International Journal of Education and Practice
2021 Vol. 9, No. 3, pp. 468-486.
ISSN(e): 2310-3868
ISSN(p): 2311-6897
DOI: 10.18488/journal.61.2021.93.468.486

THE ACTUAL SITUATION OF PRACTISING READING SKILLS IN TEACHING CHEMISTRY IN ENGLISH AT VIETNAMESE HIGH SCHOOL

Cao Cu Giac[1+]
Pham Ngoc Tuan[2]

[1]*School of Natural Science Education, Vinh University, Vietnam.*
Email: giaccc@vinhuni.edu.vn Tel: +84193504617
[2]*Nguyen Thi Minh Khai High School, Ho Chi Minh City, Vietnam.*
Email: tuanmk87@gmail.com

(+ Corresponding author)

Article History
Received: 25 January 2021
Revised: 29 March 2021
Accepted: 23 April 2021
Published: 18 May 2021

Keywords
Learning chemistry
Manipulation
Reading comprehension skill
Evaluation scale
Teaching chemistry.

ABSTRACT

There are many types of research by scientists around the world studying effective methods of learning foreign languages, including English, especially its use in teaching science subjects. Few people are aware of the criteria to assess the level of the use of the English language skills in teaching science subjects. We surveyed 14 teachers, 486 students in 10 high schools in Ho Chi Minh City, one of the largest and most modern cities in Vietnam. A need was felt to examine how to develop and practice English reading comprehension skills for teaching chemistry in high schools. This study analyzes the theoretical and the realistic aspects required for practicing English reading comprehension skills to teach chemistry. The study investigated the skills level requirement by the chemistry teachers and students and offered an evaluation scale to assess those skill levels. The findings of these projects will provide teachers and students with a helpful toolkit to assess the academic result of students. This toolkit comprises the scale of proficiency in reading comprehension skills in learning chemistry in English in high school.

Contribution/Originality: This study provides teachers and students with a helpful toolkit to assess the academic result of students, which is "the scale of proficiency in reading comprehension skill of students in learning chemistry in English in high school".

1. INTRODUCTION

Nowadays, the development and need for cultural, economic, and scientific exchanges around the world is an important factor for a country's development. Language plays an important role in science learning, especially for students who are working in groups to solve many tasks (Michelle et al., 2016). Besides communication, the English language is becoming more and more concerned with many other purposes in our life, especially learning science subjects, including Chemistry. Along with economic integration, educational development is the top strategy of every country. The two projects, which include "Developing the system of specialized schools in the period 2010 – 2020" (Decision No.959/QĐ-TTG date 24/6/2010., 2010) and "Teaching and learning foreign languages in the national education system in the period 2008 – 2020" (Decision No. 1400/QĐ-TTg date 30/9/2008, 2008) are a "double nudge" to improve the ability to use foreign languages for both teachers and students in Vietnam. According to Tinto (1993) determining the success of students in a university depends mainly on the skills that have been acquired during the study in high school, including the mastery of some fundamental academic skills, such as reading, writing, critical thinking, giving presentations, etc.

Despite the importance of these skills for academic success, teachers seldom teach them (Bean, 1996, cited in Hermida (2009)). Researchers including Erickson, Peters, and Strommer observe that teachers generally take these skills for granted, presupposing that students already acquired these skills either as part of their secondary education or elsewhere in college (Erickson, Peters, & Strommer, 2006). The reality, however, is that most first-year students lack academic reading comprehension skills because reading comprehension skill at university is very different from that of high school. Therefore, most students use "non-academic" strategies to read academic texts. This results in students taking a surface approach to reading. If high-school teachers explicitly teach students how to read academic texts in aligned courses where students have ample opportunities to engage in reading activities throughout the term, students are more likely to adopt a deep approach to reading (Hermida, 2009). Reading carefully reviewed academic documents before publication will also provide students with access to professional academic culture (Erickson et al., 2006). This is only possible if students take a deep approach to reading.

2. READING COMPREHENSION OVERVIEW

One of the facts known is that when students access the surface of the text during reading, they certainly ignore the information hidden deep in the text or accept the information available without understanding its purpose or where it comes from, or where it is inferred. Students who only read with a surface approach often consider the information in the text to be independent and ignore the link of that information to other information inside or outside the text. This leads to students just trying to read the text to answer questions on exams without long-term retention of knowledge, nor to promote exploration and learning new knowledge. In contrast, a deep approach to reading is that readers use high cognitive skills such as analysis, synthesis, solving problems, and metacognition to negotiate meanings with the author and to construct new meanings from the text. Such readers who read deeply often focus on the authors' message and the ideas the author tries to impart and argue. The readers also make connections to known concepts and principles and use this understanding to solve problems in new contexts (Bowden & Marton, 2000). This phenomenon occurs because teachers usually lecture the texts and evaluate students on their retention of facts and principles conveyed in the lectures (Wendling, 2008).

Hermida (2009) at Algoma University, Canada conducted an action research project to assess the approach towards reading among a group of first-year University students in a Legal Studies course. The objective of this project was to evaluate whether students took a deep or surface approach to read. The ultimate goal of this study was to assess the quality of their learning outcome, as the approach to read was considered directly proportional to the quality of their learning outcome. In a similar study on students' learning outcomes, which took place at the University of Gothenburg, Sweden (Bowden & Marton, 2000), the researchers asked students to read an article written by a professor of education on some proposed university reforms in Sweden. Later, they met the students and asked them open-ended questions in order to assess their approach to reading and their understanding of the text. Additionally, they specifically asked the students what they had felt while studying the text (Bowden & Marton, 2000).

There are two basic foundations for forming associated teaching. First, the teacher coordinates the planned learning activities with the learning outcomes and the assessment; secondly, students understand the meaning of what they are learning. Thus, to develop a deep approach to reading, teachers need to design a course whose learning objectives and learning outcomes should encourage students to adopt a deep approach to reading and learning and use their higher cognitive and metacognitive skills to understand, to tackle academic texts, and to negotiate meanings as intended by the author of the texts(Herteis, 2007). Gibbs and Forsaith have shown that through all three components of the system namely objectives, teaching and learning, and assessment are important, assessment plays the most effective role in students' decision on whether choosing a deep or surface approach to reading and learning (Forsaith, 2001; Gibbs, 1999). Barbara Millis also suggested the application of classroom assessment techniques to foster deep reading and learning during the course (Millis, 2008).

Reading comprehensions skill is one of the basic skills that is cared about in the process of teaching and learning foreign languages. It is also one of the most important skills to learn any language as it determines whether the learner understands the content of the text or not. The particular challenge is that the vocabularies of chemistry have both scientific and daily meanings studied by many scholars, such as Cassels and Johnstone (1980); Brown. and Spang (2008); Snow (2010); Jasien. (2011); Brown (2011). Song and Carheden (2014) conducted a qualitative study to investigate how college students understand selected dual meaning vocabulary (DMV) words before and after having been instructed about chemical meaning. They found that (i) before having been instructed, most of the students defined a DMV term with its common meaning, (ii) after instruction, understanding the scientific meaning of DMV words was a little, but (iii) there is a lack of retaining scientific meanings of words because of infrequent usage, habits of study and ignorance of other scientific vocabulary terms (Roko, Robert, & Mia, 2016).

Therefore, examining the actual situation of practicing reading comprehension skills in teaching chemistry in the English language at Vietnamese high schools is an important and urgent task. Hence this survey was designed aiming at evaluating the proficiency level of reading comprehension skills of students while they studied chemistry in English. The results of this study, it is hoped, will serve as the basis for proposing reading comprehension skills to improve the quality of teaching chemistry in the English language in Vietnamese high schools.

3. CONTENT AND RESEARCH METHODS

3.1. Reading Comprehension

Reading is a complicated cognitive ability, which is reputedly one of the basic language skills helping students in learning a foreign language. Rouai (2014) defined reading as “the meaningful interpretation of written or printed verbal symbols and a result of interaction between the perception of graphic symbols that represent language and the reader’s language skills, cognitive skills, and knowledge of the world”. Hunt (2004) asserted that "Reading is a process shaped partly by the text, partly by the reader's background, and partly by the situation, the reading occurs in". Fazeli (2010) considered the word comprehension relates to “the ability to go beyond the words, to understand the ideas conveyed in the entire text”. Reading comprehension thus results from interpreting the combination of all the features of a text. Literal comprehension is the basic meaning carried by the words, but more important are the inferential or implicit meanings implicit in the words and the way they are used by the author.

3.2. Reading Comprehension Skills in Teaching and Learning Chemistry in the English language

Skimming skill. According to Grellet. (1999), skimming is a skill used by readers to get "a general idea about the content of printed materials” to read the text quickly. In this strategy, “readers will look for something quite specific or get general ideas before putting effort into close reading". There are three types of skimming, viz., preview, overview, and review. For example, one person does not want to read all parts of the texts or articles, s/he can use skimming techniques such as (1) glancing through the pages; (2) focusing on the titles, headings, and subheadings; (3) reading the opening and the concluding sentence carefully; and (4) reading the first and the last sentence of each paragraph to get the main idea of the text(Mack & Ojalvo, 2009; The New York Times, 2014).

Scanning skill. According to Grellet (1981), “Scanning is a reading technique that requires the reader to search for specific information without reading the whole text, through looking at its title, table of content and so on”. The scanning methods include: (i) fixing clearly in your mind what you are looking for; (ii) anticipating how the information would look; (iii) running your finger down the middle of the page or backward and forwards across the page, and (iv) letting your eyes follow the particular target.

In-depth reading is used to (i) get deeper meaning and comprehension of a text; (ii) study detailed information for an assignment; (iii) read difficult parts of a text. In general, in-depth reading skill needs to be combined with

many other skills, such as surveying, searching, browsing, predicting, inferring, self-monitoring, summarizing skills, and so on, to read and understand the documents as well as articles clearly and efficiently.

3.3. Chemistry Teachers' Competences in Teaching Chemistry in the English language

Chemistry teaching's capability. DeSeCo (2002) defines competence as "a combination of intellect, skills, and attitude that already have or potentially can be learned by an individual or organization to accomplish missions". Pedagogical competence is a special ability attributed to a teaching career. Pedagogical competence is a combination of the psychological characteristics of personality to meet the requirements of pedagogical activity and determine the success of that activity (OECD, 2005) including the following basic component competencies: preparation competence, language ability, the competence of using teaching aids, and equipment, the competence of social activities inside and outside the school, assessment, and competence to organize educational activities. Grimmitt (2000) defined that pedagogy as a theory of teaching and learning encompassing aims, curriculum content, and methodology. Other studies defined pedagogy as "both the act of teaching and its attendant discourse" (Alexander, 2004) or the art (and science) of teaching (Bhowmik, Banerjee, & Banerjee, 2013).

English communication ability. Proficiency of communication is a communicated ability that is related to other people, with high accuracy, clear, easy-to-understand, coherent, efficient, and congruous. McCroskey explains: "The limit of communication ability consists of knowledge and study skills, things we already had, the way they did in different circumstances in the past, and capable of determining the achievement that has the highest probability concerning a specific situation" (McCroskey & McCroskey, 1988). Canary and Cody (2000) have given out six criteria to evaluate communication ability, which consists of adaptation skills, conversation participation, conversation management, sympathy, efficiency, and accordance.

A specialized subject-teacher, particularly of chemistry, needs to understand how to conduct students' discussion in class, how to frame scientific questions, how to analyze scientific ideas, evaluate experiments and provide proofs and arrive at conclusion (Hatch & Brown, 1995).

3.4. Survey Objectives

1. To figure out the awareness of educational subjects and the importance of reading comprehension skill in teaching and learning chemistry in English in high school.

2. To evaluate the reading comprehension skills of students in studying a science subject and determine the difficulties faced while practicing reading comprehension skills.

3. To build a scale to assess the extent of manipulating reading comprehension skills required in learning chemistry.

4. To design 4 survey projects to properly assess the situation of training reading comprehension skills of Chemistry subject in English.

3.5. Survey Method

The survey method applied to this study included sending the survey questionnaire directly to teachers and students and interviewing some teachers as well as high school students. To get on well with the survey process, and handling and analysing the data, we used "Google Forms". The data was collected and collated at the end of the survey.

3.6. Survey Process

We surveyed 14 teachers, 486 students in 10 high schools in Ho Chi Minh City, one of the largest and most modern cities in Vietnam. Table 1 illustrates these details.

The study comprised four projects: (i) The importance of reading comprehension skills in teaching and learning chemistry in English in Vietnamese high school (ii) Difficulties encountered in learning these skills (iii) Practicing these skills, and (iv) Evaluating the level of proficiency in reading comprehension skills.

To conduct this research, we designed two types of polls, "Teacher's Poll" and "Student's Poll", with optional questions and level rating. The poll data was synthesized and processed after obtaining the actual survey results.

Table-1. Sampling Plan for Questionnaire Survey.

No	Name of Highschool	District	City	Total number of school authorities	Total number of teachers	Total number of students
1	Nguyen Thi Minh Khai	3	Ho Chi Minh	2	2	82
2	Le Hong Phong	5		2	3	65
3	Tran Dai Nghia	1		1	1	69
4	Bui Thi Xuan	1		1	1	78
5	Nguyen Thuong Hien	Tan Binh		1	2	63
6	Gia Dinh	Binh Thanh		1	3	71
7	Le Quy Don	3		2	2	58
Total (N=510)				10	14	486

3.7. Survey Steps

Project 1: The importance of reading comprehension skills in teaching and learning chemistry in English in Vietnamese high schools.

First, to have a basis to carry out the next survey projects with the content relating to the evaluation of the awareness of educational items to train for reading comprehension skills in teaching and learning Chemistry in English, we conducted a preliminary survey. There were four levels of evaluation : (1) Very important (2) Important; (3) Moderate; (4) Not-important (Aday & Cornelius, 2006). Survey results are shown in the following chart Figure 1.

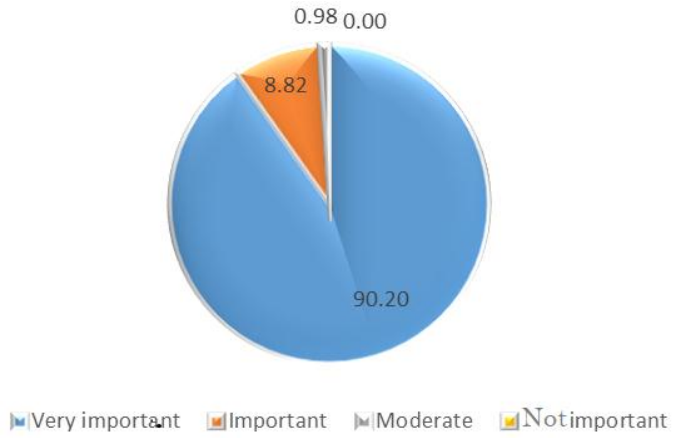

Figure-1. Awareness of educational objects about the importance of reading comprehension skills in teaching and learning chemistry in English in high school (N=510).

The pie chart above depicts the importance of reading comprehension skills in teaching and learning Chemistry in English. The percentage of people (sum of the education-subjects is 510) that say very important, important, moderate, and not-important are 90.2 %, 8.82 %, 0.98 %, and 0 %, respectively. This suggests that despite a majority of respondents realizing the importance of reading comprehension skills, it is now more important to find out what difficulties are possibly faced by them to continue practicing these skills and what are the causes of such difficulties. It is also important to investigate the reason for such a contradiction seen in these

findings. We will continue to explore through the next survey projects to be able to assess more accurately and objectively before proposing reading comprehension skills in teaching chemistry in English.

Project 2: The difficulties they encounter as they practice reading comprehension in chemistry in English.

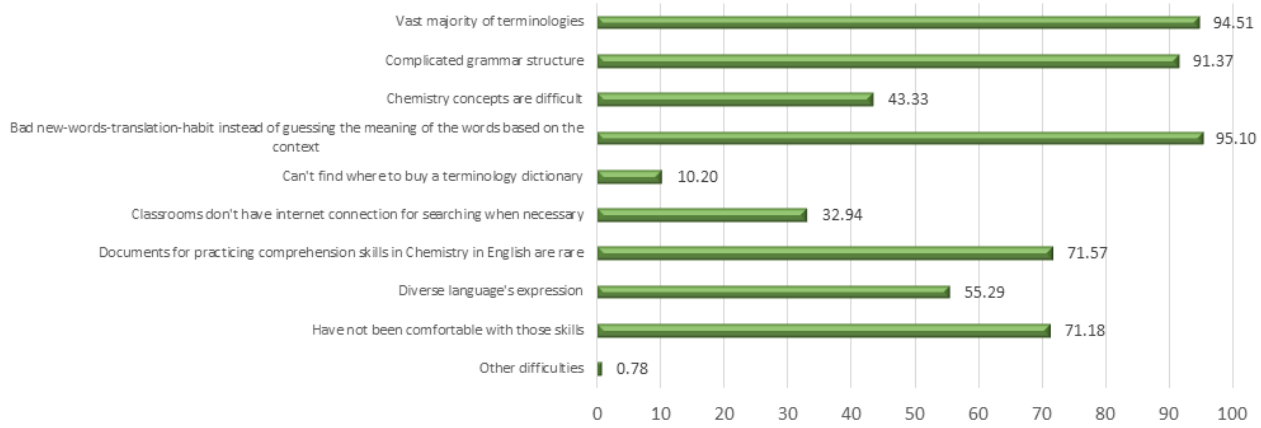

Figure-2. The difficulties they encounter as they practice reading comprehension in chemistry in English. (N=510).

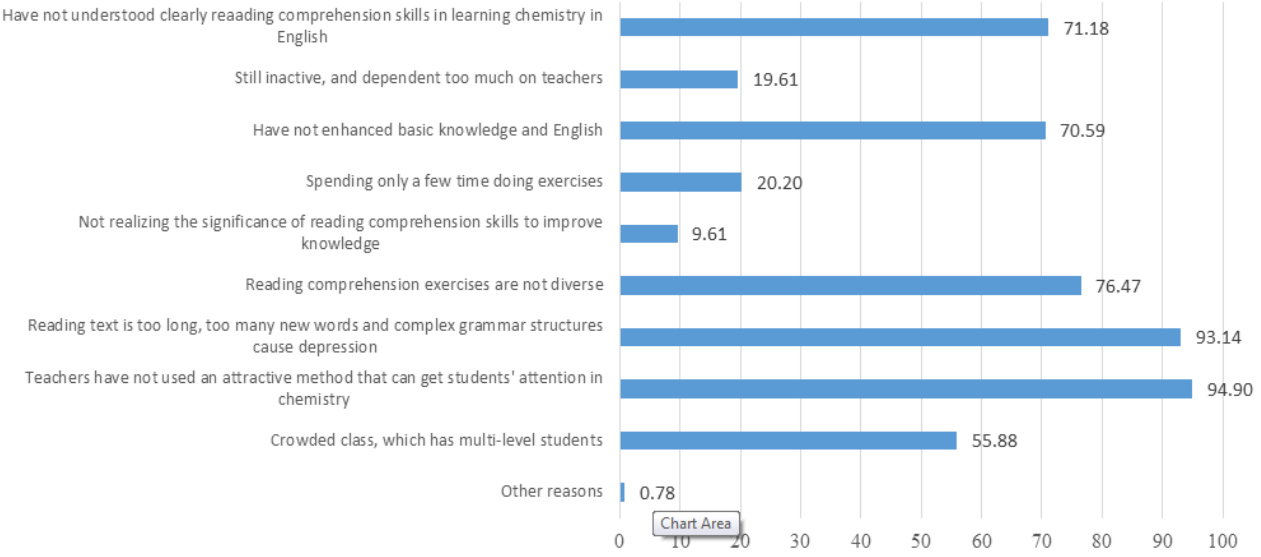

Figure-3. The reasons for those difficulties when we use reading comprehension skills in chemistry in English. (N=510).

Figure 2 and Figure 3 (sum of the participants of this study = N 510) told that most of the teachers and students say that the difficulties they encounter related to reading comprehension skills in chemistry in high school. The reasons for these difficulties were also stated by surveyed targets. Hence, it shows that practice reading comprehension skills when studying chemistry in English also meets a lot of difficulties due to different objectiveness and subjectiveness, of which the efficiency of using reading comprehension skill in this subject at different perspectives is vital, need to be studied and evaluated in-depth to be able to propose appropriate reading comprehension skills.

Project 3: Practicing reading comprehension skills in learning chemistry in English in high school.

Before evaluating the level of awareness of educational objects on the use of reading comprehension skills in teaching and learning chemistry in English, we had to first survey about the level of practicing reading comprehension skills in the teaching and learning of chemistry in English. A question was asked: "Are you feel familiar with reading comprehension skills in teaching and learning chemistry in English?". A majority of educators (75.88 %) believed that they were familiar with reading comprehension skills while 24.51 % were not. (see Figure 4)

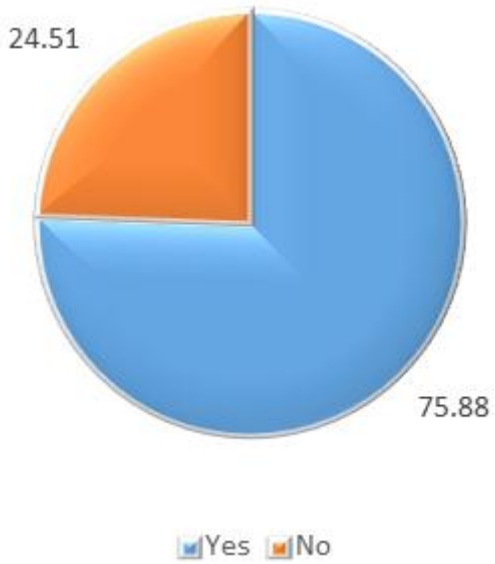

Figure-4. Awareness of using reading comprehension skills in learning chemistry in English in high school.

This finding is contradictory to the fact discovered in the previous project when the respondents were asked about the difficulties they encountered as they practiced reading comprehension chemistry in English. The previous project results (Figure 3) have suggested that those students have not mastered reading comprehension skills (71.18 %). It is, therefore, necessary to find out what makes the survey results between these two projects so contradictory.

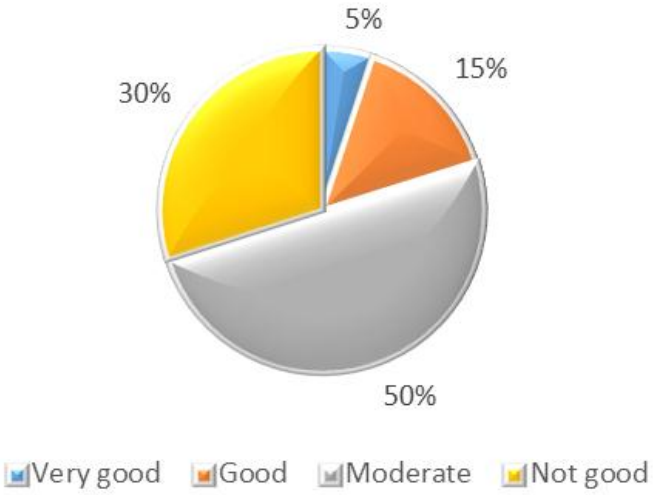

Figure-5. Awareness of education –subjects about self-evaluation results of the reading-comprehension level of students in learning Chemistry in English in high school.

We decided to delve deeper to understand this contradiction and to evaluate it more accurately. This required letting the educational objects assess their use of reading comprehension skills in teaching and learning chemistry in English at high school. A close observation of the two results (Figure 4, 75.88 %) and (Figure 3, 71.18 %) suggest that the students are not able to use reading comprehension skills proficiently. This is supported by the survey results in Figure 5 which show that only 5 % of educational objects believed that their comprehension skills are "very good", 15 % think that "good", 50 % think that "moderate" and 30 % that is "not good". Hence a large number of respondents evaluate their level of reading comprehension in learning chemistry as "moderate" and "Not good"?

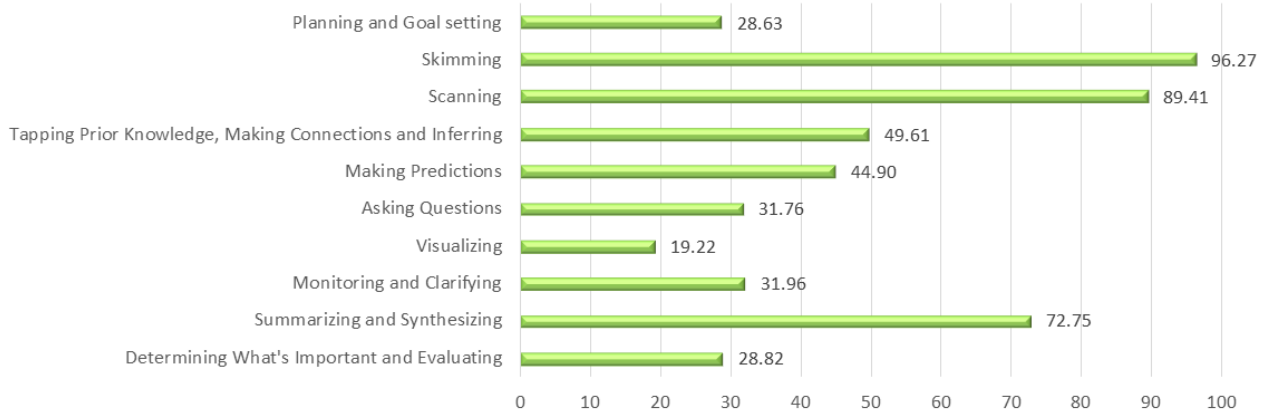

Figure-6. Awareness of education subjects about reading comprehension skills in English's academic subjects.

We continued to survey the awareness of educational objects on specific comprehension skills to assess the degree of the use of these skills in educational objects. Figure 6, represents that 96.27 % of educated people know how skimming skills, 89.41 % know scanning skills, 72.75 % know summarizing and synthesizing skills. This leads us to assume that students who are familiarized with all kinds of reading comprehension skills are different from those who lack or possess limited skills. Only those students who are proficient in these skills can organize their ideas while others are dependent on reading techniques.

This is supported by the results of interviewing the surveyed students. The interviewed students were asked whether they were comfortable with reading comprehension skills or they just knew what type of comprehension skills did they have. A majority of students confirmed that they had only heard about those skills but could not name those types of reading comprehension skills. Only when being interviewed, they told us about having known skills such as skimming and scanning.

Based on these survey results, we have a basis to propose some reading comprehension skills in teaching and learning chemistry in English to help teachers and learners to assess the level of using these skills in their teaching and learning.

Project 4: Evaluating the level of proficiency in reading comprehension skills of students in learning chemistry in English in high schools.

Based on the above research results and the surveyed and tested data, we proposed an evaluating level scale of proficiency in reading comprehension skills of students in learning chemistry in English in high school (See Appendix 1). The rating levels in each skill of the above criteria were arranged in ascending order from 1 to 6 (1 is the lowest level; 6 is the highest level) according to the improved Bloom classification scale, proposed by Pohl and colleagues (Pohl, 2000). We conducted a test of reliability through Cronbach's alpha value, which was used to eliminate garbage variables before conducting factor analysis (EFA and CFA) with the SPSS 20.0 software. Variables with the Corrected item-total correlation coefficient less than 0.3 were eliminated. If the Cronbach's alpha coefficient ≥ 0.6, the scale has an acceptable measure of reliability (Nunnally & Berstein, 1994).

Appendix 2 shows the results of Cronbach's alpha values and revel that the components of the scale have a high and good Cronbach's Alpha coefficient (> 0.6). The Correlation of the total variance in the scale is also greater than 0.3, so they are satisfactory (Hair, William, Barry, & Rolph, 2014). Thus the measurement variables of these components are used for analyzing Exploratory Factor Analysis (EFA) (Spearman, 1904) with the SPSS 20.0 software. The Average Variance Extracted (AVE) also measured the level of variance captured by a construct versus the level due to measurement error. The values above 0.7 were considered very good, whereas, the level of 0.5 was acceptable.

The EFA results in Appendix 3 show that there are 10-factor groups extracted with an AVE of 78.429% (> 50%), which suggests that it is satisfactory and has no eliminated variables. Checking the condition of factor

analysis, we have KMO = 0.876, which is qualified due to greater than 0.5 and Sig. (Bartlett's Test) = 0.000 < 0.05 (Hair et al., 2014). This shows that observed variables are overall correlated and groups of factors coincide with the scale. This result is further verified with Confirmatory Factor Analysis (CFA). Confirmatory factor analysis (CFA) is one of the techniques that allow testing of how well-observed variables represent factors. This method is used to re-affirm the univariate, multivariate, convergent validity, and discriminant validity of the scale. The structure of the scale on training in reading comprehension skills in the study of chemistry in English for high school students includes 10 main skills and the component levels are analyzed for affirmative factors (Brunner, Nagy, & Wilhelm, 2012) with SPSS AMOS 20.0 software.

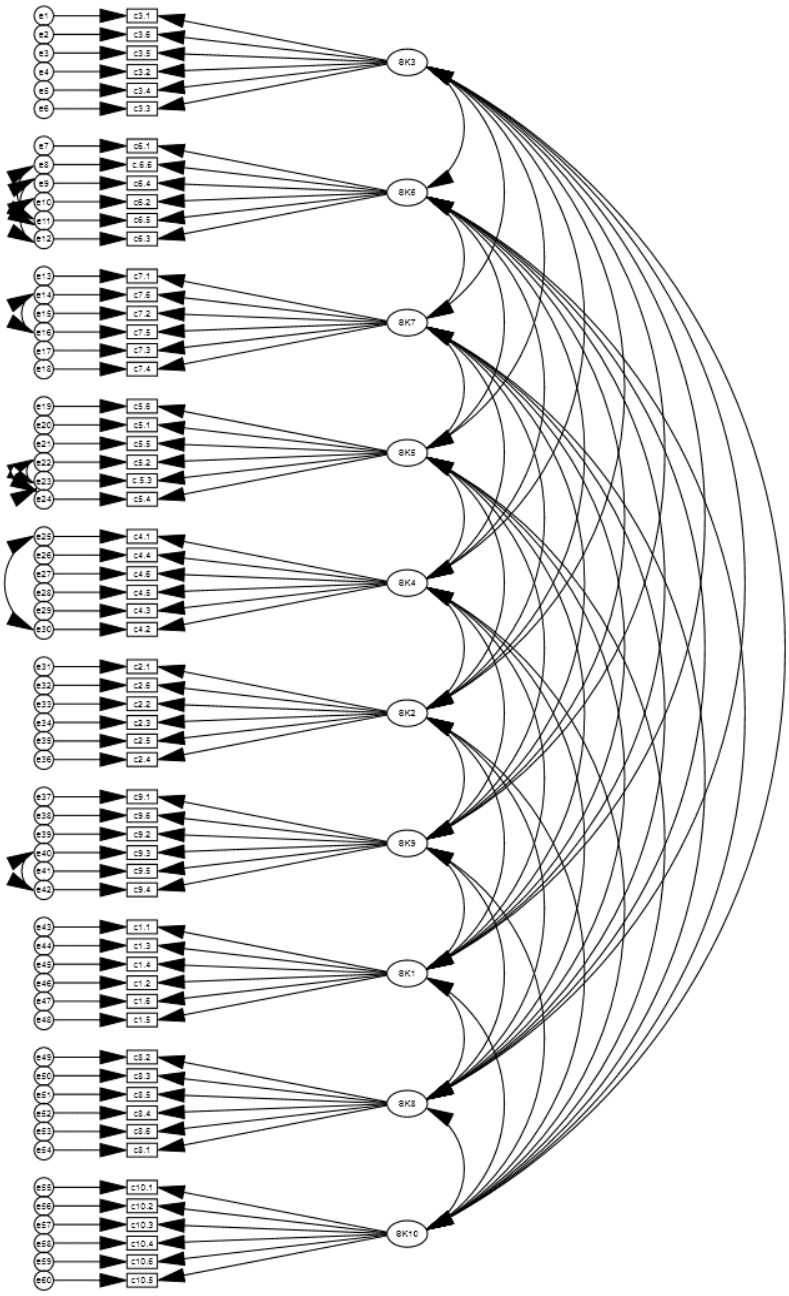

Figure-7. The CFA result of the scale of proficiency in reading comprehension skill of students in learning chemistry in English in high school.

The CFA results in Figure 7 show that the value of variables get the permitted standard (≥ 0.5) and is statistically significant (the values of p-value are equal to 0.00). Thus, it is possible to conclude the variables used to measure 10 components of the scale to achieve convergent validity. The results in Appendix 4 also show that the scale model has 1657 degrees of freedom (df), chi-square test value (χ^2) = 2170.402 with p-value = 0.000; chi-square/df = 1.310, which is satisfactory because it is less than 3 (Carmines & McIver, 1981) and other indicators (CFI = 0.984; TLI = 0.983; RMSEA = 0.025; SRMR = 0.027) are also accepted. For the CFA model to match the calculated data, and to confirm the validity of the model, both CFI and TLI values must be greater than 0.95. The value of $\chi 2$ is not important; however, with a larger sample size, this criterion does not always qualify. The RMSEA value is less than 0.06 and the SRMR value is less than 0.08, which confirms the relevance of the scale as well (Hu & Bentler, 1998; Marsh et al., 2010).

The value and reliability of the scale were assessed through the composite reliability and the average variance extracted in Appendix 5. This result shows that all components of the scale had the value and reliability that were qualified (> 0.6) with the average variance extracted greater than 50%. Most of the Sig values between independent variable pairs in Pearson Correlation were found greater than 0.05 (0.108 between SK3 and SK7 respectively), so the variables were almost uncorrelated (i.e., independent). Particularly, SK3 and SK7 variables are negatively correlated ($Sig < 0.05$; $r_{Pearson} = -0.104$), however, this correlation is not significant (see Appendix 6). This result is completely consistent with the scale given with the reading comprehension skills with each reading level of the reader is completely independent of each other. Therefore, there is a need to propose some types of exercises to practice reading comprehension skills in teaching chemistry in English effectively.

4. DISCUSSION AND CONCLUSIONS

"Science without literacy is like a ship without a sail. So just as it is impossible to construct a house without a roof, it is impossible to build an understanding of science without exploring how the multiple languages of science are used to construct meaning" (Osborne, 2002). The importance of language for learning chemistry has been known for a long time and has been discussed recently in several places (Taber, 2015). Reading comprehension skill in learning Chemistry in English plays an important role in understanding, researching new knowledge, and making it as a basis for high school students to get to know more knowledge around the world during the international integration. There is an intimate relationship between knowledge that students have (including what they achieve, and what they already have) and a successful application of reading comprehension skills to those reading texts. Therefore, we strongly suggest reading comprehension techniques for high school Chemistry in English, which consists of Skimming skill, scanning skill, and in-depth reading skill.

The projects carried out in this study have brought important results of reading comprehension skills when teaching and learning chemistry in English in high school. These results emphasize upon developing the awareness of educational objects in the training of English reading comprehension when teaching and learning chemistry in this language, particularly to clarify the confusion between "knowing" and "being familiar with" with the use of English reading comprehension skills in chemistry. Because of this confusion among educators, students also encounter difficulties and cannot achieve high proficiency of reading comprehension in English.

The findings of these projects also provide teachers and students with a helpful toolkit to assess the academic result of students. This toolkit comprises the scale of proficiency in reading comprehension skills in learning chemistry in English in high school. Furthermore, proposing exercises to train educators in reading comprehension skills when teaching chemistry in English in high school is also necessary to support both teachers and students to achieve higher proficiency in teaching and learning chemistry in English. Last, but not least, understanding the practice of reading comprehension in teaching Chemistry in English in high school also requires a scientific basis for exploring some new type of exercises, which must be chemistry-related and in English, which will further improve their reading skills.

Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no competing interests.
Acknowledgement: Both authors contributed equally to the conception and design of the study.

REFERENCES

Aday, L. A., & Cornelius, L. J. (2006). *Designing and conducting health surveys (A Comprehensive Guide)* (3rd ed.): Published by Jossey-Bass. A Wiley Imprint.

Alexander, R. (2004). Still no pedagogy? Principle, pragmatism and compliance in primary education. *Cambridge Journal of Education*, *34*(1), 7-33.Available at: https://doi.org/10.1080/0305764042000183106.

Bhowmik, M., Banerjee, B., & Banerjee, J. (2013). Role of pedagogy in effective teaching. *Basic Research Journal of Education Research and Review*, *2*(1), 1-5.

Bowden, J., & Marton, F. (2000) (pp. 47-51). London: Kogan: The University of learning.

Brown, B. A. (2011). Isn't that just good teaching? Disaggregate instruction and the language identity dilemma. *Journal of Science Teacher Education*, *22*(8), 679-704.Available at: https://doi.org/10.1007/s10972-011-9256-x.

Brown., B. A., & Spang, E. (2008). Double talk: Synthesizing everyday and science language in the classroom. *Science Education*, *92*(4), 708-732.Available at: https://doi.org/10.1002/sce.20251.

Brunner, M., Nagy, G., & Wilhelm, O. (2012). A tutorial on hierarchically structured constructs. *Journal of Personality*, *80*(4), 796–846.Available at: 10.1111/j.1467-6494.2011.00749.x.

Canary, D. J., & Cody, M. J. (2000). *Interpersonal communication: a goals-based approach.* New York: Saint Martin's.

Carmines, E. G., & McIver, J. P. (1981). *Analyzing models with unobserved variables.* Beverly Hills, CA: Sage Publications.

Cassels, J. R. T., & Johnstone, A. H. (1980). *The understanding of non-technical words in science.* London: Royal Society of Chemistry.

Decision No.959/QĐ-TTG date 24/6/2010. (2010). Decision No.959/QĐ-TTG date 24/6/2010 of Vietnamese Prime Minister approved the project "Developing the system of specialized schools from 2010 to 2020".

Decision No. 1400/QĐ-TTg date 30/9/2008. (2008). Decision No. 1400/QĐ-TTg date 30/9/2008 " of Vietnamese Prime Minister approved the project "Teaching and studying foreign languages in the national education system for the period 2008-2020.

DeSeCo. (2002). *Education - lifelong learning and the knowledge economy: Key competencies for the knowledge society*: Proceedings of the DeSeCo Symposium, Stuttgart, October 10-11.

Erickson, B. L., Peters, C. B., & Strommer, D. W. (2006). *Teaching first-year college students* (Vol. 122). San Francisco, CA: Jossey-Bass.

Fazeli, S. H. (2010). Some gaps in the current studies of reading in second/foreign language learning. *Online Submission*, *10*(4), 373-386.

Forsaith, D. (2001). *Introducing assessment-based learning to a commerce topic.* Flinders University, Research Papers Series, Retrieved from: http://www.flinders.edu.au/socsci/index.cfm?6C53293F-CB74-C9FB-9FBECB0AD332A237.

Gibbs, G. (1999). *Using assessment strategically to change the way students learn. In S. Brown, and A. Glasner (Eds.), Assessment Matters in Higher Education, Society for Research into Higher Education and Open University Press.* Buckingham, UK: Herteis, E.

Grellet, F. (1981). Developing reading skills: A practical guide to reading comprehension exercises (pp. 58–59): Cambridge University Press.

Grellet., F. (1999). *Developing reading skills.* New York: Cambridge University Press.

Grimmitt, M. (2000). *Pedagogies of Religious Education: case studies in the research and development of good pedagogic practice in Religious Education.* Essex: McCrimmon.

Hair, J. F. J., William, C. B., Barry, J. B., & Rolph, E. A. (2014). *Multivariate data analysis.* Upper Saddle River, NJ: Prentice Hall.

Hatch, E., & Brown, C. (1995). *Vocabulary, semantics, and language education.* Cambridge: Cambridge University Press.

Hermida, D. (2009). The importance of teaching academic reading skills in first-year university courses. *The International Journal of Research and Review*, *3*, 20.Available at: 10.2139/ssrn.1419247.

Herteis, E. M. (2007). Content conundrums. *PAIDEIA: Teaching and Learning at Mount Allison University*, *3*(1), 2–7.

Hu, L.-T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, *3*(4), 424–453.

Hunt, R. A. (2004). Reading and writing for real: Why it matters for learning. *Atlantic Universities' Teaching Showcase*, *55*, 137-146.

Jasien., P. G. (2011). What do you mean that "strong" doesn't mean "powerful"? *Journal of Chemical Education*, *88*(9), 1247–1249.

Mack, D., & Ojalvo, H. E. (2009). Skimming and scanning: Using the time to develop reading skills. *The New York Times*.

Marsh, H. W., Lüdtke, O., Muthén, B., Asparouhov, T., Morin, A. J., Trautwein, U., & Nagengast, B. (2010). A new look at the big five factor structure through exploratory structural equation modeling. *Psychological Assessment*, *22*(3), 471-491.Available at: https://doi.org/10.1037/a0019227.

McCroskey, J. C., & McCroskey, L. L. (1988). Self-report as an approach to measuring communication competence. *Communication Research Reports*, *5*(2), 108-113.

Michelle, R. D., Sawyer, R. K., Hogrebe, M. C., Brown, P. L., Luesse, S. B., Gealy, D. J., & Frey, R. F. (2016). Talking through the problems: A study of discourse in peer-led small groups. *Chemistry Education Research and Practice*, *17*(3), 555-568.Available at: https://doi.org/10.1039/c5rp00154d.

Millis, B. J. (2008). *Using classroom assessment techniques (CATs) to promote student learning*. Paper presented at the Paper Presented at the Oklahoma Higher Education Teaching and Learning Conference.

Nunnally, J., & Berstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.

OECD. (2005). *Teachers matter: Attracting, developing, and retaining effective teachers*. Paris: OECD Publishing.

Osborne, J. (2002). Science without literacy: A ship without a sail? *Cambridge Journal of Education*, *32*(2), 203-218.Available at: https://doi.org/10.1080/03057640220147559.

Pohl, M. (2000). *Learning to think, thinking to learn: Models and strategies to develop a classroom culture of thinking*. Cheltenham, Vic: Hawker Brownlow.

Roko, V., Robert, B., & Mia, O. (2016). Understanding of words and symbols by chemistry university students in Croatia. *Chemistry Education Research and Practice*, *17*(3), 475–476.Available at: 10.1039/c6rp00037a.

Rouai, S. (2014). *The use of reading strategies in improving reading comprehension*. Algeria: University Kasdi Merbah.

Snow, C. E. (2010). Academic language and the challenge of reading for learning about science. *Science*, *328*(5977), 450-452.

Song, Y., & Carheden, S. (2014). Dual meaning vocabulary (DMV) words in learning chemistry. *Chemistry Education Research and Practice*, *15*(2), 128-141.Available at: https://doi.org/10.1039/c3rp00128h.

Spearman, C. (1904). 'ÔGeneral Intelligence, Õ objectively determined and measured. *American Journal of Psychology*, *15*(2), 201-293.Available at: https://doi.org/10.2307/1412107.

Taber, K. S. (2015). Exploring the language (s) of chemistry education. *Chemistry Education Research and Practice*, *16*(2), 193-197.Available at: https://doi.org/10.1039/c5rp90003d.

The New York Times. (2014). Skimming and scanning: Using the times to develop reading skills.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Chicago: University of Chicago Press.

Wendling, B. (2008). *Why is there always time for their Facebook but not my textbook?* Paper presented at the The Oklahoma Higher Education Teaching and Learning Conference.

APPENDICES

Appendix-1. Evaluating level scale of proficiency in reading comprehension skill of students in learning chemistry in English in high school.

Skill	Sample of Sentence	Level of Proficiency
1. Planning and Goal Setting Strategic readers determine their purpose and what they gain, or they do after reading.	- I need to know the product of the reaction/mechanism of reaction/... to... - My purposes when reading this chemical text/ process for this experiments/... is... - My most important goal when reading this chemical text/steps to prepare for experiments/... is... - To achieve goals/purposes when finishing reading the chemical test, I need to do/plan...	1.1. List the purposes before reading a chemical text. 1.2. Research specific goals to be able to achieve the goal specified for a chemical test. 1.3. Sort goals in order of precedence according to the chemical content of the text. 1.4. Outline the plan after reading a chemical text. 1.5. Prioritize the tasks in the plan in order of precedence based on the chemical content of the text. 1.6. Evaluate results achieved after doing the plan related to the chemical content of the text.
2. Skimming Strategic readers overview the text to understand the general idea and tone of the material and to overview your textbook chapters or to review for a test (does not focus to read every word)	- The text includes … paragraph or … contents. - The title of a reading passage/text can be … - The main idea of the book/ the text can be …	2.1. Underline important keywords, chemical terminology, chemical content in each paragraph, in the text. 2.2. Give examples, chemical phenomena, reactions, to illustrate important keywords, content to understand the keywords, that content surely. 2.3. Self-Practice of using important keywords, chemical terminology, chemical content. 2.4. Classify keywords, chemical terminology, sentences, snippets that have similar chemical content or relate to each other. 2.5. The debate on the chemical content can be obtained as the main content of the text. 2.6. Give the main content of the text in a concise manner involving a chemical problem.
3. Scanning Strategic readers search for specific information without reading the whole text	- The name of chemical element/ chemical/ reaction/ laboratory tools/ phenomenon/ practical data/title… of … is …, through the line … of the paragraph/ the text. - The reason for the reaction/ chemical phenomenon… is … - The idea/ essence/ rule of the paragraph/ the chemical problem is …, through the word/ sentence … in the text. - I think the problems in the text relate to other chemical problems, such as…	3.1. Underline the names of chemical elements, substances, reactions, laboratory instruments, phenomena, title... 3.2. Describe chemical phenomena, reactions that appear in the text. 3.3. List chemical elements, substances, reactions, laboratory instruments, phenomena, titles, chemical contents that are available in the text. 3.4. Relate the chemical facts found to known chemical knowledge. 3.5. Choose the chemical facts that are relevant to each other or the facts that are likely to be able to show the content of the text. 3.6. Predict the content, the nature of a chemical problem through the information found in the text.
4. Tapping Prior Knowledge, Making Connections, and Inferring Strategic readers review what they knew before and connect what they know with	- The previous lesson showed that - This reaction/chemical element/ mechanism/ phenomenon reminds me of… - This reaction/chemical element/ mechanism/ phenomenon relates to… - I connected to known chemical knowledge when … - I can relate this chemical	4.1. List of chemical facts, knowledge, issues known to be related to the content of the text. 4.2. Give examples of chemical facts, knowledge, known issues that relate to the text. 4.3. Explain the chemical phenomena, problems, reactions in the text according to known knowledge. 4.4. Interpret phenomena, problems, mechanisms, chemical reactions that are unknown in the text. 4.5. Conclude chemical the problems, phenomena, mechanisms, reactions that were interpreted.

what they are reading.	phenomenon to other reactions because … - This makes me think about ... - This compound/ reaction/… is familiar to me because … - Based on the chemical content of the text and what I knew, I think … - This evidence/ phenomenon suggests … - Although the chemical content/ reaction/ phenomenon does not come right out and say it, I can figure out that …	4.6. Assemble the old and new facts, knowledge known into related systems thoroughly.
5. Making Predictions Strategic readers think about what's going to happen and make predictions based on what they know and what they have read.	- I think that reaction is going to happen because … - I predict that the phenomenon of this reaction will be … - I think the next reaction which is going to happen is… - According to the known knowledge, the reaction/ phenomenon which is going to happen is … - This phenomenon/ reaction/ … make me think that … will happen. - I thought that the reaction/ phenomenon was going to happen, but other reactions/phenomena happened instead. - Since the reaction/ mechanism/ phenomenon happened, I think the result will be ... - My predictions about that chemical problem were right/wrong because…	5.1. Recall the known knowledge, content, chemical reactions, phenomena that are related to the text. 5.2. Identify the chemical knowledge, content, reactions, phenomena that relate to the chemical problems in the text. 5.3. Use the chemical knowledge, contents that are being read to explain the known knowledge or vice versa. 5.4. Classify chemical problems that have been explained and unexplained. 5.5. Decide which of the most important chemical problem was not explained to clarify. 5.6. Predict chemical reactions, mechanisms, phenomena,... can happen by basing on known knowledge or inferencing.
6. Asking Questions Strategic readers ask themselves questions before, during, and after reading to better understand the author and the meaning of the text.	- I wonder what the chemical/ compound/ chemical element/ reaction is…? - I wonder why that reaction/ phenomenon happened… - I want to know when that reaction will happen. - This phenomenon makes me wonder about it…	6.1. Underline the chemical terminology/ phenomenon/ reaction/ problem not understood. 6.2. Classify of terminology/ phenomena/ reactions/ issues of chemistry not understood by various question groups 6.3. Choose the terms/ phenomena/ reactions/ chemical problems that were not understood in the ability to try to guess, explain. 6.4. Identify which unknown terms/ phenomena/ reactions/..., it's not important or not. 6.5. Wonder the questions while reading the chemical text to be sure to understand the problems in the text. 6.6. Arrange questions in a reasonable sequence to test your memory, understanding yourself after reading the text.
7. Visualizing Strategic readers picture, graph,… what is happening as they read?	- I could visualize the steps to do that experiment… - I could really picture that phenomenon/ direction/ reaction diagram/… - The description of experiment/ phenomenon/ reaction/… helped me visualize… - I created a mental image of the experiment/ phenomenon/	7.1. Remember the chemical content through experiments, phenomena, reactions, pictures, diagrams, clips,... that are available in the text. 7.2. Describe the chemical content: definitions, experiments, phenomena, reactions,... through pictures, diagrams, clips,... that are available in the text. 7.3. Outline or redraw or rebuild the chemical contents, information by drawing, diagrams, films, activities, experiences,... 7.4. Experiment with chemical experiments through guidance in the text.

	reaction/…	7.5. Draw conclusions about the properties, phenomena, nature,... of a chemical problem through information, images, drawings, diagrams,...
		7.6. Design the chemical content of the text by pictures, charts, films, mindmaps, chemical manuals... to be easier to understand and remember.
8. Monitoring and Clarifying Strategic readers stop to think about their reading and know what to do when they don't understand.	- I had to read slowly down when having the chemical definition/ substance/ compound/ experiment/ phenomenon/ … that I have not known. - I wonder what compound/ experiment/ phenomenon/ … means… - To understand better the definition/ phenomenon/ experiment/ compound/…, I need to know more about … - I need to know I'm on the right track of definition/ phenomenon/ experiment/ compound/… because … - I was confused by the construction of the compound/ reaction/… because … - I still don't understand the chemical mechanisms/ experiment/ phenomenon/ … - I'm guessing that this reaction will happen, but I need to … - Some information/ properties/ phenomena/ that is still not clear is … - I had difficulty with the explanation of phenomena/ properties/… - I can't understand the definition/ properties/ chemical mechanism/… - I need to reread this part to understand clearly chemical mechanism/ experiment/ phenomenon/ definition/…	8.1. Define the unknown chemical information, phenomena, reactions,...
		8.2. Describe the unknown chemical information, phenomena, reactions,...in your way (pictures, diagrams,...).
		8.3. Pause reading to find out, explain the unknown information, concepts, reactions, phenomena,...
		8.4. Interpret unknown information, chemical problems in the text by other information in the text.
		8.5. Decide to read slowly or quickly or reread the unknown chemical information in the text.
		8.6. Create questions relating to chemical content, new concepts, new reactions, strange phenomena of the text to make sure that you controlled the information of the text and clarify the unknown information.
9. Summarizing and Synthesizing Strategic readers identify the most important ideas and restate them in their own words.	- The chemistry text is mainly about … - The chemical properties of … include … - The reactions/phenomena ... proving the properties of the compound are ... - The most important chemical property of compound ... is ... - I can summarize this chemical text as ... - In a nutshell, this chemical text says that …	9.1. Remember the primary keywords in the chemical text.
		9.2. Identify the main content in the chemical text.
		9.3. Illustrate each of the main contents in the chemical text with diagrams, images, pictures ,...
		9.4. Outline the text by basing it on the main content (according to the section or chapter or...).
		9.5. Determine persuasive and easy-to-remember chemical concepts, reactions, phenomena,... to illustrate the main content in the chemical text.
		9.6. Compose, illustrate and present the main content of the chemical readings with evidence, examples, phenomena, reactions,... in your way.
10. Determining What's Important and Evaluating Strategic readers	- My latest thought about reactions/ phenomena/ … in the text is … - Reactions/ phenomena/	10.1. List the main contents of the chemical test.
		10.2. Explain the main chemical contents which are available in the text.
		10.3. Demonstrate the main chemical content that is available in the text with reactions, phenomena,...

think about the text's big idea or message and why it's important and define their opinion of the content after reading.	compounds that I think them being most important in the text are… - The most important message is… - This phenomenon/ reaction/ compound which is being relevant to our life is … - A conclusion I'm drawing is … -	10.4. Relate information, chemical contents that are available in the text to known knowledge, phenomena in life,... 10.5. Evaluate chemical information, facts, equations, phenomena,... that are important and make the reader think of the message to convey. 10.6. Inferring messages that relate to the chemical content of the text need to send to the readers.

Appendix-2. Results of the assessment of the scale's reliability through Cronbach's alpha test coefficient

SKILL	Items	Correlation between the total variable	Cronbach alpha's value
1. Planning and Goal Setting $\alpha_{Cronbach} = 0.911$	1.1	0.915	0.870
	1.2	0.738	0.897
	1.3	0.752	0.895
	1.4	0.744	0.896
	1.5	0.643	0.910
	1.6	0.723	0.899
2. Skimming $\alpha_{Cronbach} = 0.937$	2.1	0.931	0.910
	2.2	0.804	0.927
	2.3	0.779	0.930
	2.4	0.749	0.934
	2.5	0.760	0.932
	2.6	0.859	0.920
3. Scanning $\alpha_{Cronbach} = 0.975$	3.1	0.983	0.963
	3.2	0.896	0.972
	3.3	0.876	0.974
	3.4	0.896	0.972
	3.5	0.913	0.970
	3.6	0.930	0.968
4. Tapping Prior Knowledge, Making Connections and Inferring $\alpha_{Cronbach} = 0.963$	4.1	0.950	0.948
	4.2	0.820	0.962
	4.3	0.829	0.961
	4.4	0.918	0.951
	4.5	0.876	0.956
	4.6	0.889	0.954
5. Making Predictions $\alpha_{Cronbach} = 0.964$	5.1	0.916	0.954
	5.2	0.875	0.959
	5.3	0.867	0.960
	5.4	0.865	0.960
	5.5	0.876	0.959
	5.6	0.914	0.955
6. Asking Questions $\alpha_{Cronbach} = 0.975$	6.1	0.963	0.965
	6.2	0.908	0.971
	6.3	0.892	0.972
	6.4	0.910	0.971
	6.5	0.906	0.971
	6.6	0.919	0.970
7. Visualizing $\alpha_{Cronbach} = 0.965$	7.1	0.945	0.952
	7.2	0.886	0.958
	7.3	0.879	0.959
	7.4	0.823	0.965
	7.5	0.878	0.959
	7.6	0.910	0.956
8. Monitoring and Clarifying $\alpha_{Cronbach} = 0.857$	8.1	0.487	0.898
	8.2	0.838	0.809
	8.3	0.826	0.811
	8.4	0.788	0.818

	8.5	0.798	0.816
	8.6	0.551	0.857
9. Summarizing and Synthesizing $\alpha_{Cronbach} = 0.912$	9.1	0.834	0.885
	9.2	0.759	0.896
	9.3	0.720	0.901
	9.4	0.709	0.903
	9.5	0.707	0.903
	9.6	0.802	0.890
10. Determining What's Important and Evaluating $\alpha_{Cronbach} = 0.884$	10.1	0.872	0.835
	10.2	0.685	0.865
	10.3	0.680	0.866
	10.4	0.669	0.868
	10.5	0.625	0.876
	10.6	0.654	0.870

Appendix-3. Results of exploratory factor analysis (EFA) for the survey questionnaire on the interest in skills in the scale of proficiency in reading comprehension skill of students in learning chemistry in English in high school.

SKILL	Items	Factors									
		1	2	3	4	5	6	7	8	9	10
1. Planning and Goal Setting	1.1								0.945		
	1.2								0.822		
	1.3								0.833		
	1.4								0.827		
	1.5								0.742		
	1.6								0.809		
2. Skimming	2.1						0.955				
	2.2						0.867				
	2.3						0.847				
	2.4						0.822				
	2.5						0.831				
	2.6						0.906				
3. Scanning	3.1	0.985									
	3.2	0.927									
	3.3	0.911									
	3.4	0.924									
	3.5	0.936									
	3.6	0.948									
4. Tapping Prior Knowledge, Making Connections and Inferring	4.1					0.966					
	4.2					0.872					
	4.3					0.878					
	4.4					0.943					
	4.5					0.915					
	4.6					0.924					
5. Making Predictions	5.1				0.940						
	5.2				0.910						
	5.3				0.906						
	5.4				0.903						
	5.5				0.914						
	5.6				0.942						
6. Asking Questions	6.1		0.973								
	6.2		0.935								
	6.3		0.922								
	6.4		0.937								
	6.5		0.934								
	6.6		0.941								
7. Visualizing	7.1			0.957							
	7.2			0.917							

	7.3			0.912							
	7.4			0.872							
	7.5			0.913							
	7.6			0.937							
8. Monitoring and Clarifying	8.1									0.599	
	8.2									0.923	
	8.3									0.919	
	8.4									0.892	
	8.5									0.897	
	8.6									0.681	
9. Summarizing and Synthesizing	9.1							0.889			
	9.2							0.839			
	9.3							0.808			
	9.4							0.793			
	9.5							0.795			
	9.6							0.865			
10. Determining What's Important and Evaluating	10.1										0.923
	10.2										0.792
	10.3										0.784
	10.4										0.773
	10.5										0.733
	10.6										0.763

Note: Factor loadings below 0.40 are not present.

Appendix-4. Goodness-of-fit indices for CFA model.

CFA models	χ^2	*df*	χ^2/df	CFI	TLI	RMSEA	SRMR
10 latent factors + N dimension (Figure 1)	2170.402*	1657	1.310	0.984	0.983	0.025	0.027

Note: *p< .001, $\chi 2$ = chi-square; df = number of degrees of freedom; CFI = comparative fit index; TLI = TuckerLewis index; RMSEA = root mean square error of approximation; SRMR = standardised root mean square residual.

Appendix-5. Summary of results of testing the scale of proficiency in reading comprehension skill of students in learning chemistry in English in high school.

SKILL	The number of variables	Reliability		Average Variance Extracted	Evaluate
		$\alpha_{Cronbach}$	Composite		
SK1	6	0.911	0.913	0.639	Qualified
SK2	6	0.937	0.937	0.716	
SK3	6	0.975	0.975	0.865	
SK4	6	0.963	0.962	0.809	
SK5	6	0.964	0.962	0.810	
SK6	6	0.975	0.973	0.858	
SK7	6	0.965	0.964	0.818	
SK8	6	0.857	0.912	0.643	
SK9	6	0.912	0.910	0.631	
SK10	6	0.884	0.887	0.572	

Appendix-6. Result of Pearson Correlation between the skills of the scale of proficiency in reading comprehension skill of students in learning chemistry in English in high school.

		SK1	SK2	SK3	SK4	SK5	SK6	SK7	SK8	SK9	SK10
SK1	Pearson Correlation	1	0.019	0.055	0.031	0.006	0.035	-0.051	-0.062	-0.010	0.017
	Sig. (2-tailed)		0.665	0.215	0.480	0.891	0.424	0.249	0.160	0.821	0.708
SK2	Pearson Correlation	0.019	1	-0.043	0.016	-0.009	-0.001	-0.021	-0.018	-0.048	-0.022
	Sig. (2-tailed)	0.665		0.336	0.714	0.831	0.987	0.629	0.690	0.277	0.626
SK3	Pearson Correlation	0.055	-0.043	1	0.015	0.076	-0.010	-0.104*	-0.003	-0.054	0.014
	Sig. (2-tailed)	0.215	0.336		0.729	0.087	0.813	0.018	0.949	0.227	0.746
SK4	Pearson Correlation	0.031	0.016	0.015	1	0.001	0.017	0.048	-0.036	0.013	0.056
	Sig. (2-tailed)	0.480	0.714	0.729		0.985	0.700	0.280	0.423	0.775	0.210
SK5	Pearson Correlation	0.006	-0.009	0.076	0.001	1	-0.076	0.000	-0.054	0.030	-0.037
	Sig. (2-tailed)	0.891	0.831	0.087	0.985		0.086	10.000	0.227	0.496	0.407
SK6	Pearson Correlation	0.035	-0.001	-0.010	0.017	-0.076	1	-0.026	0.038	0.066	-0.051
	Sig. (2-tailed)	0.424	0.987	0.813	0.700	0.086		0.553	0.390	0.137	0.247
SK7	Pearson Correlation	-0.051	-0.021	-0.104*	0.048	0.000	-0.026	1	0.049	-0.084	0.062
	Sig. (2-tailed)	0.249	0.629	0.018	0.280	10.000	0.553		0.271	0.059	0.163
SK8	Pearson Correlation	-0.062	-0.018	-0.003	-0.036	-0.054	0.038	0.049	1	0.057	-0.029
	Sig. (2-tailed)	0.160	0.690	0.949	0.423	0.227	0.390	0.271		0.202	0.512
SK9	Pearson Correlation	-0.010	-0.048	-0.054	0.013	0.030	0.066	-0.084	0.057	1	-0.063
	Sig. (2-tailed)	0.821	0.277	0.227	0.775	0.496	0.137	0.059	0.202		0.158
SK10	Pearson Correlation	0.017	-0.022	0.014	0.056	-0.037	-0.051	0.062	-0.029	-0.063	1
	Sig. (2-tailed)	0.708	0.626	0.746	0.210	0.407	0.247	0.163	0.512	0.158	

Note: *. Correlation is significant at the 00.05 level (2-tailed); N = 510