Guiding Taiwanese University Students to Take Graphic Notes of English Texts

Jeng-Jia Luo[*]

Associate Professor, The English Language Center, Tunghai University

[*]Corresponding author: Jeng-Jia Luo
Address: No. 1727, Sec. 4, Taiwan Boulevard, Xitun Dist, Taichung City 407, Taiwan (R.O.C.)
E-mail: caroline.luo@gmail.com
Received: August, 2022
Accepted: October, 2022

Abstract

Researchers of teaching and learning have often suggested that guided note-taking enhances learning. However, research which has empirically documented the link between guided note-taking and English-as-Foreign-Language (EFL) learners' confidence in English reading is scant in higher education in Taiwan. Therefore, the aim of this study is to explore whether graphic organizers, used as a guided note-taking instrument, would escalate Taiwanese university students' confidence in reading English texts. This study documents the data collected over three consecutive academic years at a university in central Taiwan, where students were enrolled in a year-long required Sophomore English course. Throughout the year-long course, the instructor, who conducted this study, demonstrated a variety of graphic organizers while teaching English passages and guided her students to put these visual tools into practice. As the course proceeded toward the end, the student participants responded to an anonymous questionnaire, which included two questions to address the inquiry of this study. Results of this study suggest that most of the participants, who were mostly weak in English reading, felt more confident in English reading and attributed their increased confidence to the instructor's introduction of various graphic organizer types and their hands-on practice of them Their reported benefits of graphic organizers included easier and faster comprehension, less time and workload on textual reviews, a better understanding of the passage structure and each author' s purpose, improved synthesis ability, better memory of the content, and efficacy in reading tests. This study may be of importance in explaining feasibility of graphic organizers in an EFL course in Taiwan. Besides, it may provide English educators with a better understanding of this instructional technique. Those who intend to conduct further research in this regard are advised to investigate how differences among EFL learners impact their uses of graphic organizers and how EFL learners apply graphic organizers to online English reading.

引導臺灣大學生以圖形化英文文本的方式撰寫筆記

羅正佳 *

東海大學英語中心副教授

*通訊作者：羅正佳
 通訊地址：407 臺中市西屯區臺灣大道四段 1727 號
 E-mail: caroline.luo@gmail.com
 投稿日期：111 年 8 月
 接受日期：111 年 10 月

摘 要

母語教育研究指出，引導式筆記可以增強學習效果。然而，以英語為外語（English-as-a-foreign-language, EFL）的教學情境中，此教學法，尤其是引導英語學習者將文字圖像化，透過組織圖記錄，是否能提升這些學習者對英語閱讀的信心？此問題目前仍缺乏充分的實證研究。因此，為了探討引導臺灣的大學生使用組織圖，作為英語閱讀的筆記工具，是否會提高這些學習者閱讀英語文本的信心，作者於臺灣中部一所大學必修英語課程進行連續三年的研究。在為期一年的課程中，作者指導學生使用各種類型的組織圖記錄當下閱讀的英語文章。當此課程接近尾聲，學生回應一份作者設計的問卷。研究結果顯示，大多數參與研究的學生對英語閱讀更具信心，並歸功於長期以來，教師對各類組織圖的講解和他們的實做練習。具體而言，這群大學生認為運用適當的組織圖記錄他們所閱讀的英語內容，他們更容易和更快地理解英文文章，減少閱讀的時間和工作量，更深刻理解段落結構和作者撰文目的，整合文章內容，改善對內容的記憶力，以及提升閱讀測驗的應試能力。總而言之，以組織圖做為引導式筆記之教學方式在英語閱讀課程具高度之可行性，可提升英語學習者對於英語閱讀的信心。

關鍵詞：臺灣高等教育、英語閱讀、組織圖

I. Introduction

Notetaking is widely known as "the main ground for educational interaction between teacher and students" (Castelló & Monereo, 2005). Far from a simple activity, it includes at least three tasks—comprehension, selection, recording, as Piolat, Olive, and Kellogg (2005) depicted,

> Note taking is a complex activity that requires comprehension and selection of information and written production processes… The time urgency of selecting key points and recording them while comprehending new information at the same time places significant demands on the central executive and other components of working memory… Comparative data show that note taking demands more effort than reading or learning. (Piolat et al., 2005, p. 291)

Before learners acquire the skills to take effective notes, they need their teachers' introduction of notetaking techniques and guidance of using these techniques. According to Vygotsgy (1978) notion of *Zone of Proximal Development* (ZPD), the ability gap between novices and experts requires the experts' guidance. This gap between a novice and an expert is a spiral development and needs to be filled through continuous authentic practice (Brown, Collins, & Duguid, 1989). As the novice's ability advances, Cole (1985) cautions, the expert should offer less and less guidance and scaffolding.

> The first time a novice reaches any step the adult or adults in attendance can be found to intervene heavily; after practice they intervene seldom or not at all adult talk is also tied to the level of the child's skill and the specific task at issue. (Cole, 1985, p. 157)

The notion of *guided notes* (Blackwell & McLaughlin, 2005; Heward, 1994) has the potential to fill this gap between a novice and an expert. Common formats of guided notes are columnar and skeleton. When a teacher prepares a handout to outline the lecture, s/he leaves some spaces open for students to fill in the essential elements of the lecture, such as definitions, concepts, or facts. Research has shown that guided notes retain students' attention and help them remember the important points from the lecture. Later, a visual display of knowledge—graphic organizers, which features in using graphic forms, such as charts, diagrams, maps, to present the relationships among facts, ideas, actions and the patterns of organization within a task, arose and gained popularity. Table 1 shows common types of graphic organizers and their functions (Helmer, 2005; Ponce, Mayer, & Lopez, 2013).

To date, the applications of guided notes, conventional outlines or graphic organizers and the research on their effects on learning have mostly been related to listening in content courses. By comparison, their applications to reading texts in a foreign language have received much less attention. This gives room for research in this regard and the present study. Would using graphic

Table 1. Types, functions, and formats of common graphic organizers

Type	Function	Example
Hierarchical	Presenting main concept and subsets	Outlines
Conceptual	Description, collection, problem with solutions, comparison and contract	1. Concept maps 2. Matrices 3. Knowledge maps
Sequential	1. Chronological order 2. Cause and effect	Ordered lists
Cyclical	Presenting series of events within a process	Flowcharts

organizers as guided notes help English-as-a-foreign-language (EFL) learners to read English passages? How do these learners perceive this as reading strategy? Such inquiries need to be explored. Yang, Miller, and Bai (2011) pinpointed a missing puzzle piece in the literature of using graphic organizers as an instructional medium in Asian universities.

> Graphics in instruction are typically used in elementary and secondary environments, and have only recently begun to grow more rapidly in their use on college campuses…In Asian cultures where learning environments tend to be formal and instructor centered, the use of visual graphics as an instructional supplement has grown, but is largely undocumented and unexplored. (Yang et al., 2011, p. 171)

This missing puzzle piece was also echoed by Ponce et al. (2013), who called for research in authentic classrooms and long-term classroom interventions. Besides, learners' voices have not been given the attention they need. Due to the lack of literature reporting EFL learners' perceptions of their exposures to and experiences of graphic organizers to read English texts in higher education, this study was designed as a case study to provide insight into the issue. I conducted a study in a year-long required English course offered in a Taiwanese university for three consecutive academic years. My primary goal was to use EFL university students' voices to deepen our understanding of graphic organizers as an instructional medium to determine the feasibility of using them to teach English reading in higher education. Given the theoretical positions taken for the study and the status of the field as briefly reviewed above, the study aimed to provide answers to the following questions:

1. How do Taiwanese EFL university students perceive their routine guided practice of converting English passages into graphic organizers over time?

2. How do these English learners perceive their English reading ability after the year-long practice of graphic organizers?

For those objectives to be achieved, the paper is structured as follow. The first section is a review of the literature, addressing both empirical and theoretical aspects of the role of graphic organizers. The next section describes the methodology,

including full details of research instruments and procedures. Results are then presented, with a thorough description of the student participants' accounts. Finally, results are discussed and suggestions are made for further research.

II. Literature Review

A growing number of research studies are now available to shed some light on the effects of guided notes on learning. In recent three decades we have seen mounting evidence of success in using guided notes in formal schooling. A number of studies have been conducted using primary and secondary school students as subjects. For example, Lazarus (1991) used guided notes to guide secondary students with learning disabilities in mainstream content course. Sweeney et al. (1999) used guided notes with academically at-risk high school students during a remedial summer social studies class. Poohkay and Szabo (1995) used animation and visuals to teach high-school mathematics. Chanlin and Chan (1996) used computer graphics and metaphorical elaboration to teach learning science.

Among different forms of guided notes, graphic organizers have caught educational researchers' attention. This instructional technique has been proved to foster deeper processing during learning (Alvermann, 1981; Katayama & Robinson, 2000), help teachers to assess learner understanding (McCagg & Dansereau, 1991), promote better connections with existing memory (Kiewra et al., 1991), and improve reading

and writing (Strangman, Ge, Hall, & Mayer, 2004; Stull & Mayer, 2007). Ponce et al. (2013) conducted a study to explore K–12 students' guided practice of converting passages into graphic organizers to provide a well-structured set of strategies to improve students' cognitive skills. After reviewing thirteen studies investigating effects of graphic organizer use on learning in general curriculum, Strangman et al. (2004) reported,

> There is solid evidence for the effectiveness of graphic organizers in facilitating learning. Eleven of the thirteen studies investigating effects of graphic organizer use on learning reviewed here reported some positive learning outcome…graphic organizers appear to be a very effective tool for improving vocabulary knowledge. (Strangman et al., 2004, pp. 817-818)

and made the general conclusions below:

> graphic organizers, when properly designed and placed in the margins of a textbook can promote generative processing that leads to superior knowledge transfer. Finally, the limits of the learner's cognitive capacity should be addressed in the design of graphic organizers for textbook passage. (Strangman et al., 2004, p. 818)

Besides content courses, graphic organizers can promote language learning (Helmer, 2005; Paivio, 1971; Yang et al.,

2011). Research has provided evidence that graphic organizers enhance concept development (Helmer, 2005), create better memory and learning (Paivio & Csapo, 1973), enhance the ability to creative connections between target words (Canning-Wilson, 2001), improve learning of target vocabulary (Kim & Gilman, 2008), help learners to integrate prior and new knowledge (Helmer, 2005), and promote their critical reading skills (Sathongeay & Prasansaph, 2019).

In very recent years, two notable studies were conducted to explore the effects of graphic organizers on EFL learners' reading comprehension of English texts. One of them took place in China. Qi and Jiang (2021) wondered whether graphic organizers would improve English learners' sustainable development in English reading comprehension and therefore engaged 100 Chinese junior high students in the training of graphic organizers for three months. At the end of the intervention, the researchers adopted observations and interviews to address their inquiry. The findings reveal that the application of graphic organizers improved these learners' sustainable development in English reading comprehension overall and benefited those of intermediate English reading ability the most. The other study was conducted in Thailand. 64 upper secondary school students participated in Imsa-ard (2022) study. The researched designed 10 graphic organizers to teach English passages. The results suggest that English reading instruction employing graphic organizers benefited all the students,

particularly those of low reading abilities. These two studies provide evidence to claim the effect of graphic organizers on EFL learners' reading comprehension. However, this pedagogy seemed to make different impacts on students of diverse English reading abilities. Whether the length of sustaining the improved reading comprehension causes the difference, as stated by Wong (2019), requires researchers' attention and longitudinal investigation.

Researchers of this domain claim that graphic organizers activate teachers' and learners' efforts before and during class sessions. Before teaching a reading passage, the teacher must carefully select a suitable graphic organizer based on the content of this passage. During the class, the graphic visual tends to make the teacher stay on task with the sequence and contents of the passage under study. In the meanwhile, due to the expectation of completing the provided graphic organizer within the limited class time, language learners are likely to stay focused on the reading passage. In particular, they pay attention to key ideas rather than too many words (Helmer, 2005). In the meanwhile, the expectation of completing the notetaking task requires active textual processing. They have to use the cues to find correct answers. Graphic organizers can also serve as tool for the language learners to check whether they fully understand a certain point and request the teacher's immediate clarification. Their focused and active reading increases engaging time and eventually activates their ability to decode the passage and to construct the meaning of it.

Up to this point, however, there are few empirical studies, particularly longitudinal explorations, of guided notes involving graphic organizers in EFL reading in higher education. Current research studies on EFL reading in universities mostly use reading tests—pretests and posttests—to detect the effects, that is, research on this issue from students' points of view is still scarce. A recent collaborative study by Yang et al. (2011) examined the effects of four combinations of computerized graphic visuals on EFL college students' English proficiency. They recruited 170 college sophomores with similar English and computer skills. These subjects were randomly selected and randomly assigned to five groups, including on control group (text-only) and four treatment groups (concrete-static and concrete-animated, abstract-static, abstract-animated). The research findings reveal that concrete-animated treatment group was the most effective instruction to enhance EFL college students' comprehension and retention of English texts. Although this result supported Poohkay and Szabo (1995) study on high-school math and Chanlin and Chan (1996) study on science, this research team was surprised that the control group, text-only, was the second most effective. Nevertheless, they concluded with a recommendation of incorporating visual- or graphic-assisted strategies into EFL reading instruction. Much more recently, Sathongeay and Prasansaph (2019) conducted a study to investigate university students' perceptions of using graphic organizers to read English texts.

36 undergraduate Thai students majoring in Engineering and Industrial Technology participated in this study. The results revealed that the students were extremely satisfied with this reading technique.

In summary, previous studies regarding graphic organizers have not addressed Asian EFL readers adequately. They do not give English educators a full picture of the nature of English reading in the EFL contexts. Little attention has been given to EFL university learners' perceptions of using graphic organizers to read English texts. Reading is mostly an individual practice, and so the importance of valuing students' opinions cannot be overlooked. Longitudinal research targeting at EFL university students would clarify whether graphic organizers are truly beneficial to this student population.

III. Curriculum Design and Research Methodology

This section starts with detailed descriptions of the research context and then turns to describe how the data were collected and analyzed.

A. Research Context

The investigation took place at a university in central Taiwan. After students complete the Freshman English for Non-English Majors (FENM) course, which aims to improve the students' English skills so as to use this language to communicate with people from other countries. They are enrolled in the Sophomore English for Non-English Majors (SENM) program unless they

present valid evidence of qualified English proficiency to get this course waived. Both FENM and SENM are one-year required courses and feature in small class, where English is used as the medium to enhance the students' English proficiency and multi-cultural awareness. Unlike FENM, in SENM classes few students are advanced English learners and many are weak in English reading. Table 2 depicts the student participants' reading performance on their first exam. Take the Engineering class of 2014–2015 academic year as an example, seven students scored 30 or less out of 50, 11 students scored between 31 and 40, and only 9 students scored 41 or above. Classes meet only once, lasting for two hours, every week. During the time of this study, SENM was a unified program. Teachers used the same textbook—*Q: Skills for success, reading and writing (level 3)* (Ward & Gramer, 2014).

When I taught each topical passage, I used pre-reading, during-reading and post-reading activities. Before my students read the passage, I encouraged them to make predictions of the picture and the passage title or to discuss the given warm-up questions. While my students were reading the passage for the first time, I told them to take notes in the text (highlighting topic sentences,

key words or information) and near the text (writing the main idea of each paragraph in the margin). Before they read the same passage for the second time, I presented a carefully selected graphic organizer to teach the passage. Table 3 provides the list of graphic organizers that were used for the English passages taught during the academic year, grouped into four categories. Figures 1 and 2 exemplify using graphic organizers to cover the passages titled "Small talk: A big deal" and "A question of numbers" respectively. After I introduced its function and demonstrated how to respond to one of the cues, the students read the passage again and took notes on the graphic organizer. As stated earlier, the students' English proficiencies were mostly weak. Therefore, I always checked on every student while they were reading, offering prompt compliments and timely guidance. In the meanwhile, I often encourage the students to use their own words and concise expressions, instead of copying the words or sentences from the passage, to respond to the cues. When most of the students completed the notetaking task, I revealed my answers to those cues and directed the students' attention to the corresponding texts. Finally, the session ended with a post-reading activity, such as a discussion in pairs or groups.

Table 2. Participants' reading performance on the midterm exam of the fall semester

| Score | Participants' reading performance | | | | | |
| | 2014–2015 | | 2015–2016 | | 2016–2017 | |
	M	E	M	E	M	E
0–30	4	7	7	5	10	18
31–40	8	11	12	11	16	9
41–50	11	9	8	7	3	0

Note. M = College of Management; E = College of Engineering.

Table 3.   Used graphic organizers during the year-long course

| Type	Visual format	Passage title in the course book
Hierarchical	1. Classification tree 2. T-chart 3. Matrixes	1. Job interviews 101 2. Fast cars, big money 3. Knowing your tastes 4. Food advertising tricks you should know about 5. In defense of advertising 6. Fear factors: Success and risk in extreme sports 7. Practice makes…pain?
Conceptual	1. Concept map 2. Venn diagram 3. Pie/Bar graph	1. Small talk: A big deal 2. 2b or not 2b? 3. The climb of my life 4. Finding balance in food 5. Knowing your tastes
Sequential	1. Timeline 2. Flow graph	1. How a ugandan girl got an education 2. A question of numbers 3. Money makes you happy—If you spend it on others
Cyclical	Cycle diagram	1. Living outside the box 2. How to make the biggest difference when giving to charity
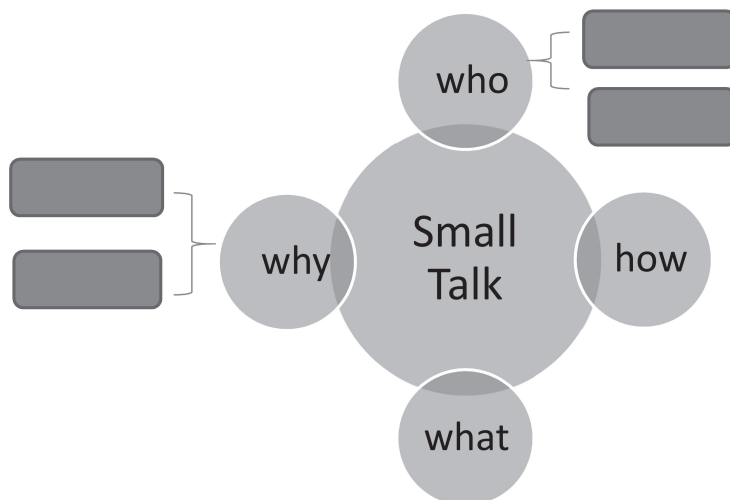
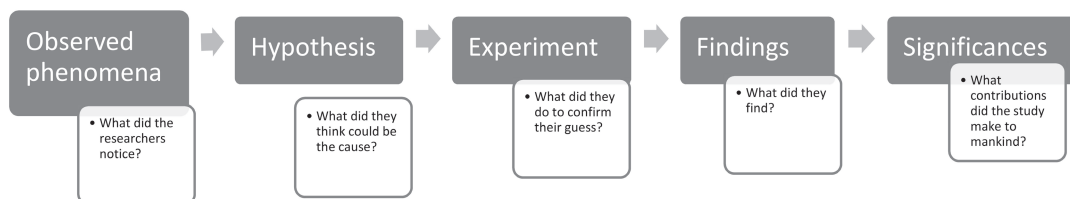Figure 1. Concept map for the passage "Small talk: A big deal"

Figure 2. Flow graph for the passage "A question of numbers"

B. Data Collection & Analysis

Data were gathered through a questionnaire. At the end of every academic year, a questionnaire was administered. To answer inquiries concerning Taiwanese EFL learners' opinions of using graphic organizers as a guided notetaking tool and their perceptions of their English reading abilities, the questionnaire consisted of two questions:

1. Do you think taking notes with graphic organizers helpful for your English reading? Why or why not?

2. How do you rate your English reading ability (from 1–10) at the beginning of the school year? How do you rate it now? Are you satisfied with your current English reading ability?

The responses were collected anonymously to obtain the students' genuine responses. Moreover, it was emphasized that their responses would not affect their grades because the data analysis would not be launched until the course grades were submitted to the school. After the responses were collected, qualitative and quantitative data analysis were performed. First, all the responses were calculated to determine the size of population that deemed graphic organizer as a helpful reading strategy. Next, the explanatory accounts were documented in meaningful categories to detect the benefits of graphic organizers from these students' perspective.

IV. Findings

This section documents the SENM students' responses to the questions. To address each research question, statistic results are presented and followed by their elaborated accounts.

A. How do Taiwanese EFL university students perceive their routine guided practice of converting English passages into graphic organizers over time?

Table 4 documents the percentage of students, in every class during the three research years, considering their routine practice of graphic organizers helpful. Slight variations exist between the two colleges. In the classes comprised by students from College of Management, the percentage of students reporting positive accounts remains above 70 over the three academic years. By contrast, this consistency is absent in its counterpart. In addition, it is notable that the percentage of Engineering majors' positive response is higher than that of Management majors except the second research year. Despite the above differences, the routine practice of graphic organizers received favorable responses from the majority in every class: Approximately 77% of all the recruited students gave positive feedback.

Table 4. Percentages of research participants who consider graphic organizers helpful

| | Research year | | | | | | | | | |
| | 1st | | | 2nd | | | 3rd | | | |
College	M	E	AVG	M	E	AVG	M	E	AVG	AVG
Reported helpful (%)	75	79	77	78	67	72.5	72	89	80.44	76.65

Note. M = College of Management; E = College of Engineering; AVG = average.

Statistically, a large number of students reported favorably on graphic organizers, and it is necessary to find out how this pedagogy benefited this student population. To address this inquiry, a qualitative analysis was conducted. The students' explanatory accounts were color-coded to compose meaningful categories and to record the frequency of every mentioned benefit. As shown in the comments summarized in Table 5, the advantages most frequently reported by the university participants are related to comprehension. Using graphic organizers seems to help them grasp the gist and details of the text under study more easily and faster. This resonates with the study conducted by Strangman et al. (2004). While making efforts to achieve reading comprehension, the students also reported that graphic organizers

had led them to read above and beyond the text because they were able to understand the textual structure and the author's purpose. Besides comprehending the text under study, graphic organizers appear to help these students tackle with course requirements. The research participants stated that graphic organizer had reduced their work load on subsequent reviews and helped them performed better on reading tests.

The benefits of graphic organizers are not limited to English reading. Similar to the findings gathered by Helmer (2005) and Ponce et al. (2013), the present study suggests that the routine visualized notetaking practice advanced the university participants' other cognitive abilities. Several participants claimed that graphic organizer had enhanced their memory of the passage and vocabulary

Table 5. Student participants' further comments on graphic organizers

	Research year					
	1st		2nd		3rd	
College	M	E	M	E	M	E
Easier to grasp main points	6	3	5	3	5	5
Helps later review	2	1		3		
Easier to comprehend details	1	1	1	2	7	2
Comprehend texts faster	1		3	1	2	2
Better understanding of article structure			1	2		
Helps answer questions of tests				3		
Enhance memory		1	1			
Better understanding of author's purpose			1		1	1
Enhance synthesis ability	1					
Helps memorize more English words					2	
A good reading habit	1			1		
A good reading strategy				1		
Passages and practice are not tested				2		
Sum	11	6	12	14	15	10

Note. M = College of Management; E = College of Engineering

words as well as their ability to synthesize texts. Their remarks echo Paivio and Csapo (1973) assertion that graphic visuals create better memory and learning. In addition, they resonate Canning-Wilson (2001) claim that graphic visuals enhance readers' ability to create connections between English words and Kim and Gilman (2008) and Strangman et al (2004) belief that this notetaking tool improves learning of English vocabulary. Two students made a comprehensive account: "Using graphic organizer is a good reading habit and strategy." Contrary to the above positive feedback, only two students stated that graphic organizers were not necessary because neither their practice of the graphic organizers nor the covered English passages were assessed.

Some student participants not only explained why they considered graphic organizers helpful, they also reported how the instructions had maximized the benefits of this notetaking tool. The remarks gathered in Table 6 present a revealing portrait of helpful instructions moves. The accounts include the instructor's introduction of various graphic visuals, modeling how to use them, one-on-one guidance, consistent calls for notetaking in texts and besides texts, and encouraging students to search for the topic sentence of every paragraph and to compose an outline of the reading passage.

B. How do these English learners perceive their English reading ability after the year-long practice of graphic organizers?

We see from Table 7 all the students reported their progress on English reading and the majority of them felt satisfied with their advancement. A closer look at the data reveals several intriguing differences between the students from diverse fields of study. Management majors reported more improvement than Engineering majors, but their satisfaction with their improved English reading ability declined as years went by. By contrast, the Engineering majors, who consistently reported less improvement, remained highly satisfied with their improved English ability.

The above results lead us to the general conclusion that the majority of the EFL university students participating in this study considered the year-long training of graphic organizers helpful to enhance their English

Table 6. Reported helpful instructional moves with graphic organizers

	Research year						
	1st		2nd		3rd		
Response	M	E	M	E	M	E	Sum
Provides various graphic organizers	1						1
Pemonstration + personalized tutoring			1		1	1	3
In texts and beside texts				1			1
Direct Ss to search for topic sentence and compose an outline				1			1

Note. M = College of Management; E = College of Engineering

Table 7. Participants' self-perceived English reading ability

| College | Research year | | | | | | | | | | | | Satisfaction AVG (%) |
| | 1st | | | | 2nd | | | | 3rd | | | | |
	S	E	I	SA (%)	S	E	I	SA (%)	S	E	I	SA (%)	
MAN	6.19	8.19	2.00	88	5.50	7.02	1.52	75	5.44	7.50	2.06	60	74
ENG	5.57	7.43	1.86	88	5.38	7.25	1.87	88	5.15	7.08	1.93	92	89

Note. MAN = College of Management; ENG = College of Engineering; S = class average of self-rated confidence in English reading at the start of the academic year; E = class average of self-rated confidence in English reading at the end of the academic year; I = class average of improved confidence over the academic year; SA = average percentage of satisfaction with current English reading ability.

reading ability and cognitive skills. Besides, they became more confident in their English reading at the end of the academic year. These findings will be further discussed in the next section.

V. Discussion

The EFL university students provided consistent positive feedback to the first question over the three academic years suggests that using graphic organizers is plausible in teaching English reading in higher education in Taiwan. According to their explanatory accounts, this type of notetaking not only helps them comprehend English passages but also fosters deep and thorough textual processing. The initial reading that involves taking notes in text and beside text appears to activate their working memory, while the repeated reading of the same passage with graphic organizers seems to generate deep and semantic processing, which in turn achieves long-term learning and retention of information. This finding is in complete agreement with the assertion of Bui, Myerson, and Hale (2013) "organizing information involves deeper, semantic processing, which promotes long-term retention" (p. 307). The deep and thorough processing enhanced their memory of the passage and the learned vocabulary. Their memory made their review effective and efficient due to the reduced time and workload.

Those students' response to the second question further endorses the feasibility of this guided notetaking tool. All the student participants stated that their English reading had improved, and the majority of them felt satisfied with their progress. Despite the shared remarks, differences are found between the students from diverse fields of study. Engineering majors, who consistently reported less improvement, remained highly satisfied with their improved English ability. However, Management majors reported more improvement, but their satisfaction declined as years went by. To identify the cause of the difference, it may be helpful to consider at least two important factors here. Compared with Engineering majors, Management majors are usually required to read more course materials printed in English and their

future jobs are more often related to English reading. Due to increasing competition in the job market, it is quite likely that these Management majors' growing anxiety caused their relatively lower satisfaction with their current English reading ability. The findings generated from the exploration lead to pedagogical and research implications.

A. Pedagogical Implications

It is important to teach EFL learners notetaking strategies because "students need effective notetaking skills and strategies in order to do well on exams" (Bui et al., 2013, p. 308). The results indicate that integrating graphic organizers into English reading could be beneficial to EFL students in Asian universities. This pedagogical implication resonates Stull and Mayer (2007) remarks:

When the learners are inexperienced, we recommend adding a few key graphic organizers to help learners select relevant material from the text and organize it into a coherent structure. We do not recommend asking low-knowledge students to construct their own organizers, especially when the learning task is difficult, such as with the scientific text used…Guided use of constructive activities, when learners are familiar with a technique, is a better option and more likely to promote the selection, organization, and integration of knowledge that is necessary to facilitate meaningful learning. (Stull & Mayer, 2007, p. 818)

Despite awareness of the above-mentioned benefits, Ponce et al. (2013) emphasized developing students' ability to use graphic organizers takes much time.

The student participants' accounts of helpful instructions with graphic organizers may be also insightful to English educators. They imply the importance of selecting suitable organizers for passages, teachers' modeling, students' hands-on practice, and personalized guidance. While introducing a graphic organizer, teachers are advised to justify their selection of this format so that their students have adequate knowledge to choose a proper format for a particular English passage on their own. In this regard, Ponce et al. (2013) cautioned teachers to avoid overloading students with too many notetaking formats at a time.

Besides the knowledge of selecting suitable graphic organizers, students will benefit from teachers' on-site demonstration of navigating in the passage to find the correct responses to the cues. Teachers' presentation of a graphic organizer cannot guarantee students' learning without their instant hands-on experiences. The learning-by-doing process requires teachers' timely individualized encouragement and guidance.

B. Research Implications

The findings imply that EFL university students' extensive practice of graphic organizers enhances their cognitive development. Several participants reported that visual displays had improved their memory of the English passages and the vocabulary. Besides, they felt more confident in connecting the

passage under study with another text they had read before.

The student participants' comments on graphic organizers also suggest that the year-long training facilitated their metacognitive knowledge. Exposed to diverse graphic organizers and practicing them firsthand provided them an opportunity to examine whether this reading strategy suits them and how this reading strategy had impacted their English reading ability. Metacognitive strategy, Chen (2013) maintained, promotes autonomous learning and self-regulated learners (p. 106). EFL learners' awareness of this reading strategy will direct them to make well-informed reading moves without their teachers' assistance.

VI. Conclusion

The present study provides a detailed examination of using graphic organizers as a guided notetaking tool from EFL university students' perspective. The students' reported opinions after extensive engagement in this reading strategy offer valuable insight into its feasibility in the higher education in Taiwan. This insight can increase EFL teachers' faith in incorporating graphic organizers in their curricular design, motivate textbook writers to include graphic organizers in reading materials, and encourage researchers to seek more conditions that would maximize the effects of graphic organizers on these learners.

Although the present study has yielded findings that have both pedagogical and theoretical implications, its design is not without flaws. The first concerns the

participants' educational backgrounds. They were from only two colleges—Management and Engineering. Those who take interest in replicating this study are advised to target at EFL students from other fields of study. The second is rooted in the student participants' English proficiency. The classes under study comprise students with intermediate and low English proficiencies. Therefore, it cannot identify whether advanced English learners will also benefit as much from graphic organizers. A multiple-level research design may generate fruitful insights. Last but not least, the present study adopted solely a questionnaire to obtain the students' responses. Additional data-collecting methods, such as interviews and observations, would have further harnessed the reliability of the findings.

An area of future research that should be considered is the factor of individual learners. Individual learners' characteristics have received an increasing recognition as a vital factor of foreign language acquisition. Perhaps future research should examine the interaction between individual learners' differences and effective graphic organizers. In addition to the above-mentioned educational background and English proficiency, Ponce et al. (2013) and Bui et al. (2013), who believed in the interactions of individual learners' cognitive ability and notetaking strategy, encouraged researchers identify most effective graphic organizers for students of diverse cognitive abilities. A plausible study is to recruit EFL learners who have similar English proficiency but obviously different cognitive abilities, for example, freshmen in senior high and

university juniors. Additionally, as Stull and Mayer (2007) suggested, it would be also intriguing to identify "how the form and difficulty of different graphic organizers, in both author-provided and learner-generated strategies, promote generative processing and cognitive load" (p. 818).

Another recommendable line of future research is concerned about EFL university students' metacognition. The year-long training of graphic organizers has raised the research participants' awareness of this reading strategy and their own reading ability. A qualitative and longitudinal study that involves observations and documents to investigate to what extent the students apply their metacognitive knowledge to extensive readers or their field-related English texts outside class would make contributions to the research on learner autonomy and English for Academic Purposes (EAP). Alternatively, researchers could target at successful EFL readers' metacognitive experience, as Ponce et al. (2013) recommended:

> A future version of the applications could include metacognitive prompts to guide the learner, explanative feedback after students try each step in a learning episode, or worked-out examples showing how a successful student carried out an exercise… keep track of the learners' progress on key skills such as highlighting or completing each type of graphic organizer. (Ponce et al., 2013, p. 837)

The last but extremely promising direction of future research is applications of graphic organizers to online English reading. As Internet technology advances, the population of EFL online readers expands. Computer software has proved to be a useful resource for learning. For instance, the software developed by Mochizuki et al. (2019) fostered university students' ability to capture the authors' arguments. Therefore, the next logical step will be to investigate the potential of more fully integrating such software into English reading.

References

Alvermann, D. E. (1981). The compensatory effect of graphic organizers on descriptive text. *The Journal of Educational Research*, *75*(1), 44-48. doi:10.1080/00220671.1981.10885354

Blackwell, A. J., & McLaughlin, A. F. (2005). Using guided notes, choral responding, and response cards to increase student performance. *International Journal of Special Education*, *20*(2), 1-5.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, *18*(1), 32-42. doi:10.3102/0013189X018001032

Bui, D. C., Myerson, J., & Hale, S. (2013). Note-taking with computers: Exploring alternative strategies for improved recall. *Journal of Educational Psychology*, *105*, 299-309. doi:10.1037/a0030367

Canning-Wilson, C. (2001). *Choosing EFL/ESL visual assessments: Image and picture selection on foreign and second language exams*. (ERIC Document Reproduction Service No. ED 452707)

Castelló, M., & Monereo, C. (2005). Students' note-taking as a knowledge-construction tool.

L1-Educational Studies in Language and Literature, *5*, 265-285. doi:10.1007/s10674-005-8557-4

Chanlin, L.-J., & Chan, K.-C. (1996). *Computer graphics and metaphorical elaboration for learning science concepts*. Retrieved from ERIC database. (ED392390)

Chen, P.-H. (2013). The effectiveness of an integrated lecture note-taking intervention program. *Bulletin of Educational Researc*h, *59*(1), 73-112. doi:10.3966/102887082013035901003 (in Chinese)

Cole, M. (1985). The zone of proximal development: Where culture and cognition create each other. In J. V. Wertsch (Ed.), *Culture, communication, and cognition: Vygotskian perspectives* (pp. 146-161). Cambridge, UK: Cambridge University Press.

Helmer, S. (2005, March). *Supporting thinking and learning with visual tools*. Paper presented at the 39th Annual TESOL Convention and Exhibit, San Antonio, TX.

Heward, W. L. (1994). Three "low-tech" strategies for increasing the frequency of active student response during group instruction. In R. Gardner III, D. M. Sainato, J. O. Cooper, T. E. Heron, W. L. Heward, J. W. Eshleman, & T. A. Grossi (Eds.), *Behavior analysis in education: Focus on measurably superior instruction* (pp. 283-320). Monterey, CA: Brooks.

Imsa-ard, P. (2022). Reading better? Enhancing Thai EFL Secondary School students' reading comprehension abilities with the use of graphic organizers. *English Language Teaching*, *15*(5), 1-13. doi:10.5539/elt.v15n5p1

Katayama, A. D., & Robinson, D. H. (2000). Getting students "partially" involved in note-taking using graphic organizers. *The Journal of Experimental Education*, *68*, 119-133. doi:10.1080/00220970009598498

Kiewra, K. A., DuBois, N. F., Christian, D., McShane, A., Meyerhoffer, M., & Roskelley, D. (1991). Note-taking functions and techniques. *Journal of Educational Psychology*, *83*, 240-245. doi:10.1037/0022-0663.83.2.240

Kim, D., & Gilman, D. A. (2008). Effects of text, audio, and graphic aids in multimedia instruction for vocabulary learning. *Educational Technology & Society*, *11*(3), 114-126.

Lazarus, B. D. (1991). Guided notes, review, and achievement of secondary students with learning disabilities in mainstream content courses. *Educational and Treatment of Children*, *14*, 112-127.

McCagg, E. C., & Dansereau, D. F. (1991). A convergent paradigm for examining knowledge mapping as a learning strategy. *The Journal of Educational Research*, *84*, 317-324. doi:10.1080/00220671.1991.9941812

Mochizuki, T., Nishimori, T., Tsubakimoto, M., Oura, H., Sato, T., Johansson, H., ... & Yamauchi, Y. (2019). Development of software to support argumentative reading and writing by means of creating a graphic organizer from an electronic text. *Educational Technology Research and Development*, *67*, 1197-1230. doi:10.1007/s11423-019-09676-1

Paivio, A. (1971). *Imagery and verbal processes*. New York, NY: Holt, Rinehart and Winston.

Paivio, A., & Csapo, K. (1973). Picture superiority in free recall: Imagery or dual coding? *Cognitive Psychology*, *5*, 176-206. doi:10.1016/0010-0285(73)90032-7

Piolat, A., Olive, T., & Kellogg, R. T. (2005). Cognitive effort during note taking. *Applied Cognitive Psychology*, *19*, 291-312. doi:10.1002/acp.1086

Ponce, H. R., Mayer, R. E., & Lopez, M. J. (2013). A computer-based spatial learning strategy approach that improves reading comprehension and writing. *Education Technology Research Development*, *61*, 819-840. doi:10.1007/s11423-013-9310-9

Poohkay, B., & Szabo, M. (1995). *Effects of*

animation & visuals on learning high school mathematics. (ERIC Document Reproduction Service No. ED 380122)

Qi, W., & Jiang, Y. (2021). Use of a graphic organiser as a pedagogical instrument for the sustainable development of EFL learners' English reading comprehension. *Sustainability*, *13*(24), 13748. doi:10.3390/su132413748

Sathongeay, S., & Prasansaph, S. (2019). Effects of using graphic organizers technique to enhance undergraduate students' English critical reading skills. *Rajapark Journal*, *13*(31), 209-220.

Strangman, N., Ge, V., Hall, T., & Mayer, A. (2004). *Graphic organizers and implications for universal design for learning: Curriculum enhancement report*. Wakefield, MA: National Center on Accessing the General Curriculum.

Stull, A. T., & Mayer, R. E. (2007). Learning by doing versus learning by viewing: Three experimental comparisons of learner-generated versus author-provided graphic organizers. *Journal of Educational Psychology*, *99*, 808-820. doi:10.1037/0022-0663.99.4.808

Sweeney, W. J., Ehrhardt, A. M., Gardner, R., III, Jones, L., Greendifeld, R., & Fribley, S. (1999). Using guided notes with academically at-risk high school students during a remedial summer social studies class. *Psychology in the Schools*, *36*(4), 305-319. doi:10.1002/(SICI)1520-6807(199907)36:4<305::AID-PITS4>3.0.CO;2-2

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press. doi:10.2307/j.ctvjf9vz4

Ward, C. S., & Gramer, M. F. (2014). *Q: Skills for success 2E reading and writing (level 3)*. Oxford, UK: Oxford University Press.

Wong, S. (2019). The effectiveness of graphic organizers on the reading comprehension of EFL students: A proposed syllabus. *Temple University Japan Studies in Applied Linguistics*, *122*, 73-79.

Yang, Q., Miller, M., & Bai, K. (2011). Testing the improvement of English as a foreign language instruction among Chinese college students through computerized graphic visuals. *TESOL Quarterly*, *45*, 170-181.