



Reading Scientific Texts: Some Challenges Faced and Strategies Used by EFL Readers

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Abstract

EFL readers face a set of linguistic challenges. Evidence from research indicates that students' performance in reading comprehension is far below international standards. The purpose of this study was to get insights on the reading strategies used by EFL students when they read scientific texts for comprehension and to elicit their reading comprehension problems. Participants were 60 MA students majoring in the fields of midwifery and nursing enrolled in ESP I course in Isfahan University of Medical Sciences. To elicit certain reading strategies, retrospective protocols and structured interviews were conducted. The findings of this study revealed that lack of knowledge of effective reading strategies plays a vital role in the decline of reading ability among EFL learners. Lower cognitive strategies like decoding and translating were the main strategies used by EFL learners. The main problem they had in comprehension was word-for-word translation.

Key words: EFL learners, Scientific texts, ESP, MA students, Reading strategies

INTRODUCTION

In view of a myriad of significant discoveries and research findings in the fields of science and technology frequently reported in English, the need to acquire efficient personal cognitive tools in reading printed texts, especially scientific texts is imperative. Paris, Wasik & Turner (1991, p. 610) consider cognitive strategies as a repertoire of tactics that readers employ to comprehend a text and these tactics are deliberate and calculated cognitive actions (Anderson, 1991) that help regulate reading behaviours and comprehension. Reading strategies have been shown to be very significant in improving reading comprehension of non-scientific texts amongst EFL learners (Alsamadani, 2011; Talebi, 2012; Tsai et al, 2010). Researchers are also in agreement that the use of higher level cognitive strategies such as inferring, synthesizing information, and referring to prior knowledge most often lead to better comprehension (Hamada, 2009; Phakiti, 2004) while lower cognitive strategies such as translating and decoding will not. Yet, little is known about the reading struggles faced and strategies used by EFL readers reading scientific texts in English (Abdul-Hamid & Samuel, 2011). More research is needed to look into how EFL readers read academic scientific texts

written for native speakers and navigate through its scientific terminology and syntactic complexity.

The only and most important skill required to access professional information in various subject fields is reading comprehension. Especially for students in academic settings to make use of materials in different domains of science and technology, reading ability has been found to be the most required skill. By considering the fact that in EFL (English as foreign language) contexts learners need reading comprehension skill more than other skills in their academic studies, reading comprehension should be attached more importance especially in ESP (English for specific purposes) classes in which reading ability plays a crucial role in the students' academic success.

However, in order to help learners in the best possible way, teachers need to identify their learners' strategies and problems in reading ESP texts. Detecting the problematic areas for the students will assist teachers better design and apply appropriate methods and strategies to solve their students' reading comprehension problems. Therefore, the following research was an attempt to explore the EFL learners' reading comprehension strategies used and the problems faced in reading ESP texts in ESP classes.

READING ACADEMIC TEXTS IN ESP CONTEXTS

Regarding the primary significance of acquiring the reading ability by ESP students for academic purposes, steps have been taken to identify the problematic factors underlying reading process. It is important to identify the reading problems of the learners before designing suitable methods for teaching in order to help them tackle their reading comprehension problems.

Grabe (1991) argued that some knowledge areas that have bearing on the efficiency of reading process are structural and vocabulary knowledge. That is, readers with less command of such areas of knowledge will get into trouble processing written texts. Campbell (1987) made it clear that "linguistic difficulty would more affect the less advanced learners' enjoyment of texts and their development of fluent reading skills in the target language" (p.132). Additionally, it has become evident that the acquisition of this apparently straightforward skill is not that much easy and students' reading fluency is hampered by many linguistic problems. In their reading comprehension, ESP students face challenges that may impede their understanding of the reading material assigned in their EFL curriculum and so postpone or deter their reading comprehension skills development. For instance, according to Abdul-Hamid and Samuel (2012), known scientific terminology in a complex sentence was much easier to comprehend compared to complex English sentences with only general English words.

DOMINANT TREND IN TEACHING EFL IN EFL CONTEXTS

Early in the twentieth century, according to the tenets of the Grammar Translation Method, translation was highly thought of and utilized as a means to learn language. Later on, the advocates of the Direct Method and the Audio-Lingual Method took issue with this view and even went on to disallow it. In spite of the recent objections,

translation in language learning still persists (Chamot, 1987). Naiman et al. (1978) sought to identify strategies drawn upon by "Good Language Learners" (GLLs), and found that one of the strategies often used by GLLs was to "refer back to their native language(s) judiciously [translate into L1] and make effective cross-lingual comparisons at different stages of language learning" (p. 14).

Increasingly, studies suggest a facilitative role of translation or L1 transfer in students' language learning (Cohen & Brooks-Carson, 2001). Translation is widely used in learners' foreign language learning process. It appears that learners very often use translation as a learning strategy to comprehend, remember, and produce a foreign language. What is believed is that strategic learners can make intelligent use of their L1 skills to learn a new language (Liao, 2006). Kern (1994) stated that language instructors and learners realized the inevitability or unavoidability of mental translation in reading L2 texts.

THIS STUDY

As with Al Brashdi's study (2002), this study was designed to yield data that would contribute to our understanding of the nature of the problems our students encounter in comprehending English texts and the way they process such texts. The reading literature which presents the shift from product-focused approaches in reading research to a more process-focused view has become of interest in this study. Through investigating the reading process, we can learn a great deal about how our students approach reading and what kind of strategies they use.

The following research questions are investigated in this study.

1. What are the reading strategies used by EFL students in reading scientific texts?
2. What are the problems they encounter as a result of strategies they use?

METHODOLOGY

Participants

Participants were 60 MA students majoring in the fields of midwifery, nursing and operating room enrolled in ESP I course in Isfahan University of Medical Sciences, Isfahan, Iran. They were accepted at MA level from 7 to 15 years after graduating from BA level. They were all working in hospitals in related wards. Forty-two were married and the rest of them were single. They were all first-year students. They did not have the experience of attending English institutes or being abroad. They had all passed their MSc entrance exam with grades higher than 80% in their specialized subjects but lower than 50% and even some with zero in English.

Instruments

Two methods of data collection were used: retrospective think-aloud protocols and structured interviews. First, at the beginning of the term before presenting the teaching method, they were given a scientific passage related to their field of study and asked to

write about how they read the ESP texts in their ESPI course. They mailed it to the researcher together with a copy of one of the reading passages given to them as class activity. It is a kind of retrospective think aloud. This method involves participants first caving out their tasks silently, after which they verbalize their thoughts in retrospect. In some cases, this retrospective verbalization takes place without any stimuli, which is likely to have a negative effect on the exhaustiveness of the comments produced. The latter is the case of this study as the participants reported what they did while they were reading the scientific texts. The students' answers to the teacher's comprehension questions were also examined to elicit the reading strategies used and their reading comprehension problems. Then, the researcher arranged a 20-minute structured interview for each participant to remove the gaps in the protocols.

Data collection procedure

Training sessions were conducted prior to real experiment to familiarize the participants with the techniques used in this study. The reading texts were taken from the syllabus of ESPI course. The participants were asked to explain how they read their texts to be prepared for ESP classes at the beginning of the term. The role of the teacher's teaching method is eliminated in this way. And then they were asked to write how the teacher's method of teaching affected their reading habits/ strategies. The instructions were given to them in Persian. After delivering the reports to the researcher, she read them and highlighted the missing parts. Then in the 20-minute interview with each participant, they were asked about the gaps in Persian. They were also asked what their reading problems were as they read according to their own reading strategies and how they solved their problems using the teacher's new teaching method.

Despite grammar translation method in which translation from L1 into L2 served as a reference system in learning the foreign language (Brown, 2000 as cited in Mehrabi Boshrahadi, 2014), in this study, translation from L2 into L1 was used as a facilitative tool in the learning process. Despite grammar translation method in which students were given literary or religious texts, in this study students were given scientific texts. Moreover, according to the teacher's method, students were required to use monolingual dictionaries and reading strategies to comprehend/mentally translate the texts according to the grammar structures used in the texts.

FINDINGS

Reading strategies used by EFL learners

1. Highlighting or underlining the new words
2. Relying too much on bilingual dictionaries mainly those installed in their mobiles for looking up the meaning of the new words whether technical or non-technical
3. Writing the meaning of the new words above the word in the text or in the margin of the page by numbering the words

4. Translating the words in the order in which they occur in the text (word for word/linear translation)
5. Insisting on translating every single word
6. Giving Persian meaning/synonyms for the new words without paying attention to the context in which they are used
7. Giving Persian meaning/synonyms for the new words without paying attention to their part of speech
8. Using the already learnt part of speech of a given word regardless of the new context in which it is used
9. Using the already learnt Persian meaning of a given word regardless of the new context in which it is used; even if it does not make sense in the given context
10. Relying too much on the previously learnt information about old words without checking its accuracy in a dictionary
11. Relying too much on their content schemata of a given topic in their field of study while reading academic texts and forcing it into the text regardless of the given context in which it is used
12. Making too many generalizations (e.g. any word with "-ly" is an adverb, every word that modifies a noun is an adjective, any "that" shows the beginning of an adjective clause, etc.)
13. Relying too much on their poor knowledge of grammar and vocabulary in reading comprehension
14. Relying too much on the teacher to give them simple synonyms for the new words and translate the complex sentences for them into their native language
15. Relying too much on their native language
16. Giving synonyms for the new words based on the Persian meaning they have found for them (for instance, they give the word "reason" as the synonym of "cause" in the phrase "the cause of this disease")
17. Moving from parts to whole or having a bottom-up approach to reading rather than having a gestaltian and top-down approach to reading; i.e., reading the whole passage several times, reading each paragraph and imply its relation with the whole passage, deriving the relationship between paragraphs, deriving the relationship between sentences in a paragraph and the main idea of the same paragraph (how the main idea is developed by the writer)
18. Referring to bilingual dictionaries to look up just the meaning of the new word

Reading problems of Iranian EFL learners: an academic context

1. Not being equipped with effective and efficient translation strategies
2. Not being able to recognize meaningful chunks
3. Not being able to recognize the semantic role of punctuation marks in a text
4. Not being able to recognize the omitted parts in different parts of a text; for instance, clauses that have been reduced to phrases
5. Not being familiar with the technical concepts in a given text
6. Not having content schemata in terms of a given topic area
7. Not knowing where and how to find the meaning of unfamiliar words especially technical terms
8. Having difficulty in translating semitechnical vocabulary
9. Not being familiar with online dictionaries
10. Not being able to understand the grammatical and semantic relationship between words in a sentence and sentences in a paragraph
11. Not being able to manipulate the Persian meaning to fit the context in which the original word has been used. Although they know that there is something wrong in their translation and it is not meaningful in Persian, they cannot express it in a way to match the Persian system
12. Not being able to choose the appropriate meaning of a given word in the bilingual dictionaries
13. Taking the new word as another word because of their similarity in spelling; that is, misreading words (such as "form" and "from")
14. Having wrong beliefs which have been developed during their education; for instance, all words have one part of speech and one meaning and it is the one learnt for the first time
15. Not being able to recognize the reference of the pronouns especially relative pronouns and pronouns other than subjective pronouns
16. Not paying attention to cohesion and coherence between sentences especially in the case of implicit relationship
17. Not recognizing the semantic role of linking words, just translating them literally
18. Having problems in making inferences

19. Not paying enough attention to and/or tracking the contextual clues, in other words; not having alert reading; i.e., not having internal dialogue with the author, not being able to follow his/her cues/clues in the text
20. Not being able to differentiate between literal and special meaning of a word in a given context
21. Not being able to derive special meaning of a word from its literal meaning according to the context in which it is used
22. Focusing too much on the literal meaning of the words in reading a text
23. Not being familiar with most of the phrasal verbs especially those consisting of more than two words
24. Not being able to recognize the relationship between the words in phrasal verbs especially when the parts of the phrase are separated from each other
25. Not being able to understand the syntactic and semantic relation between the words in a sentence especially in sentences with several phrases and clauses; that is, complex sentences
26. Not being familiar with the structure of compound and complex sentences; as a result, not being able to recognize the subject and verb of the complex sentences
27. Taking every single word as a unit of meaning rather than taking group of words into consideration when needed
28. Not recognizing the phrases in a sentence as units of meaning which results not only in comprehension problems but also in fluency disruption while reading aloud
29. Making too many overgeneralizations; e.g., any word that has "-al" is an adjective, any word which is at the beginning of a sentence is the subject, etc.
30. Not being able to find the synonym of the new words in the same text
31. Not being familiar with the derivations of a single word to take advantage of them in reading comprehension
32. Not being able to make semantic connections between derivations of the same word in different parts of a single text and using this potential to facilitate reading comprehension.
33. Not being familiar with the structure of a paragraph and paragraph organization patterns and their role in reading comprehension
34. Not being familiar with different kinds of clauses and their role in reading comprehension

35. Not being familiar with the grammatical function of different words and/or phrases in a sentence
36. Not being familiar with different types of phrases and their heads and their role in reading comprehension
37. Not being able to even find the appropriate Persian meanings for most of the new words let alone their English synonyms
38. Not being aware of the rich information sources embedded in monolingual dictionaries about every single word and how to use them; in other words, not being equipped with dictionary use skills either bilingual or monolingual
39. Not being equipped with strategic reading skills
40. Not recognizing the essential role of grammar knowledge in reading comprehension, which results in not being able to use the grammatical resources to facilitate reading comprehension
41. Focusing too much on vocabulary items in a text to derive the meaning of its different parts while ignoring the potential role of grammar to facilitate reading comprehension
42. Not being familiar with collocations, just reading them literally the same as the other parts of the text which results in giving synonyms for every single word in a collocation; thus disrupting the entire collocation
43. Not being familiar with the semantic and syntactic role of suffixes and prefixes in reading comprehension
44. Not knowing how to read efficiently and effectively
45. Not being able to be creative, have analytical mind, have reflective reading and elicit the reading strategies by themselves as they are not raised to be independent self-directed learners throughout their education; the majority of them mainly learned English to pass the course either with a high or low grade and the main technique they used was learning by heart and word-for-word translation
46. Having teachers who have been raised in the same educational system not equipped with the required skills and strategies for learning English and often lack expertise and creativity to raise self-directed, independent, lifelong learners
47. Having a limited depth and breadth of vocabulary items
48. Showing resistance whether consciously or unconsciously to practicing new methods of learning reading comprehension skill. On the one hand, they got used to the old deeply rooted habit of having word-for-word translation and it not easy to remove it during such a short time as one semester. On the other hand, at this educational level, they do not have much time to spend on learning English even from the scratch.

49. Learning the subjects including English mainly by heart to be prepared for taking part in multiple-choice exams (the most common testing format used) throughout their education deprived the majority of learners of learning practically and productively

50. Having too much stress and fear for learning English especially for the weak students

51. Not being equipped with the required study skills

Students' reports in interviews

They experience these problems because:

1. They do not pay the due attention to the structure of the sentences as they think grammar should just be used for doing exercises

2. They take notes in the classroom and memorize them as far as the comprehension of a given text is concerned and then take multiple-choice tests and pass the course with relatively good grades. The same students when expected to write a simple English sentence or even give an appropriate English synonym in a given text in their field of study fail to do so.

3. They feel that they are very weak students as far as their English language proficiency is concerned as they were mainly required to read their English books and translate them into Persian with teacher's help. And what they have learned during the past years cannot help them to satisfy their educational needs at MSc level. Reading and translating academic texts in their fields of study with the unique features of academic writing (complicated structures, ellipsis, non-specialized vocabulary which takes different meanings in different contexts, technical vocabulary together with the conceptual meaning they convey, etc.) is very difficult for them.

4. What aggravates the problem is that they were accepted at MSc level from seven to fifteen years after BSc graduation. So, they have forgotten much of their English knowledge mainly acquired through learning by heart. Their very low or zero English scores in the MSc multiple choice entrance exam can provide further evidence for their weakness in English. They were accepted at this level because they had higher than eighty percent scores in their specialized subjects.

5. They are afraid of reading English texts and try to avoid them as much as possible since they think they cannot read for exact information, read for implied meaning and read for the gist (i.e., ability to read for essentials) (Padma, 2008) in spite of spending a lot of time looking up the new words in bilingual dictionaries. As they do not achieve the expected results, they become disinterested in learning English and their stress increases. They often complain about finding the wrong meaning for the new words and getting a different meaning from what their English teacher says in the classroom.

6. They have not learned efficient and effective ways of reading English texts during the past years of formal education so they resort to their deeply rooted habit of translating into Persian.
7. As they have low English language proficiency, they are not able to use self-study English books.
8. They do not have enough time to practice English because of time restraints (they are married, they have children and they work).
9. They cannot easily leave their wrong habits and/or beliefs despite their English teacher's great efforts to help them to do so.
10. They still mainly use bilingual dictionaries and avoid using monolingual dictionaries.
11. They use google translate or bilingual dictionaries in their mobiles.
12. Their teachers in previous educational levels had a crucial role in shaping their reading strategies. Their focus was on the translation of texts, grammar, and rote learning of vocabulary. But they did not teach the learners appropriate translation strategies and how to use the rich potentials of monolingual dictionaries and the potential problems of using bilingual dictionaries.
13. Most of what they have learned about English has been easily forgotten due to lack of practice, interruptions in learning English and short-term retention strategies used for learning.
14. Time interval between BSc and MSc is so great that they have forgotten most of the vocabulary and structures they have already learned.
15. At BSc level, they have three units of general English in semester one and two units of special English in semester two. And they do not have any English units to the end of their education at BSc level; in other words, they do not have enough exposure to English. In addition, the medium of instruction in universities is not English language. At MSc level, they have two units of special English in the first two semesters and it is not enough for them to satisfy their needs. They need to read English academic texts and articles and translate them into Persian for writing their thesis and they need to translate the abstract of their thesis into English.
16. They have a misunderstanding of the reading process as they read slowly focusing on vocalization and sounding out words moving from specific to general ; i.e., words, sentences, paragraph rather than moving from general to specific i.e., paragraph, sentences and words. Many of the difficulties students face are sometimes caused by teachers' misunderstanding of the reading process (Miller and Yochum, 1991 as cited in Al-Mahrooqi and Roscoe, 2014).
17. They have weak first language basis. Readers tend to transfer and use their L1 strategies in the process of L2 reading (Al-Mahrooqi and Roscoe, 2014). As their L1

language proficiency is low, through negative transfer, it inhibits L2 reading comprehension.

18. As they were taught to have word-for-word translation, they think there is a one-to-one equivalence between L2 and L1.

19. Another challenge is students' resistance to reading in L2. Getting students to read extensively, when possible, is the easiest and most effective way to improve their reading skill (Nuttal, 2005). As mentioned by Al-Mahrooqi and Roscoe(2014), even in content subjects like arts, science and geography , students seldom read books; instead, they rely on notes and summaries written in the classroom. When preparing for tests or lessons in these subjects, they read their notes which are in L1 and they have no chance to analyze a text in English and construct their own knowledge.

20. They are not familiar with basic paragraph structure, its organization and the organization of the text as a whole.

21. They are not familiar with features such as coherence and unity in a paragraph.

22. Despite the great importance of improving reading, current teaching practices have failed so far to effect an improvement. The oral lecture is the dominating method where the role of learners is not that of active participants. So student involvement in learning through question and discussion is insignificant. No proper tasks or exercises for intensive reading are given. In reading classes, most teachers do not teach it as opposed to testing it. Having studied these interrelated causes, one can recognize that reading skills develop slowly over time as learners gain more knowledge, improve their strategic reading and expand their vocabulary. Teachers are encouraged to develop reading strategies in their students. Research (Al-Mahrooqi and Roscoe, 2014) has shown that students struggle to understand texts in English and that they lack crucial skills when it comes to reading comprehension. The fundamental step for improving reading abilities is to form a common understanding among EFL learners of what the complex process of reading really involves.

DISCUSSION AND CONCLUSION

One of the main concerns for those of us working in an ESP context is how to help our students deal with authentic academic texts which by its nature requires a fairly advanced level of language proficiency. By "advanced level of proficiency", it is meant, in fact, a good knowledge of grammar and a good vocabulary size. In order to develop reading comprehension skill as an aim and translation skill as a means to achieve this end, the significant role of grammatical knowledge as well as vocabulary knowledge as two wings should be taken into account. A combination of the following techniques was used to highlight the significant role of grammar in reading comprehension (akbari, 2014).

1. Asking Wh questions and answering them in order to elicit the semantic and syntactic relationship between different parts of a complex and/or compound sentence

2. Raising students' consciousness about the role of punctuation marks in reading comprehension
3. Bringing the omitted parts back to their original place
4. Identifying the main sentence and the dependent sentence (s) in complex-compound sentences and understanding their semantic and syntactic relationship
5. Identifying the reference of the pronouns
6. Simplifying long sentences by omitting pre- and post-modifiers of nouns and adjective clauses whether restrictive or nonrestrictive
7. Learning how to use the grammatical information available in monolingual dictionaries
8. Learning "phrase breaking" and recognizing phrases in long sentences to promote reading comprehension and increase its speed
9. Identifying the head noun of different kinds of phrases

As Upton (1997) asserts, reading in a second language is not a monolingual event and L2 readers have access to their first language as they read and may use it as a strategy to comprehend an L2 text (cited in Merabi Boshrahadi, 2014). Since learners use their prior system of their native language in comprehending the texts in a foreign language, it can play a facilitative and supportive role in the process of comprehension if they just know how to use it efficiently and effectively through learning translation skills. L2 teachers and practitioners have largely neglected the use of translation as a skill/technique in teaching foreign languages. Therefore, there is a call for reintroduction of translation in the process of L2 acquisition. (Duff, 1994; Beeby, 1996 as cited in Merabi Boshrahadi, 2014).

As learners inevitably use translation as a viable learning strategy, in spite of the abandonment of translation, it can be reintroduced as a pedagogical tool in teaching a foreign language in order to redirect the learners' mental translation in the right path and improve the efficiency of the learning process. Pedagogical translation is an instrumental kind of translation in which the translated text serves as a tool of improving the language learners' foreign language proficiency (Mehrabani Boshrahadi, 2014). Translation is a means not an end. As with Mehrabi Boshrahadi (2014), this study views pedagogical translation as a tool and it discusses the relevance of translation and translation activities for enhancing learners' foreign language skills and more specifically their reading comprehension skill.

According to Gunning (1998), there are six factors that are responsible for poor reading, including "(a) lack of basic decoding skills or fluency, (b) lack of academic vocabulary, (c) limited vocabulary, (d) overuse of background knowledge, (e) failure to read for meaning, and (f) lack of strategies or failure to use strategies" (p. 311). The last factor is what this study is concerned with_lack of strategies or failure to use strategies in the

process of reading comprehension. In this regard, the researcher believes that imparting effective and efficient reading strategies to graduate student is very important.

Therefore, comprehension strategy instruction which focuses on teaching reading strategies to students to help them become strategic readers and more self-regulated learners seems not only promising but also necessary. This is in line with the findings of Abdul-Hamid and Samuel (2012) which suggest that to assist EFL science undergraduates to read scientific texts with comprehension would be to first help them improve their general English proficiency, which includes vocabulary and syntax. The second step would be to help them become aware and users of good reading strategies such as summarizing and accessing prior knowledge.

In another study, Abdul-Hamid and Samuel (2013) suggest that reading scientific texts requires the EFL readers to not only understand the whole scientific concept by employing certain efficient higher cognitive strategies but also to hold in the bottom by using lower cognitive strategies such as rereading, translating and decoding.

As stated by Raftari, Seyyedi and Ismail (2012), the scope of reading strategy research is so wide; however, the most important probable conclusions to be drawn according to the literature review in this field are: First, successful readers use reading strategies more actively and make use of a greater variety of strategies, and Second, explicit reading strategy instruction is always useful ; though, its usefulness varies according to different factors such as the teaching methods and the learners' personal variables.

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