Mind Mapping in CLIL: How It Facilitates Students' Reading Comprehension

Evi Puspitasari
Universitas Muhammadiyah Yogyakarta
evipuspitasari@fpb.umy.ac.id

Abstract

In Content and Language Integrated Learning (CLIL), students are exposed with texts in a language that they are still learning, a mind map could be one of significant alternatives to gain students' reading comprehension. This exploratory research discussed six EFL students' voices about how mind map can be an instrument to comprehend English texts they read. This current research was carried out in one of private universities in Indonesia in the middle of 2019. In gaining the data, thirty-seven students who enrolled a theory-based subject in fourth semester were assigned to write a reflective essay about mind map tasks and six fourth semester students were interviewed to get the main data. Students' portfolio of mind map assignment with teacher feedback was also employed to triangulate the interview data. After the data were obtained, they were coded and interpreted to attain the findings. The findings show that thirty-seven students agreed that mind map assisted them to comprehend English texts, yet the process was a bit complicated for them. All process that students passed through in making mind map contributed to reach L2 reading comprehension in CLIL classroom. Conclusion and recommendation are also discussed in this article.

Keywords: CLIL, reading comprehension, EFL students, content subjects

Introduction

In reading texts, comprehension becomes one prominent goal for students to achieve. As an attempt to achieve the goal, students need to deal with a complex process. Hancock in Chou (2011) mentioned some steps which could be divided into two, language and content. In regard to language, a set of process comprises lexical item understanding and word relationship identification while in relation to the idea, the process covers idea organization, identification of among concepts relationship, understanding on writers' objective, context evaluation, and self-conclusion. In parallel with that, Grasparil and Hernandez (2015) depict the process as word-level and text-level which are the combination of them are required to develop reading comprehension. Concluding the concepts from those two different experts, to reach reading comprehension, students need vocabulary knowledge and strategies on content identification.

Considering that reading comprehension requires development in two areas, content and language, it triggers a new challenge for students in a setting of English as a foreign language (EFL). In first language reading (L1 reading), students do not need to worry about word decoding since they are familiar with a language used in a text. They could focus on the other responsibility which is on content strategy or text-level comprehension.

Making areas of discussion more specific, in an instruction of Content and Language Integrated Learning (CLIL) where content is delivered using a language that the students still learn, the challenge is way higher than in a common EFL instruction. In CLIL, mastering a new language is not even an option but also a requirement to get more achievement in an academic or non-academic context. The learned language (L2) is employed to deliver materials in an oral and written form. Dalton-Puffer (2011) argued that students of CLIL have double jobs to accomplish which are content and language. Thus, in this type of instruction, students learn concepts *with* a new language not *in* a new language. Due to the dual focuses that the students should achieve in this type of classroom, Otwinowska's (2013) and Wibowo, et al. (2020) research showed that the focuses might become a potential factor to students' demotivation and negative attitude in learning. Regarding that danger, an effective teaching strategy needs to be selectively decided and carefully implemented.

As an effort of assisting CLIL students to comprehend texts in L2, mind map could be a worth trying alternative. In nutshell, mind map is considered as a type of graphic organizers to present a single concept which is placed in a center and followed by subsections in branches of the main point (Buzan, 2006). This visual tool is also supported with colors, pictures, and symbols which facilitate students in note taking and idea development. Besides those features, mind map is also completed with arrows that link one branch to another show connection among them. This visual tool also provides symbols, pictures and colors to take notes (Siriphanich & Laohawiriyanon, 2010). For the function, Zhao (2003) corroborated that mind map is utilized to develop concept, generate ideas, organize thinking, memorize information, and of course take notes. Dealing with the function mentioned by Zhao (2003) and characteristics of mind map (Buzan, 2006) mentioned above, this tool is surely a good facility to gain students' comprehension in reading.

Mind maps provide assistances for students or users in learning. Buzan (2006), the creator of mind map claimed that mind map enables students to save time in reading, helps them remember content of what the read, balances students' left and right brain, and assists the students to learn the concept fully. In regard to time saving, with mind map, students just need to go to the points and ignore unnecessary information of the text and it needs less time than reading every single word from the first to the last line. Mind map also help the students to remember better because they summarize and make notes while reading. Boardman, Roberts, Vaughn, Wexler, Murray & Kosanovich (2008) stated that good readers do summarizing and making notes using simple words which could make information they get stay in their long-term memory chamber. Dealing with balancing left and right brain, in mind mapping, people can draw a simple picture which is right brain activity and they should associate the picture a concept which needs left brain. Taylor (2014) appointed that when two sides of brain work together at the same time, it allows multiple intelligences to be drawn together. The last assistance that mind maps offer to students is enabling them to see the tree of holistic concept which leads to complete understanding and avoids students end up with pieces of information that result different interpretation toward the concept (Buzan, 2006).

In relation to the position of mind map in a context of English as a Foreign Language (EFL), teaching and learning practitioners consider it as a strategy to gain reading comprehension. That is justified by numbers of research focusing on mind mapping. Mohaidat (2018) conducted an experimental study by involving nine graders which were divided into an experimental group and a controlled group. After being treated using electronic mind map, EFL reading comprehension score of an experimental group was improved. In a university context, Siriphanich and Laohawiriyanon (2010) carried out a study using mixed method. The quantitative data unveiled a positive impact of mind mapping to EFL students' reading comprehension. Corresponding with the numeric data, the interview conducted also showed students' positive feeling using mind map in group. Malekzadeh and Bayat (2015) did research with a more specific discussion than the other two studies mentioned. Their quasi experimental design proved that mind mapping gave a positive influence on students' comprehension to implicit information in an English text. Having one thing in common which is proving a considerable benefit of mind

map to reading comprehension, those three studies strongly recommend mind mapping as an applicable strategy for reading instruction in EFL classroom.

Studies discussed above use quantitative data to validate constructive impacts of mind map to students' reading comprehension. Consequently, none of them provides further elaboration about how mind map woks for students to comprehend conceptual texts. In fact, exploratory research is imperatively needed to build logical explanation about the contribution of mind map to reading comprehension that strengthen the results of quantitative data. However, numbers of research that put the lens on deep discussion on contributing factors of mind map are still limited. The need of qualitative data about the use of mind map for reading comprehension and the limited numbers of elaborative research becomes a strong rationale why this current research was carried out.

Corresponding with the aforementioned gap, an Indonesian teacher who was in charge of teaching a theoretical subject to Indonesian students in fourth semester applied main mapping as a part of reading assignment. The context could be considered as CLIL since in this department, students were projected to be an English teacher learned concepts of EFL teaching and learning in English as their new language. Technically, in twelve weeks, the teacher assigned students to read twelve book chapters. Each chapter was a topic to discuss for every meeting in class. Using a flipped teaching model, the students read the chapter before meetings and reported their reading through a mind map. They should submit each mind map every meeting. In classroom discussion, the teacher also used a mind map that she created so that the students could get a model of mind map in a right format from the teacher. Then on the next meeting, the teacher brought the work back with feedback.

Reflecting the gap and the implementation of mind mapping in CLIL, the researcher was interested to investigate students in that department regarding their one semester experience using mind map to reach L2 reading comprehension. In order to make this current research focused, two research questions are formulated as 1) What are the students' perceptions about using mind map in a CLIL context? 2) How does mind map facilitate their second language reading comprehension? All data gathered in this research aimed to answer those research questions.

Method

This research utilized a qualitative descriptive research design. According to Maxwell (2013), research with a qualitative design is research which aims to understand the process not outcome through events and actions taking place in participants' surroundings. In line with that, this research focuses on identifying the process of how mind maps are used to facilitate students' comprehension in CLIL classroom. Additionally, Creswell (2018) stated that in qualitative research, scopes of participants' experiences on a particular issue becomes the center in the data collection and this research focused on exploring students' experiences in making mind map for a semester in a theory based subject.

This research was carried out by involving 37 students in fourth semester who enrolled a theory-based subject which used English as the main language for the materials and a medium of instruction in a private university in Indonesia. In this subject, the teacher assigned students to make a mind map for each chapter discussed in the class. In total, the students should make 12 mind maps for the tasks which was purposefully to help them comprehend the reading. The 37 students were asked to write a 300-word reflective essay after the course. The data were used to select participants for a one on one interview session and as a source to compose questions for the interview.

To investigate their experience in making mind maps, 6 of the 37 students were interviewed. The participants consisting of four females and two males were chosen because of high commitment in doing mind map tasks which was seen from their high score and full submission of 12 mind map assignments. When the data were collected, their age was ranged from 19 to 20 years old. To protect their real identity, the students were presented using pseudonymous names as Alana, Briana, Concita, Delilah, Evan, and Frank. In the interview, they shared their experience in making mind map. Besides that, they were also asked to explore some statements they wrote in reflective essay. Accomplishing the interview, data analysis was done. It was commenced from transcription and member-checking. The result of member-checking showed that all data were confirmed. No addition, omission, or revision to the data were needed. In order to triangulate the data, information from mind map portfolio with their teacher's feedback was also employed. After that, a coding process consisting of open coding, analytical coding, and axial coding (Cohen,

Manion, & Morrison, 2011), was done to set themes and concepts that answer questions of this research. Last, the researcher interpreted information gained and connected it from one data collection technique to another.

Table 1. Information of the Participants

No	Name	Sex	Age	Number of mind map submitted (12)	Score of mind-maps in one semester (24)	Experience in Mind Mapping
1.	Alana	F	19	12	22	In senior high school
2.	Briana	F	20	12	22	None
3.	Concita	F	20	12	22	None
4.	Delilah	F	20	12	21	None
5.	Evan	M	21	12	23	None
6.	Frank	M	20	12	22	None

Findings and Discussion

Students' perception about using mind map in CLIL context

Data from the students' reflective essays showed that at first students felt anxious with the task because they were unfamiliar with mind map. For some students, making mind map after reading was their first experience. However, a student stated she ever experienced mind mapping in reading class when she was in senior high school. She admitted that she could enjoy the process of reading, drafting and writing some keywords on each box of the mind map. After some mind map making, they started to like doing the activity. They even made a discussion group to share what they have understood after reading the assigned chapter to ease them making the mind map.

Based on the reflective essay, besides feeling, students also perceived that mind map gave them positive impacts. First, mind map prepared them for a final assessment. They had a portfolio of materials they learned in the class that they used to review the topic discussed in the class. They did not need to bring the heavy book everywhere then got confused in finding the intended pages. They could learn only

by opening the mind maps to review the materials. Second, a task on making mind map after reading drove the students to be more thoughtful in time management. They needed to read the chapter on repeat so they should arrange their schedule to get time when to read and reread the chapters until they got all points of the materials before making mind map. Third, the students wrote in the essay that mind map task could push their willingness to read. They were more motivated to read the chapters since they wanted to present an understandable and compact concept in their mind map.

Last, students perceived that mind map was a challenging task. They mentioned, what challenged them the most is selecting important information. In identifying which one was important and which one was not, they needed to comprehend the reading well. Meanwhile, some of them were still struggling with English and they found a lot of unfamiliar vocabulary.

From the first finding which captures students' perception about mind map in CLIL context, it is known that their anxiety was caused by their unfamiliarity with mind map. This type of anxiety is categorized into situational variables and course activity became the cause of the feeling (Andrade & Williams, 2009). The anxiety came up due to the students' unfamiliarity with the task.
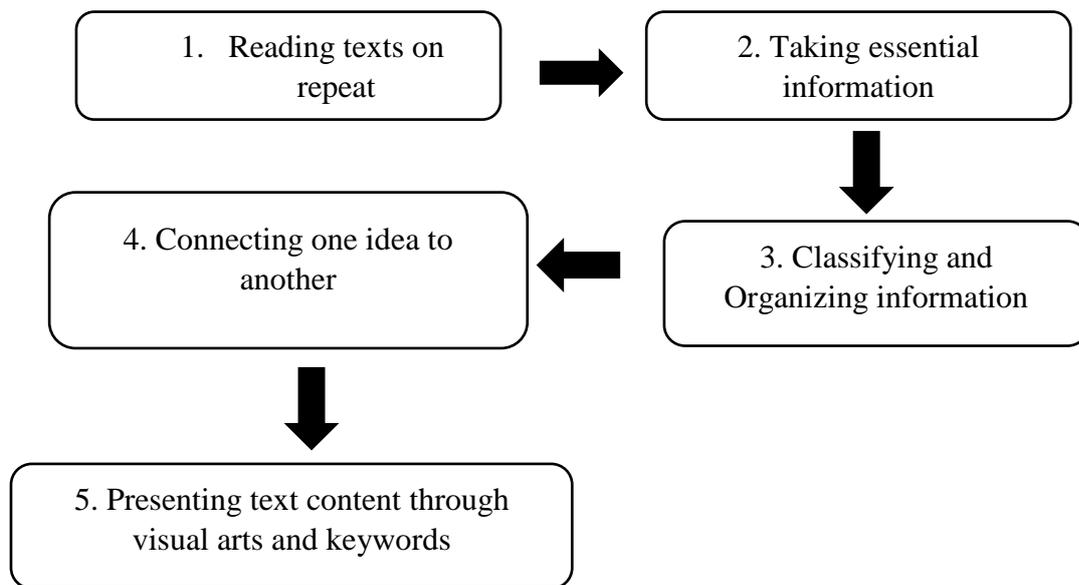
The findings showed that mind maps assisted them in preparation to the exam, time management, and reading motivation. Mind maps physically presented a main point in the center with some branches as sub-concepts of it (Buzan, 2006). In addition, Boardman, Roberts, Vaughn, Wexler, Murray and Kosanovich (2008) mentioned that mind map only contained simple ideas taken from the complex concept by taking keywords. That explained why students felt easier in reading the maps rather than the hand-out which was considerably thick and not handy. Regarding the time management, as what the students stated that making mind maps needs a process. In a CLIL context, students learn the concept and the language used to deliver materials both in an oral and written form (Ibrahim, Schwartz, Kahn-Horwitz, & Leikin, 2013). Those double jobs dealing with the content and language take them more time to make mind map. In addition, Banegas (2015) who practiced mind mapping technique in CLIL context also confirmed the challenges faced by the students. It does not only deal with the language but also reading and organizing information absorbed requires students' great attempt.

Since the process is quite long, the students should be wiser in time management to get the task done before the deadline. The discussion from the experts above also answers why mind mapping falls into a complex task for the students.

How mind map becomes a facility to students' reading comprehension

To attain the data that corroborate how mind map facilitates students reading comprehension, six students (Alana, Briana, Concita, Delilah, Evan, and Frank) were interviewed about their experience during joining a class that required them to make mind maps after reading. Questions in the interview were based on the reflective essays that the students wrote. The data demonstrated the process of how mind maps assist students to comprehend texts.

Picture 1. The process of mind mapping in reading

```
┌──────────────────────┐        ┌──────────────────────┐
│  1. Reading texts on │  ──▶   │  2. Taking essential │
│       repeat         │        │     information      │
└──────────────────────┘        └──────────────────────┘
                                           │
                                           ▼
┌──────────────────────┐        ┌──────────────────────┐
│ 4. Connecting one    │  ◀──   │  3. Classifying and  │
│   idea to another    │        │ Organizing information│
└──────────────────────┘        └──────────────────────┘
       │
       ▼
┌──────────────────────┐
│ 5. Presenting text   │
│ content through      │
│ visual arts and      │
│ keywords             │
└──────────────────────┘
```

Reading the texts on repeat. In the interview, Briana and Concita agreed that the first process of mind mapping is reading texts more than once.

> *"In the first reading, I could understand few. Then it improved on the second reading. In my third reading, everything is clearer. I could draw a map of the ideas that authors tried to present in texts." (Briana)*

Briana said that she gained full understanding of an assigned chapter after three times of reading. Her full understanding was seen from her ability to see a big picture of the idea.

Different from Briana who focused more on obtaining the knowledge in each reading, Frank also tried to overcome his language barrier in his repeated readings.

"First, I read the whole part in the chapter. Then, I listed difficult words and consulted them to a translation site. After getting the Indonesian translation, I wrote the L1 word under the English word on the book. I was back to the front page and started reading. I usually read the article twice without the translation process." (Concita)

From the participants' opinion, it indicates that mind mapping assists students to attain great reading comprehension since the technique encourages the students to read texts on repeat. According to Grasparil and Hernandez (2015), what is experienced by Briana belongs to text-level comprehension while Concita's experience is categorized into word-level comprehension. Both levels are significant to reach full comprehension in L2 reading. Grasparil and Hernandez said that those levels work hand in hand meaning that great vocabulary knowledge supports students to get main ideas and conclusion. In addition, the support of mind map to students' vocabulary development is also confirmed by Tarkashvand (2015).

Taking essential information. In the interview, Alana and Evan said, in mind mapping, students should be able to take imperative information from texts.

"In mind mapping, we have to select primary ideas and ignore the unnecessary details. In fact, for me, all information in the chapters looks important. So, it is quite challenging. To comprehend texts, we have to read them carefully and highlight the important parts." (Alana).

"We cannot take a sentence and ignore other sentences. All should be read carefully to draw a conclusion. In doing the task (mind map), I looked at a subheading and try to guess what it is about. Then I look for information that explains the subheading. It is not easy but challenges us to know how far we comprehend a text." (Evan)

Both participants agreed that getting nuclear points of texts is not easy since one information must be supported by other information. In doing the step, Alana and Evan suggested a different strategy. Alana highlighted important information while Evan read subheadings and found supporting ideas that explained the subheadings. Even they used different strategies, their goal for doing that is same which is to reach comprehension.

Taking the important ideas of texts is also known as a note taking process. In mind mapping, students usually make a note points they got after reading. In note taking, they will not describe whole things presented in texts. That is why they need to select imperative information to be reported. According to Zhou (2016), in note taking, students summarize messages from texts and it is a part of process that they do to make a mind map that could improve students comprehension on L2 texts.

Classifying and organizing information. After attaining the main ideas, based on the interview, the participants classified and organized the ideas. Alana and Evan shared their experienced in doing this process.

"We did not stop at getting important information from the texts. What we have to do next is putting what we got in a correct box and organize it based on the sequential events. If you did not comprehend the text ass well, you will not be able to do it." (Alana)

Alana used a box as an analogy to a place for all information she obtained. She also appointed that in doing this step, students need to know text content deeply.

"When reading a text for a class, I usually went through line by line without classifying knowledge that I had got from texts. But using mind map, I should think about it. We have boxes to be filled with information from texts in mind map. No other way, you have to understand the text. And, keep following the subheadings which will lead you to classify the information obtained."(Evan)

Evan still used subheadings as a guide to information classification. It is confirmed from his mind map portfolio that each topic he had under the central idea was taken from subchapter of the heading. By doing so, he had a positive feedback from the lecturer.

From those statements, it is known that Alana and Evan are in the same shoes for considering that classifying information from texts need comprehensive understanding about the material discussed. Without comprehension, students cannot do the classification.

The data above highlighted that students who are able to categorize information they absorbed from their reading are considered having good understanding on content discussed in texts. That is supported by Buran and Filyukov (2015) whose research approved that mind map empowered students to visualize and classify information absorbed which confirmed students' comprehension.

Connecting one idea to another. From the interview, it is approved that mind mapping facilitates students' comprehension in a way it provides connection from one piece of information to another piece. Briana, Concita, Delilah, and Evan shared their thought and experience about how that process made them get into texts they read.

> *"Reading is like a puzzle. We had to arrange piece by piece of ideas that we attained from texts and find how they are related to each other. Mind maps facilitate us to do it (relating the concept). By knowing the relationship among the ideas, I could understand the texts more." (Briana)*

> *"Knowing the relationship between messages could avoid us from copying the original texts and pasting to the mind map. As we know, copying and pasting indicated that we don't understand." (Concita)*

> *"Mind map has a central box, branches, and sub-branches and lines. My teacher kept telling me, I have to be careful in making mind map especially in making a new line. I have to know how it connects two idea." (Delilah)*

Delilah's statement was in line with what her teacher commented on one of her works. The teacher asked why she connected one branch to sub – branch in fact based on the text, those did not have connection. The teacher added that she needed to be careful in making lines because they showed relationship of two ideas.

Analytically, through his statement, as a decoder, Evan explained how lines in mind maps assists them understand the message from the encoder. Evan also mentioned some relationships he had ever found in texts which the finding process could successfully develop his comprehension.

> *"In my opinion, mind maps provide lines to connect the central idea to the branch or the branch to the sub-branch. The lines could show relationship of cause-effect, types, or further explanation. It made me understand more what the author tried to deliver in the texts." (Evan)*

The four participants agreed that identifying relationship of one concept to another help construct their understanding on a text. Additionally, Delilah and Evan, lines in mind maps are a significant component. If the students could use the lines correctly to link a branch to a sub-branch, it means they had understood messages delivered in reading texts. In line with that, Weiwei (2017) stated, mind map is a facilitative technique in which students put new information in a provided branch to connect one ide to another. In the process of finding the relationship, students should read text carefully and meticulously so that their comprehension will be significantly improved.

Presenting contents through visual arts and keywords. The last finding to figure out how mind mapping is able to help students achieve great comprehension on English texts is presenting content using visual arts such as colors, pictures and graphs and minimize description through representative keywords. Alana and Frank considered that this step is the most influential part of mind mapping to their reading comprehension.

> "Personally, I like drawing and I was a visual person. I feel good to simplify concept by visualizing it through pictures...." (Alana)

> "... when reading, I keep thinking how to visualize it and choosing typical pictures to demonstrate the concept I have got. That process made memory about learning material obtained from the chapter stays." (Alana)

> *"For some people, illustrating what we got from reading takes time. But not me. I got used to it in senior high school since my teachers there use the same technique. ... mind map could help my reading a lot." (Alana)*

In the three statements taken from the interview excerpt above, Alana tried to highlight three different points. First, mind maps let students visualize what they got from reading. Second, mind maps give rooms to students' imagination through the thinking process of choosing illustrative pictures to information from her reading. Third, she has proved that mind map works to help her digest information from texts.

Not only visual arts, mind map also encourages students to avoid copy and paste from original texts by suggesting students to use keywords not long texts for the branches and sub-branches. Frank shared his experience in choosing keywords to be used in mind maps.

"At first, I took random words. … My teacher told me that I couldn't do it. I had to know what the keywords mean and their contribution to concept explained in the chapter." (Frank)

"Next reading assignments, assignment 3, the topic was English Teacher, I started to read again and again to identify keywords. After finding some, I retold the chapter guided by the keywords. I did it. I got a good score for that assignment." (Frank)

From Frank's story, it is noticeable that in mind mapping, students are required to write keywords instead of long sentences. The process of finding keywords could help students absorb information more information from reading. If they could find representative keywords and be able to explain them, they have comprehended their reading.

Alana's and Frank's experience captures that pictures and keywords give benefits for students' comprehension. How pictures and keywords as a part of mind mapping could support students' understanding in reading that is justified by Zhou (2016) who claimed that mind map is a tool that connects language to picture to help students comprehend a text. In addition to that, Taylor (2014) stated, mind map balances the works of left and right hemisphere of students' brain which is good to train students' multiple intelligences.

Conclusion and Recommendation

All in all, mind maps undeniably gave a positive influence on students' reading comprehension through processes in making the map. The processes are repetitive reading, selection to essential information, information classification and organization, identification on how the concepts are related to each other, and presentation through visual arts and keywords. By going through all those steps, all participants admitted their understanding on materials discussed in class improved. Even though it needs a quite long process, they perceived mind mapping helps them pass decoding process in reading to gain both in a word level and text level comprehension.

Based on the findings, recommendation to some parties are specifically drawn. The first recommendation is addressed to other researchers to quantitatively study impacts of each process appeared in this research to students' reading comprehension. The result of that study could help teaching practitioners decide

which process that needs to be maintain or improved as an effort to assist students using mind maps to comprehend English texts. In addition to that, since this research was conducted in an intensive reading instruction, it would be interesting to know contribution of mind mapping to students' comprehension in extensive reading classes. The second recommendation regards to mind map as an alternative to teach reading so that EFL teachers are encouraged to apply this in their classroom. The recommendation is also given to EFL students to utilize mind maps for reading. Since this research provides steps to do in mind mapping, they could do it autonomously.

References

Andrade, M. & Williams, K. (2009). Foreign language learning anxiety in Japanese EFL university classes: physical, emotional, expressive, and verbal reactions. *Sophia Junior College Faculty Journal*, 29, 1-24.

Banegas, L. D. (2015). Sharing views of CLIL lesson planning in language teacher education. *Latin American Journal of Content and Language Integrated Learning*, 8(2), 104 -130. doi:10. 5294/laclil.2015.8.2.3

Boardman, A. G., Roberts, G., Vaughn, S., Wexler, J., Murray, C. S., Kosanovich, M. (2008). *Effective instruction for adolescent struggling readers: A practice brief*. Portsmouth, NH: RMC Research Corporation, Center on Instruction.

Buzan, T. (2006). *The ultimate book of mind maps: unlock your creativity, boost your memory, change your life*. London: Thornson

Chou. P. T. M. (2011). The effects of vocabulary knowledge and background knowledge on reading comprehension of Taiwanese EFL students. *Electronic Journal of Foreign Language Teaching*, 8(1), 108-115.

Cohen, L., Manion, L., & Morrison, K. (2011). *Researcher methods in education*. 7th ed. London: Routledge.

Creswell, J. W. & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approach.* 5th ed. Los Angeles: SAGE.

Dalton-Puffer, C. (2011). Content and language integrated learning: from practice to principles? *Annual Review of Applied Linguistics*, 31, 182-204.

Grasparil, T. A. & Hernandez, D. A. (2015). Predictors of Latino English learners' reading comprehension proficiency. *Journal of Educational Research and Practice*, 5(1), 35-57.

Ibrahim, R., Schwartz, M., Kahn-Horwitz, J., & Leikin, M. (2013). Bi-cultural aspects of second language learning in a bilingual context. *Asian EFL Journal*, *15*(4). 65-89.

Malekzadeh, B. & Bayat, A. (2015). The effect of mind mapping strategy on comprehending implicit information in EFL reading texts. *International Journal of Educational Investigations*, available online @ www.ijeionline.com, *2*(3), 81-90.

Maxwell, J. A. (2013). *Qualitative research design: an interactive approach*. California: Sage Publication Inc.

Mohaidat, M. M. T. (2018). The impact of electronic mind maps on students' reading comprehension. *English Language Teaching*, *11* (4), 32-42

Otwinowska, A. (2013). 'CLIL lessons in the upper primary: The interplay of affective factors and CALP' in D. Gabrys-Barker and J. Bielska (eds): *Affectivity in Second Language Acquisition*. Multilingual Matters, pp. 211–25.

Siriphanich, P. & Laohawiriyanon, C. (April 10, 2010). Using mind mapping technique to improve reading comprehension ability of Thai EFL universities students. *The 2ⁿᵈ international conference on humanities and social sciences*. Faculty of Liberal Art, Prince of Songkla University.

Tarkashvand, Z. (2015). Male learners' vocabulary achievement through concept mapping and mind mapping: differences and similarities. *Academic Journals. 10*(7), 790-798.

Weiwei, Z. (June, 2017). The application of mind mapping in business English reading teaching. *2nd International Conference on Education, Sports, Arts and Management Engineering*. https://www.atlantis-press.com/proceedings/series/assehr

Wibowo, Y.E.W., Syafrizal., Syafryadin. (2020). An analysis of English teachers'strategies in teaching reading comprehension. *JALL (Journal of Applied Linguistics and Literacy)*. 4(1), 20-27.

Zhao, Y. (2003). The use of a constructivist teaching model in environmental science at Beijing Normal University. *The China Papers*, 2, 78-84.

Zhou, S. (2016). Scaffolding Chinese college students' English learning through mind mapping. *International Journal on Studies in English Language and Literature*, 4(1), 31-35.