have given are correct, they see no point in completing the task, so they put it aside. Even if a textbook has a key, it is often very inconvenient to turn the pages innumerable times to the last pages to check each answer. Learners could, besides, cheat and look at the answers before completing the task. All those problems are solved by a computer which provides the answers by a click of a mouse, and makes it impossible to see them until all of the exercise is done. When the learner is in doubt about an answer, a hint can be provided by the computer by clicking on the help button. Some computer programs provide, moreover, an evaluation of the results after the task is completed, for example presenting the percentage of correct answers and giving a note or a
When the learner wants to finish the work with a program, it often sums up the results of all the exercises done on that day, giving an overall evaluation of the results. Thus, the learner can see the progress he has done. Doing many printed reading comprehension tests at once, the learner can have only a vague feeling of how well he has done.

Reading comprehension exercises have always been neglected by both teachers and learners. The teachers think that grammar, speaking and listening are much more important and students find reading comprehension tests boring. Computerised versions of such tests, however, have changed the situation significantly, adding a motivation factor to notorious question-answer comprehension checks. Though this fact may not change the attitude of many teachers, there is a chance it will alter the attitude of the learners. Dangerfield, for instance, cites two examples of research done by Watts, and by Brett, to give evidence that multimedia exercises are more motivating and attractive for the learners than the traditional books and tapes. “This may be due to the novelty factor or to the very appealing features of multimedia” (Brett, 1996). Also Chi James Wong claims, on the basis of his research, that students are generally positive about the use of computers for language learning. Wong did his research during a course with an intensive focus on reading and writing for academic purposes. He also incorporated some on-line reading tasks in the course. According to the students such a move provided the students with a good authentic reading activity. The learners believed that CALL activities were beneficial, and that “acquiring such knowledge [would] help facilitate language learning and academic and professional readiness” (Wong, http://www.coe.missouri.edu/~cjw/call/intern.htm). Almost every article about CALL describes students as eager to use computers in the learning process. They find traditional methods of language learning boring and tiring, and they feel that the materials presented on computers are new, fresh and more real, and the texts they read are more authentic. With the help of multimedia aids language learning programs make them engaged into language activities, reading comprehension activities among others.

Yet another possibility that computers can offer, contrary to a traditional language class, is privacy. When the learner works with the computer, only the machine and the teacher know his mistakes, so the learner is freed from the fear of being ridiculed for his mistakes by his classmates. During traditional classes students
having problems with reading comprehension very rarely volunteer to give an answer to a comprehension check question, as they are afraid they could be laughed at for not being able to master a level of reading skills which the majority of their group has already mastered. Eventually, they become passive readers and very often only skim through the text just to be on the safe side in case the teacher asks them for the answer. The computer encourages such students to try and become active. There is no time allotted for all the students to read the text, so the students who need more time to read the text can take their time and work at their own pace, which certainly increases comprehension. Since no colleagues judge their results, worse students are not afraid to answer the questions. It frees them to focus on the further development of reading skills, previously hindered by the fear of being mocked. Thus, computerised reading comprehension exercises may be particularly beneficial for learners regarding themselves as less able.

Since the computer activity of whatever kind, be it a text with questions, a maze, or a jumble, cannot be completed without the learner’s full participation, the student must be active all the time, which is easy taking into consideration the fun factor provided by the mentioned computer applications. The learner can no longer just passively listen to the teacher, as it happens during classes. The teacher, on his computer, has the reports of the progress of each student, so the students have to actively work to complete the task.

Another advantage of the computer for the development of reading skills is the access to authentic materials available on the Internet. “Through the use of authentic materials for (...) reading instruction, learners should be able to acquire ‘usable skills’ in real-life situations”(Kramsch, et.al., 2000:78). Not only can the learner search through the Web for an article on a particular topic, but educational software can automatically link him to constantly updated sites offering numerous extra reading materials (Warschauer & Healey, 1998). Thus, while texts offered in printed textbooks are unalterable, those provided by a CD-ROM give a student a chance to choose an article that would interest him. It is important to remember that materials must be adapted to the type of students, not the other way round. Students may not be, for example, interested in a particular topic so they will not focus and will be unwilling to be active. They may also not be able to understand a given text because of too great a cultural difference between the culture presented by the text and the culture of the readers. While the authors of printed books see no solution to
this problem, the designers of language learning software equip their programs with automatic links to particular Internet sites, offering a wide range of materials connected with a particular lesson. It is up to the learner which of the suggested texts he will choose.

4. The role of the Internet in the development of reading comprehension skills

Almost everyone nowadays knows the Internet and its extremely useful application in all fields of life. As the Internet is based on written language, it requires well developed reading skills to be “surfged through”. Obviously, people usually turn to search machines in their native language, but as it is known, people sometimes try other search machines, not necessarily in their mother language, when they are dissatisfied with the results of the previous ones, or want to find more information. It is also known that many people from all over the world publish their articles or other writings on the Internet but they hardly ever translate them. Thus, to use the World Wide Web effectively, not only L1 reading skills should be well developed, but also L2 ones.

When the readers digest a text on the Internet, they mainly make use of reading comprehension skills. But before they decide which text to choose, they come across many papers which they have to skim to get the main idea, and then apply critical reading skills to discard some of the texts. The initial process during which the reader looks for the information he needs, involves the application of lower level reading processes. Thus, to know which link to click, the reader activates his L2 vocabulary and syntactic knowledge. Generally, reading on The Web involves extensive reading, as the reader has to deal with a significant amount and number of texts.

As far as the benefits of the Internet for the language classroom are concerned, it offers an abundance of reading materials for both teachers and learners to choose. Also individual readers can benefit from this unlimited source of texts and increase their reading proficiency. The readers can choose Web sites with on-line newspapers offering up-to-date and interesting information, or other Web sites providing various articles on particular topics. Some of these Web sites are glossed, which encourages learners and makes reading easier, more fluent, and less time consuming. Another advantage of on-line texts is their authenticity, they are not
artificially designed for the purposes of teaching, but their authors focus on the topic rather than on the form. Also learner motivation is increased due to the novelty factor of on-line texts and positive attitudes of learners towards the use of computers in language learning. Krajka (Krajka, 2000) mentions also other advantages of on-line texts. One of them is the possibility to change an article if the chosen one has appeared to be inappropriate. The reader can also copy and edit it. He also emphasises that on-line newspapers provide current information, contrary to printed coursebooks. If the teacher decides, for example, that a particular article in the book is obsolete, he may look for its thematically connected substitute on the Internet. Searching the Internet for an article covering a particular topic, the students come across many materials presenting different points of view, very often culturally biased. Thus, the readers can become acquainted with the phenomenon of cultural differences which very often hinder appropriate comprehension of a text. As far as preparation of reading comprehension tests is concerned, the teacher can create such exercises himself by copying a text from the Internet and adapting it to the needs of the reading activity he has planned. But as Krajka emphasises, copyrights must be preserved in such situations.

To sum up, the development of the Internet may foster the development of reading skills and emphasise their importance, as the World Wide Web rests on a written language.
Chapter 4
Examples of software and their comparison with traditional methods of reading comprehension testing

Nowadays, there are more and more computer-assisted tests and educational games available both on the Internet and in the form of commercial software. Almost all of them are based on HyperCard, a software package which allows pen and paper texts to be presented in a non-linear form. With the use of this application, a text can be easily accompanied by sounds and graphics, which makes educational software much more interesting for its users. As Moira Monteith says, “...HyperCard has provided educators, and the children in their charge, with a rich environment in which texts, graphics and sound can be related in the process of building knowledge, making meaning and communicating” (Monteith, 1993). And indeed, the main difference between traditional and computerised language tests lies in their representation mode. But the most important difference is made by the fact that computers can provide many valuable activities which cannot be presented in a paper-printed form. Both differences will be depicted in the course of the chapter.

As the whole chapter is devoted to the analysis of reading comprehension exercises, the definition of reading itself should be formed. It will help to decide which of the exercises can be regarded as reading comprehension ones. One of the definitions, offered by Dictionary of Language and Linguistics, says that reading is “the skill of recognising and understanding written language in the form of sequences or graphic signs and its transformation into meaningful speech, either as silent comprehension or by reading aloud” (Hartmann & Stork, 1972:192). Thus, according to this definition, reading involves both lower and higher level processing. Hence, both exercises based on word reconstruction and recognition, and exercises based on the overall comprehension of the text, can be regarded as reading exercises.
1. Types of computerised reading comprehension tests and their comparison with pen and paper tests

1.1. Cloze tests

Both in a printed and computerised form, cloze tests are based on a text with gaps to be filled in. Also both forms can provide the learner with a list of missing words. And that is all that printed exercises can offer, what is more, they often lack a key with answers. Computerised cloze tests, apart from providing the key with answers, count points the learner has gathered, and present them in the form of percentages. Sometimes not only one correct answer is displayed, but also all range of words that can fit into a gap. This kind of exercise is very often accompanied by an on-line dictionary, which saves the learner much time he would normally spend on looking up unfamiliar words in a printed dictionary. Paper-based tests cannot provide any hint if the student does not know the answer at all. Computerised tests usually “uncover” the first letter of a word or a part of it. Some applications allow the learner to hear the text as many times as he wants to, which is also a kind of hint. There is yet another possibility. If the student types in a wrong answer, the definition of the correct word can be automatically displayed, and the student can try again. Students can also ask to see the definition, which is written in the target language, if they have no idea of what the answer could be. Some programs even allow the user to determine the gap frequency, which can change the level of difficulty of the same text. Thus, for example, if the learner feels that a particular cloze test is too difficult, he may decrease the number of deleted words and adapt this way the test to his abilities.

1.2. Jumbling

Jumbling means reordering words in a sentence, or sentences in a paragraph. The task of the learner is to organise them back into the right order. Basically, the activity is the same in the case of both computer-based and paper-based one. There are, however, significant differences. When students work with cut pieces of paper, it is relatively easy to lose one of the pieces. A littered table does not also make it easy for the learner to complete the task, as he may quickly get confused and discouraged. The way the computer presents the exercise is neat, organised and attractive, very
often accompanied by pictures. Another advantage of the computer over paper-based jumble exercises is the fact that the computer can offer help or a hint to the learner.

1.3. Question-answer tests

Pre-reading activities very often take the form of questions, for example multiple-choice or true/false ones. The learner has to answer them without seeing the text, as this is the aim of the exercise. In the case of printed books, the questions are very often placed above the passage which should be inaccessible for the reader until he finishes the task. The teacher is not able to prevent the students from looking into the text. The computer, on the other hand, displays only the questions, and will not let the learner see the text before the task is completed. Next, the learner is allowed to read the text and revise his answers. Students using books will simply erase the initial answers and will not be able to compare them with their final decisions. The computer, however, presents the final results in the most appropriate way. It shows both the former and the present answers of the learner, and compares them with the right ones.

1.4. A reading maze

A reading maze is a problem-solving activity based on a dilemma or a challenging task to be dealt with. This kind of activity involves the so called incidental use of reading, as the learner has to read through the written information to complete the task. At the beginning, the reader is presented with the problem followed by a question and a list of possible actions to take in response to this question. When the student chooses one of these options, the computer presents the consequences of this decision, and poses the next question also followed by the list of suggested solutions. The game is continued until some final state is reached. Reading mazes are also available in a paper-based form but they appear to have significant disadvantages in comparison with computerised ones. Paper mazes usually take the form of a book, and the reader, after making a decision, has to turn a particular number of pages to find out about the consequences of his move. The first disadvantage appears when the learner is not satisfied with his decision or cannot understand the text on a particular page. In such situations, the learner can easily turn pages back and change his decision. Such a move is prevented by the computer program which obliges the student to face the consequences of his choices and solve
the dilemma he has created by himself. Moreover, solving paper mazes, students sometimes get bored in the middle of the exercise and omit a few stages to speed up the completion of the exercise. Also this move is prevented by the computer.

2. The description of reading comprehension software

2.1. Developing Critical Thinking Skills

This program, produced by Merit Software, is designed to evaluate the learner’s comprehension skills. At the beginning the student has to sign in, which later allows the teacher to view his scores. The learner is presented with short pieces of a text in a small window. Next to the window various kinds of comprehension questions are displayed. These may be:

a) choosing the best replacement for the highlighted word in the text. Four options are given. If a student does not know the word, he can figure out its meaning from the text.

b) answering final questions, which exercises the learners critical thinking skills and reading comprehension skills. Such questions usually have the form “What do you learn from this paragraph that is NOT actually stated?”,
“Which sentence would best complete this paragraph?”, or “Which sentence could logically be inserted in this paragraph?”. Three options are given here.

c) deciding what title would be the best for the paragraph. Three options provided.

d) choosing the two best answers that describe what the paragraph is about. Four options are given.

If the learner chooses a wrong answer the computer will not provide the correct answer, but will try to make the learner think again and answer the question again. Moreover, the computer gives the learner the reasons why his answer is incorrect. An example of such a comment can be shown on the diagram above. Paper-based tests of this kind are only able to provide a correct answer, if at all. It discourages the learners from trying to answer the questions by themselves again, because as soon as they have the correct answers they will not bother to ponder why these and not their initial answers are right. Thus, this program makes the students work with the text, while the paper-based version contributes to superficial work with the exercise.

At the end of each exercise the computer displays a crossword containing words learned from the text the student has worked with. The text is shown in a window next to the crossword, thus the learner can read it any time to look for the word he needs to complete the task. If he still does not know the answer, he may click the <HINT> button to receive one letter of the missing word. This, however, costs him some points. In printed course books, there are also exercises on text-related vocabulary following the text. They are, however, merely word-match exercises or gap filling ones, and hardly ever is there the key with answers to these exercises. They are only contained in a teacher’s book, to which an individual
learner, learning the language by himself, has very often no access. Moreover, the printed exercises cannot provide any hints.

When the whole task is completed, a table with scores concerning particular parts of the test is displayed. Each attempt of an answer given by the learner is accompanied with a sound and a comment. When an answer is correct, a triumphant sound can be heard. Beneath the question window the learner can also see one of the following comments: wonderful, spectacular, splendid, superb, nice work, excellent. If a given answer happens to be incorrect, a long buzz can be heard and the computer displays such comments as, for example, “Not correct, try again. The paragraph is about .... We cannot learn anything about... because it is not mentioned at all”.

The program is also interesting as far as its layout is concerned. Windows are big enough, they are colourful but it does not disturb the user in concentrating on the exercise. The tasks in this program are focused on the application of intensive reading described in chapter 1 and 2. They also work to activate top-down models of reading comprehension which help in predicting the content of the text and aid interpretation. The detailed description of top-down models can be found in chapter 1.

A demo version of the program can be downloaded, and a full version can be ordered on the following Web site: http://www.meritsoftware.com/software/developing_critical_thinking_skills/index.html

2.2. Diagnostic Prescriptive Reading

Merit Software. This program is not based on longer texts, like traditional reading comprehension applications, but rather on two–sentence pieces with a multiple–choice question following them. To answer this single question the learner has to rely on his reading skills. An example of such an exercise can be the one below.

*While jogging, Andy looked back over his shoulder at a girl and ran right into a stop sign.*

*What happened first?*

- *He went out jogging.*
- *He ran into a sign.*
- *He saw a girl.*
• He looked over his shoulder.

This is one of the easiest examples, but there are sentences that need to be carefully analysed if the reader wants to give a correct answer. Below, there is another example:

Another type of exercise offered by the program is deciding which title would be the best for a short text displayed on the screen or deciding which of the three listed sentences describe the main idea of a passage. The user can also come across an exercise, for example:

The program also contains traditional reading comprehension exercises with multiple-choice answers.

Like in the case of Developing Critical Thinking Skills, a program described above and produced by the same company, Merit Software, the system of evaluating the user’s answers is the same. The learner can see the same comments and hear the same sounds. There is also a crossword at the end of each exercise the user has done well. In Diagnostic Prescriptive Reading a crossword contains a different task. This time the learner has to find the opposite word to the one written in capital letters. The word is incorporated in a sentence. The answer is a word within
the same or next sentence, for example: “The test will be easy if you read the whole book. It will be DIFFICULT if you skip some chapters”.

At the end of a set of exercises the computer displays the scores of the user.

As Diagnostic Prescriptive Reading was produced by the same company as Developing Critical Reading Skills, the advantages of exercises provided by this program over their paper-based equivalents are comparable.

A demo version of the program can be downloaded, and a full version can be ordered on the following Web site: http://www.meritsoftware.com/software/diagnostic_prescriptive_reading/index.html

2.3. Reading Critically Non-Fiction

This is another product of Merit Software. The program is based on texts concerning authentic historical events like the American Civil War etc. The learner is again provided with multiplicity of exercises which are divided into blocks. Each block begins with a vocabulary exercise where the user has to match highlighted words from the text with their synonyms displayed in the neighbouring window. There is always one additional word in the window which is not a match of any of the highlighted words. This makes the exercise a little bit more difficult. When the reader clicks on the word to match, its pronunciation can be heard in the loudspeakers.

Next, there is a traditional reading comprehension exercise with multiple-choice answers containing a very interesting way of giving hints to the user if his answer is incorrect. In such a case the computer asks the learner to look at the text again and highlights, at the same time, the piece of text containing the hint.
Such a hint can only be provided by a computerised test, and it makes the learner read the text again and figure out the answer on the basis of a particular piece of the text. In the case of paper-based tests of this kind, the learner checks the answers, counts points and moves on to the next question. But if the computer specifies a particular fragment to consult, in case the answer is incorrect, the learner is more likely to look at the text again. Again, the computerised version proves to be better at involving the student in the reading task.

What is worth noticing, in Reading Critically Non-Fiction the student works on the same text through the whole set of exercises, which is not the case in previously described Diagnostic Prescriptive Reading and Developing Critical Thinking Skills, where each question concerns a different text displayed next to it.

In the next type of exercise, which follows the reading comprehension exercise with multiple-choice answers, the user has to write down answers to the questions concerning the text he is working on. This kind of activity prevents the learner from random clicking on the buttons with answers and makes him work with the text. This kind of exercise activates the creation of a mental model described in chapter 2. Thus, when the reader has constructed a mental model while reading, in other words when he has imagined the whole story, he keeps it in memory, and when it comes to writing answers to the questions, the reader relays on the mental model rather than on the contents of the text. Some programs happen, however, to be insufficiently developed as far as the range of possible answers to accept is concerned. The learner can, for example, come up with a correct answer, but phrase it in a different way than the one expected by the computer. There are always many
options which can be accepted by the computer, but there are always more ways in which people express what they want to say.

The application of multimedia aids in the form of auditory and visual clues (highlighting if an answer is incorrect) is a powerful advantage of the program, as it bolsters comprehension.

A demo version of the program can be downloaded, and a full version can be ordered on the following Web site: http://www.meritsoftware.com/software/reading_critically_non_fiction/index.html

2.4. Fun With Text

The program was created by Marco Buzzone and Graham Davies, and produced by Cramsoft. It offers a variety of reading exercises, one of them being Clozewrite. The exercise contains a text with gaps to be filled in with an appropriate word. The student can see the text before doing the exercise. He may, moreover, decide how long he wants to see it. There are the following options to choose: read text for as long as you like, see the text for 30 seconds, see the text for 10 seconds, and start without seeing the text. Next the student is asked to choose the deletion interval (from 1 to 9). Then, the text with e.g. every 4th word deleted is displayed, and the student is asked to double click on the gap he wants to fill in. The learner writes his guesses in the window at the bottom of the screen. If the answer is correct, the word appears in the gap. If it is not correct, the computer indicates the number of letters in the word in the “guesses window”. If the exercise turns out to be too difficult because the deletion interval is too small, the learner can change it and start the exercise again. This is, obviously, impossible in the case of paper-based tests, which often discourages worse students and makes them give up completing the exercise.

Another exercise is called Copywrite. The authors provided two versions of this exercise, namely Easy and Hard ones. The student can again choose whether he wants to see the text. Next, in the Easy version, about 85% of letters are deleted from the text and the learner can only see boxes indicating the number and location of missing letters plus the 15% of remaining letters. The task is to complete the text by putting an appropriate letter in an appropriate gap. If the student guesses correctly, not only this single gap is filled, but also each gap containing this letter. At the beginning guessing of the words may be a matter of pure guessing, but as the learner
has more and more letters displayed, he may guess some words, not letters, from the context of a partially recovered text. Initial stages of the exercise activate lower-level (or bottom up) processes, thus recognising letters and words, while the more advanced stages necessitate the activation of top-down processes which are responsible for comprehension and interpretation of a text. All the mentioned processes have been described in chapter 1. This kind of exercise is inapplicable in a paper-based form.

Another exercise is called Prediction. After choosing whether to see the text or not, the student is presented with a blank screen, where only punctuation is left. There is also another window on the screen with a few words listed. The learner must decide which of these words is the first word of the story, then the second one and so on. This way the student has to complete the whole story. The scores are displayed through the course of exercises, changing every time any answer is given.

A demo version of the program can be downloaded, and a full version can be ordered on the following Web site: http://www.camsoftpartners.co.uk/#anchor249023
2.5. GapKit

This program, also created by Marco Buzzone and Graham Davies, and produced by Cramsoft, contains some activities aiming to practice reading comprehension skills. One of them consists in filling in a gapped text. The learner has two choices when he sees the gapped text: he can try to complete the exercise without any hints from the computer, and he can ask the computer to display a short list of words to choose from.

The fact that the learner can choose if he wants to see the list or not makes the program flexible for various types of learners. If the learner is quite good at reading comprehension, it is certainly better for him to guess the missing words only on the basis of the context. If the student happens to represent a lower level of reading comprehension skills, such a list can certainly help him, preventing him from giving up the exercise as being too difficult. In paper-based versions, such a choice is impossible, the list is either provided or not. Thus, computerised gap filling exercises are better adapted for an individual learner.

Another exercise also presents the learner with a gapped text. This time the learner has no access to a hint in the form of a list of words, but to a pictorial help. By double clicking the gap, the student is presented with a picture of a word that should be put in the gap.
A demo version of the program can be downloaded, and a full version can be ordered on the following Web site: http://www.camsoftpartners.co.uk/#anchor249023

2.6. AceReader Pro Deluxe

This program, designed by StepWare Inc., helps improve reading speed and mutual comprehension of the read text. It consists of a big window where a text is displayed, not as a whole, but word after word, so the reader sees only one word at a time.
As the authors of this program explain, the reader can read faster in that way because his eyes do not have to move. “The words come to your eyes instead your eyes going to the words” says the first exercise of the program. This technique of text presentation is called RSVP (Rapid Serial Visual Presentation). Such a reading exercise can be solely provided by a computer, its printed version is impossible to realize. What is worth noticing, the exercise requires great concentration on the side of the reader who has to entirely focus on both structure and meaning of the text. It is not enough to recognise letters, characters and words, thus activate lower-level processing operated by automatic recognition skills described in the first paragraph. The aim of this exercise is to activate the reader’s vocabulary and structural knowledge, formal discourse structure knowledge, content/world background knowledge, synthesis and evaluation skills/strategies; metacognitive knowledge and skills monitoring also described in the first chapter. The reader has to comprehend the text within a limited amount of time.

There is yet another technique utilised by AceReader, namely Tachistoscopic Scroll Presentation. The text is displayed in a manner that forces the readers’ eyes move just like they do in normal reading. This mode trains to read in a normal fashion but at greater speeds. The flow of the text can be stopped whenever the reader gets lost, last sentence can be repeated by clicking a <Back> button, or last word or few words by clicking a <Rewind> button next to the progress bar. If the reader wants to read the text from a particular place (e.g. from the word “wants”), he can click the button Word Search, enter the desired word, and the computer will display it in the window. By clicking <Play>, the reader can continue from this point. Also the speed at which words are displayed can be set by the reader. The learner can choose from 100 to 2000 words per minute. The difficulty of the texts vary, they are divided into levels which can be chosen by a program user. Each user can have his bookmark to mark certain places within the text he is reading to be able to return to those locations quickly and easily.

In Tachistoscopic Scroll Presentation the text written in a normal fashion is invisible to the reader as a whole, and only three consecutive words appear for three seconds immediately followed by next three words when the previous ones disappear. Such a mode is a little bit disrupting, as sentences are divided in a random fashion, not semantically, thus it may result in a chunk like “…the computer. It…”.

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The number of appearing words can be specified by the reader. This, however, will not prevent the text from being divided in a random fashion.

The program also contains reading comprehension tests with multiple-choice questions. The aim of these activities is to evaluate the reader’s comprehension of the text within a particular amount of time. When the reader finishes reading a text he has to click the <Done> button, which allows the computer to count the amount of words he can read per minute and later compare it with comprehension. Test results can also be presented with graphs. The teacher can, moreover, view comprehension test results of all the users.

Speed reading comprehension exercises are generally better in a computerised form, as they do not need any human factor to run the test, the computer sets the time during which the text is to be read and seen. In the case of printed tests, a teacher or other person should make sure that the learner does not exceed the set amount of time, and that he does not look at the text after the time to read it has expired. Thus, speed reading programs, AceReader Pro Deluxe in this case, are perfect to be used to practice speed reading and speed reading comprehension skills.


2.7. FReader

This software, produced by ReadingSoft, is designed to practice both reading comprehension skills and reading speed. The text is displayed on the screen and when the reader is ready to answer the questions, he has to click an appropriate button to be presented with multiple choice questions. They are presented on the screen one after another, so there is only one question at a time. The learner cannot cheat by checking answers before completing the task, because they are shown by the computer automatically only after the whole exercise is done. In the case of paper-based exercises of this kind, the learner cannot be prevented from looking at the answers before completing the task. Thus, his results may not reflect the degree of his comprehension of the text. If the learner has not done well, the program suggests restarting the exercise – doing it once more. The time during which the learner has to give an answer is limited. After the allotted time expires, a correct answer is provided, accompanied by a sound of an item sinking in water. This makes
the student actively think about the task and prevents him from being passive even for a short while. When the students in a class work with paper-based tests, the teacher is not able to make all of them active all the time, which very often results in some percent of students passively writing answers read by their classmates. In the case of computerised exercises, the learner works with the program individually, thus only he can provide any answer and cannot copy it from his colleagues. As the teacher supervises the progress of all the students on his computer, all the learners have to work as the teacher can easily notice who lags behind.

If the student answers the question correctly, a sound of a triumphant trumpet can be heard. At the end of an exercise the computer displays scores in percentages. The scores can be viewed by the learner at any time. By choosing an option “Test history”, the results from previous sessions with the program, with their dates, can be seen.

A demo version of the program can be downloaded, and a full version can be ordered on the following Web site: http://www.readingsoft.com/uk/freader.html

2.8. Heaven and Hell

This is one of the older DOS programs with which to practice reading comprehension skills. The task of the learner is to complete a story by giving correct answers to a number of questions. For every correct answer the learner is credited points and some part of the story appears on the screen. If the answer is incorrect, the user loses points, and if too many points are lost, the program ends. The program consists of only one story, but completing it is very exciting and involving, as the reader has to decide which of the suggestions given by a computer constitute the plot of the story. At the beginning an empty window is displayed on a computer screen, and the first question is asked. Every time the program is started, it is a different question, not necessarily concerning the beginning of the story. Gradually, when the user answers more and more questions, further parts of the story appear on the screen. Thus, though answering questions at the beginning is a matter of pure guessing, further answers need to be deduced from the partly uncovered text. The exercise is very interesting, gripping, and can be realised only in a computerised form.
To complete this exercise the learner has to interpret the information he can see on the screen and predict the content of the story on the basis of this information and his background knowledge. Thus, the learner needs to make use of cognitive schemata described in detail in chapter 2.

2.9. West

West is another DOS application to practice reading comprehension skills and additionally speed reading. In this short program, the learner’s task is to answer questions concerning the story displayed at the beginning of the program. The amount of time to read the text is limited and quite short, it could be even said that it is too short, because the learner is not able to even scan through the whole text, and questions are quite detailed. The allotted time during which the text is displayed on the screen cannot be changed by the user, which makes the exercise an extremely difficult one and certainly not appropriate for learners with poor reading skills. The text does not disappear suddenly, but letters randomly chosen by the computer vanish gradually.

2.10. Close-up

This is a program whose aim is to make the user infer information from a fragment of a text in order to guess its title. At the beginning of the program, the computer displays several titles of stories, chooses one of the texts, and prints one of randomly chosen words from this text. One word is not enough for the learner to guess the title, and the learner can ask the computer to show more words by pressing the space bar. This move, however, costs the learner some points. The computer displays one word before and one word after the first word. If the student knows the
title, he may press, on his keyboard, the key with the number of the story. A wrong
guess costs him points, so it is better to ‘buy’ more words, read the longer text, and
only then have a try. Once the title has been found, the computer chooses another
story and the exercise begins again. As the computer is able to recognize only word
boundaries, it chooses the first word randomly. It may result in an unpredictable level
of difficulty of the exercise, as the computer may display a word which is a part of a
title, or a word which is just a preposition or an article, and buying new words does
not improve the situation. John Higgins gives an example of such a situation:

of
one of the
being one of the most
like being one of the most important
looks like being one of the most important environmental

Only at this point, does the learner know that the story will be related to some
environmental matter (Higgins, 1995:92). But if the computer chooses an appropriate
word, the exercise may be very interesting and involving.

As it is in the case of Heaven and Hell, also this program requires the reader
to rely on cognitive schemata, as on the basis of textual cues and background
knowledge the reader has to figure out the title which would match the content of a
partially displayed text.

3. On-line exercises

3.1. www.comenius.com/fables

This Web site run by Comenius Group is a rich source of reading
comprehension exercises which are based on short fables like The Tortoise and the
Hare, The Donkey and the Grasshopper, or The Thirsty Pigeon. This Web site offers
various kinds of activities following each fable. They are optional, and the learner
can choose which exercise he wants to do. One of the activities is called Vocabulary
Matching Exercise. Here, the learner has to choose the best definitions for the
phrases from the text. The text is displayed above the questions, so the learner can
consult it whenever he is in doubt as far as the answer is concerned.
Next exercise is the *True or False Comprehension Exercise*, with buttons to click next to T and F letter. The following exercise, namely *Vocabulary Completion Exercise*, is a text with gaps on a topic related to the fable. The gaps have to be filled in with words or phrases from the fable. Thus, the learner needs to understand the original text to be able to complete the gaps in the passage below. This kind of activity is a very good test to evaluate the learner’s comprehension.
The results of each exercise are presented in a table containing the learner’s answer, the phrase tested, its correct meaning, and scores in percentages.
3.2. www.eduweb.com/adventure.html
http://www1.umn.edu/bellmuse/mnideals/watershed/watershed.html

This is the most interesting Web site concerning reading comprehension activities. It contains educational Web adventures, so called mazes, described above. The learner can choose, for example, Build-a-prairie or an interactive watershed-planning game. In the case of the first one, the task of the student is to build back a destroyed prairie. First, a short introduction is displayed listing the things the user will have to do to restore the landscape. Then, gradually, in stages, the user has to plant bushes, grass, bring mammals, worms, birds. Each stage consists of instructions and a list of items to introduce on the prairie, for example, kinds of birds. Each animal or plant is shown on a photo. To know which of the animals or plants can live on a prairie and which ones to choose, the learner has to read additional information about them. This can be done by clicking on the info button below each photo. If a learner’s choice is incorrect, the computer asks him to reconsider his decision. If the choice is appropriate, the student can see a short animated video with the results of his decisions (e.g. slowly growing plants, or flying birds that he has chosen). Then, the next stage is introduced. If the student cannot understand some words in the descriptions, he may use an on-line dictionary which opens in an additional small window, thus the user can see both the task and the dictionary.
In the Watershed game, the learner has to make several decisions concerning the managing of a watershed and keeping water pure and fresh. There are four sections: National Park, Agriculture, Neighbourhood, and City. The computer presents problems to solve, and the consequences of the learner’s decisions are listed after all of the decisions are made.
Such interactive games are better in the computerised form, the learner gets easily involved in the exercise as he can see the results of his decisions on short videos, thus, completing of the task is not monotonous and unexciting. A detailed comparison of computer-based and paper-based mazes was made in the course of the chapter, in subchapter 1.4. Mazes are examples of the use of incidental reading.


This Web site, created with Halfbaked Software’s JCB, contains multiplicity of exercises on reading comprehension. Some exercises begin with a pre-reading task in which the learner has to predict the contents of the text on the basis of a picture concerning the text. This task is designed for two students who have to discuss the matter. There is yet another pre-reading exercise provided, and this time the student’s task is to answer multiple-choice questions concerning the text which is not displayed, thus the learner has to predict right answers on the basis of his background knowledge. These exercises are similar to the printed ones. The following exercises are based on working with the text. First, there is a skimming exercise where the student has two minutes to read the text to get the main idea and to be able to answer multiple-choice questions on the text. Thus, after the student reads the instructions, he has to click the <START> button to see the text which will be displayed for two minutes. Then, there is a scanning exercise where the text appears on the screen also for only two minutes, but this time multiple-choice questions to answer are detailed ones. The advantage of computerised tests over paper-based ones as far as time limit is concerned has already been described above.
Next, the student is presented with a multiple-choice reading exercise. This time the student can see the text for twelve minutes. Each answer chosen by the learner is commented on by the computer. When an incorrect answer is provided, the computer advises to try again, and when it is correct, the computer repeats the whole sentence from the text containing the right answer. After the reading task is completed, the student can do multiple-choice exercise on some of the vocabulary from the reading passage. The questions contain a sentence from the text, and the sub-question takes the form: What does XXX(a word from the text) mean?. The learner is given a few answers from among which he has to choose the correct one.

This activity is followed by an exercise on transitions which is preceded by a grammar note on transitions. The student has to fill in gaps by choosing a correct transition word. Next, there are a few sentence ordering exercises. Here, the learner’s task is to rearrange the words in the jumbled sentence to make it meaningful. After all the sentences have been rearranged, critical reading exercise is introduced. The learner reads questions below the text in which there are a few quotations. The text is about the opinions of several groups on the protection of environment. The task is to decide which group each quotation comes from. In all these exercises the text the student works with is displayed on the screen all the time, thus the learner can have a look any time if he is not sure about his answer. Each answer the student gives is immediately commented on by the computer. If the answer is incorrect, the computer
advises to try again, but if it is correct, the computer repeats the whole correct answer.

And finally, the last exercise which is called scavenger hunt. Here, the learner has to find on the Internet the answers to questions on the main topic of the whole activity. The learner does not have to look for the materials by himself because the authors of this Web site provided a list of links and valuable resources. The last two exercises aim to make the learner practice his critical thinking skills which are vital nowadays, as the widespread and uncontrolled development of media makes people choose which of accounted pieces of information are valuable and relevant to the reader’s needs. Critical reading exercise is basically similar to its paper-based equivalent. However, the way in which answers are checked by the program, and the fact that each correct answer is commented on by the computer, are a significant advantage of a computerised test over its printed form. The last exercise, namely scavenger hunt is also available in printed form, but there is one significant disadvantage it has. In order to answer the questions the learner has to go to a library and may come back with poor results due to many reasons. First, a library has set open hours which are very often inconvenient for its user. The Internet, on the other hand, is available 24 hour a day. Second, if the reader succeeds in getting to the library, it happens very often that he cannot find necessary sources because either the library does not posses the searched book, or somebody has borrowed it. The Internet, however, offers unlimited access to enormous amount of knowledge on every subject, and, contrary to the library, many users can surf the same Web sites at the same time. Moreover, the multiplicity of information on the Internet helps to develop critical reading skills much better, which was already described in detail in chapter 3.

General advantage of the exercises available on this Web site over their printed versions lies in the fact that computerised versions provide the learner with instant feedback, which keeps him interested in the task. Passive completing of a ‘chain’ of exercises, which is the case of paper-based exercises, quickly makes the task a tedious one.

Similar exercises are also available under the following address: http://www.lclark.edu/%7Ekrauss/toppicks
3.4. www.cdlponline.org/news.html

This Web site, called California Distance Learning Project, offers a wide range of stories to work with, as well as many reading comprehension exercises accompanying each text. The student has to first choose one of the alphabetically listed stories, and then read the chosen passage, which can also be heard if the learner wishes. Next, there comes the LESSONS section containing activities. First of them, namely Select a Word, consists of gapped sentences from the text. Each gap is a small window in which there are a few options listed, and the student’s task is to choose the correct one. If the learner does not know the missing word, he may hear the sentence by clicking an appropriate button. The luxury of hearing the sentence is only available in computerised form. In the case of paper-based form, individual learners doing such an exercise by themselves, without a tutor or a teacher, are devoid of a chance to use this very helpful multimedia aid, having an auditory form in this case. The advantage of multimedia aids has already been described in chapter 1.

![Select a Word](image)

After completing this exercise, the student can move on to the next one, multiple-choice reading comprehension exercise. There is another very similar
exercise there, called *Drawing Conclusions*, where the student also has to answer questions concerning the same story.

*Sequencing* is another task awaiting the learner. Here, the sentences from the story are in a different order from the one in which they appear in the story. The student’s task is to put them in the right order. The advantage of jumble exercises over paper-based ones have already been described above.

There is also a *Vocabulary exercise*, where words from the text have to be linked with their definitions. Both the words and the definitions can be played to the learner if needed. After each exercise the computer shows the results. The way in which the answers are provided is worth mentioning because the computer does not only display a comment CORRECT or INCORRECT, but also the correct answer itself. The student can also see a *Report Card* containing the number of correct answers compared with the number of all questions, as well as the results shown in percentages. Such a sheet presenting overall results of all the tasks the learner has completed during one session with the computer gives the learner an adequate feeling of how well he has done. The results are most often presented both in points and percentages. Since the scores are calculated automatically, the learner can entirely focus on the exercises without bothering about summing up all the points he has gathered, not mentioning converting them into percentages which give the best picture of the student’s progress.

### 3.5. http://vlc.polyu.edu.hk

This Web site, called Virtual Language Centre, provides four types of reading exercises and a multiplicity of texts to work with. Each text is accompanied by a particular kind of exercise. Thus, there may be a set of stories followed by *reading comprehension* multiple-choice questions. In this task, the screen is divided into three parts, one for the text, one for questions, and one for an on-line monolingual English dictionary. The most difficult words in the text are highlighted and by clicking on them, the learner can receive their definition which is displayed in the dictionary field on the screen. If the student does not know a word which is not highlighted, he may look it up in an on-line dictionary available in each exercise. The definition of the word provided by the dictionary is not a mere explanation, but it also contains an example and information on the part of speech. The advantages of on-line dictionaries were already described in chapter 3.
Scores are not presented merely as a list of points gathered by the learner. The computer also provides a correct answer compared with the submitted one, so the learner can see what he has done wrong. Such a kind of results presentation in not possible in the case of paper-based exercises. Some of the texts are accompanied by cloze tests. Apart from a gapped text, the learner also has access to the list of missing words and an on-line dictionary to aid the completion of the exercise.
The authors of this Web site also offer a *proof reading* exercise. Here, the learner’s task is to click on an error in a text or to correct it. If the student clicks on the appropriate word, it changes its colour from black to red. Apart from identifying an error, the learner has to decide on its correct form. There are a few options to choose from in the *Answer List* window. If the learner happens to provide a wrong answer, the computer displays a comment: “*There is no error here. You lose 1 penalty point*”. The computer also informs the learner how many mistakes are left. The Web site also offers *reading for fun and interest*, texts which are not accompanied by any exercises, and whose role is to make students read not because they have to but because they want to. As well as other texts, also these ones are supplemented with a dictionary.

3.6. [http://www.toefl.org/cbabttfl.html](http://www.toefl.org/cbabttfl.html)

Also the TOEFL organisation decided to computerise their tests. The result for reading comprehension exercises can be seen below.

---

**Reading** - Measures ability to read and understand short passages similar in topic and style to those that students are likely to encounter in North American universities and colleges. This section contains reading passages and questions about the passages.

*Here is an example:*

![Example of reading comprehension exercise](image)

Because the selection of these passages and questions will not be based on your performance, you will be allowed to go back to previous questions within this section.

---

In this exercise the learner is asked to click on the paragraph describing a particular situation, event or object. Thus, the task is designed to check the student’s overall comprehension of the text. The scores are counted here automatically after the learner gives an answer. Such a design frees the examiners from correcting this part of exam, and also excludes the possibility of miscounting the scores.
Conclusion

The software and the Internet applications described above are only a few examples of educational computerised activities. Constant changes, improvements, and innovations are introduced to already existing programs, and the newest ones are equipped with more and more modern, useful and necessary options. On the basis of all the information above, a question “Why should we turn to Computer Assisted Language Testing (CALT)?” seems, thus, easy to answer. Summarising all that has been said, computer-based exercises are flexible, the level of difficulty can be set by the user, and thus, the programs seem tailored to an individual. Computer software and the Internet applications provide more interesting and involving activities than paper-based tests. The advantage of the layout of computer programs over the layout of printed materials is also indisputable. The presence of on-line dictionaries is another advantage of CALT. Visual and auditory aids, which are extremely helpful, are only available in computerized versions. Similarly, hints and counting of scores can be offered only by software and the World Wide Web. Moreover, computers prevent students from cheating, which makes the results more reliable. What is also very important, thanks to the computer and its reports, the teacher has full control over the students’ work and can view their scores at any time.
A table presenting all the features of software and on-line exercises described in the chapter:

<table>
<thead>
<tr>
<th>Dictionary</th>
<th>Summary of all scores</th>
<th>Sounds</th>
<th>Hints</th>
<th>Comments</th>
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<td>Reading Critically Non-Fiction</td>
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<td>Freader</td>
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<td>Close-up</td>
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Conclusion

As the use of computers in education is a relatively new topic in discussion about language teaching methods, educators are still discovering the benefits of the application of this kind of technology, and some of them remain sceptical and distrustful towards the idea. Fortunately, research on the effectiveness of new technologies in education has been an ongoing process, and the more research is carried out, the more the educators realise the significance of the application of computers in language learning and teaching. However, the responses of both teachers and students to the use of technology vary considerably. The students generally appear to be positive towards the idea, while the majority of teachers try to give it a wide berth. Such a situation may result from the fact that nowadays students are rather acquainted with the computer, while the majority of teachers have never operated it, thus they are afraid of it. The solution could be found in special courses which would not only present the teachers with the benefits of the use of computers in education, but also train them in operating the machine itself. Certainly, the negative attitude of teachers must be changed, as the development of technology altered the meaning of the concept “reading”. Thus teaching methods must be adapted to the requirements of contemporary written texts, namely electronic ones. Though e-texts use the same symbols as the printed ones, different reading skills are required to read them.

Why else, apart from developing reading comprehension, should we apply computer-based reading exercises? First, differences between these two types of texts shall be briefly depicted, which will help understand that the reading of printed texts varies from the reading of e-texts. Traditional writings are linear, thus a line of symbols is read sequentially. They have only one dimension, namely length, and they are permanently static. In the case of electronic texts we deal with hypertext, which entails strategic and critical reading, as the learner has to move on different levels of the text by choosing electronic links. Thus, electronic texts are dynamic and manipulable. Also the way of organising symbolic information differs. Printed texts can be accompanied by static graphics and sometimes glosses. Hypertext incorporates both static and moving pictures, sound, glosses or on-line dictionaries.
Thus comprehension is much enhanced by appealing to more than one sense, it is multisensory. As Topping puts it:

Reading a hypertext is unlike the continuous scanning of linear text and more like the “reading” of tea leaves, someone’s palm, entrails, dreams, or the clouds. It is a search for personal relevance, an exploration of the most salient points in relation to the needs of the reader and in relation to each other. It involves more frequent and more overt selectivity on the part of the reader – and thus potentially both more partial understanding and deeper understanding (Topping, 1997).

Thus, e-reading is a more active activity, involves more flexible reading strategies and most of all critical reading, as the reader has to assess the significance of the multiplicity of material he comes across. Moreover, reading electronic texts means an interaction between a text and the reader, as the reader can request a context-specific definition of difficult words provided by accompanying dictionary or glossary. Thus, the reader is given an immediate feedback, which enhances comprehension.

Since reading is changing, also the concept of literacy undergoes such a process. Next to traditional print-based literacy appears the new concept of electronic literacy. “Electronic literacy”, a term which gains more and more significance, can be understood as the ability to read, write and spell by means of computer. The term should not be confused with “computer literacy” which is the knowledge how to use the keyboard, computer programs, how to install programs etc. “Electronic literacy” can be divided into a few categories, namely electronically supported reading, electronically supported writing, electronic audiences, electronic literacy assessment, feedback, and management, and electronic direct speech-text conversion (Topping, 1997). Electronically supported reading is the most significant part for this thesis, and its advantage over the typographical reading was widely described in the course of the dissertation.

The increasing use of e-texts suggests that educators should think about incorporating the activities developing electronic literacy into school curriculum. Since printed texts still prevail, the activities should relate to print-based literacy, they should help the reader notice the differences between the two types of literacy, and promote the electronic one. To become electronically literate, one has to become
acquainted with the nonlinear, nonsequential text structures that are characteristic for electronic texts, and to develop appropriate strategies for reading and writing such texts. The exercises and software described in the course of this dissertation represent the group of activities promoting electronic literacy, while helping develop print-based literacy at the same time.

Educators supporting the application of CALL into the educational curriculum have developed more and more sophisticated software, which creates the opportunity for realising the CALL scheme. There is still one obstacle which delays the realisation, namely the lack of funds to have computers installed both at school and at home. Some schools, however, were able to find sponsors, whether private or public. Moreover, many local public libraries, e.g. in England, have installed computer terminals with the Internet access for free use, even in rural areas.

To sum up, the definition of literacy must be expanded to include reading and writing electronic texts. Grounds for developing e-reading have been formed for time long enough to seriously think about the incorporation of CALL in language learning and teaching. One has to keep in mind that nowadays reading is not what it used to be.
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[3] Sam Houston State University. [http://www.shsu.edu/~counsel/study_skills.html#READING](http://www.shsu.edu/~counsel/study_skills.html#READING)
