**Effect of Using Digital Graphic Organizers in English Grammar Learning**

**of ESL Undergraduate Students**

1. **Introduction**

English language has become significantly important since it is considered as the most common language spoken internationally in the world nowadays. As well as Thailand is the country that used English as second language (ESL) also finds a lot of beneﬁts from using English language to communicate to others in various purposes (Sudathip et al., 2020). Moreover, English language helps transform the educational experiences and business to other people around the world. Therefore, English is not only a subject studied in schools, but also a center of knowledge in global society.

English grammar has been a focus in ESL learning research for longtime. The on-going debate about the best way to teach grammar has significant influenced on the development of language teaching practice. The concept of pedagogical grammars is intended to provide those involved in language teaching and learning with grammatical presentation of the language for the purpose of teaching and learning, syllabus construction, and materials development (Namaziandost & Çakmak, 2020). Hence, various perspectives, methods, and techniques for teaching grammar have emerged for ESL teachers to choose from in order to suit their own learners and classroom environment. Therefore, empowering students today to learn and become productive, students requires educators to use approaches that engage them on a personal level with their learning (Tavakoli, 2021).

The digital technologies of information and communication are having a growing role in university educational processes (Carpenter, Green, & LaFlam, 2011). Thus, it is recommended that university lecturers are required to teach effectively in different environments, and to make effective use of information and communication technology on their teaching (Phantharakphong, Sudathip, & Tang, 2019). Today’s language teaching and learning require a lot of digital platforms to support ESL learners in achieving their target language, especially when society faces the situation of the Covid 19 pandemic. In addition, many online tools are implemented in various language classes including graphic organizers (GOs), which combine linguistic forms like words and phrases with non-linguistic forms like symbols and arrows that show relationships of information. Ausubel (1963) who firstly developed Graphic Organizers (GOs) believed that the methods used by teachers to represent information can stimulate learning; a suitable organizer can help students to establish associations between new information and what they have previously learned. Egan (1999) defined GOs as “visual representation of knowledge, a way of structuring information, and of arranging essential aspects of an idea or topic into a pattern using labels”. It is also believed that GOs effectively lead learners to unify new concepts and propositions in an active way (Kansızoğlu, 2017). GOs can also serve as a brainstorming tool to activate prior knowledge and to connect what students know with new information (Manoli & Papadopoulou, 2012). The GOs are used as a tool to explain and organize ideas and relationship of each grammatical structure and rule in the students’ learning process which represents in various ways, such as, concept maps, mind maps, fishbones maps, Venn diagrams and network trees (Dexter & Hughes, 2011). Many studies on GOs are conducted by many researchers (Odegaard, 2015; Robinson, 2015; Khalaji, 2016; and Rahmat, 2020). The results show that the students are motivated and preferred working with the various strategies since GOs are more interesting and up to date than using textbooks alone. Even if there are a lot of evidence showing positive effects of using GOs in Language learning, there are still little information about using digital GOs to improve English grammar ability in ESL learners. Therefore, it is needed to investigate in order to clarify the use of digital GOs as online learning tool that actually suites to English grammar learning for ESL learners or not. Thus, this study has the purposes to answer the questions:

1. Can digital GOs as online learning tool help the students to improve their English grammar learning ability?
2. To what aspects of digital GOs can help the students to learn English grammar?
3. **Objectives**

2.1) To investigate the students’ English grammar learning ability after using digital graphic organizers as online learning tool that 80% of the participants pass the criterion (get the scores on the test over 80%).

2.2) To explore the aspects of using digital graphic organizers to improve the undergraduate students’ English grammar learning ability.

1. **Literature Review**

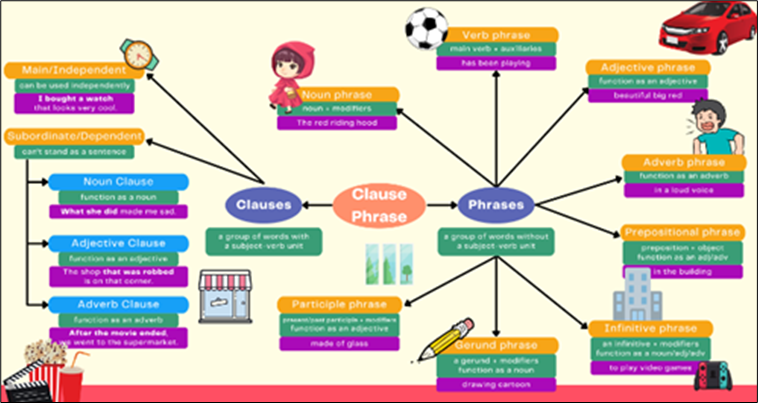
David Ausubel (1963, 1968) developed an educational psychology that is intimately related to learning as it typically occurs in schools. At the core of this psychology is the proposition that a principal variable influencing new learning in a subject matter field is one's existing background of knowledge, or cognitive structure. Ausubel maintained that new meanings in any discipline are acquired only in relation to a previously learned background of relevant concepts and principles. Thus, if existing cognitive structure is clear stable, and organized, new learning will be enhanced. The use of "advance organizers" has been proposed as one means of strengthening existing cognitive structure. As developed by Ausubel, advance organizers are introductory arose passages written at a higher level of "generality, abstraction, and inclusiveness". Graphic organizers (GOs) were after suggested under the rubric of "structured overviews" (Barron, 1969, as cited in Barron, 1971). They have been defined as "visual and verbal presentations of the key vocabulary in a new learning task in relation to subsuming and/or parallel terms that presumably have previously been incorporated into the learner's cognitive structure" (Barron, 1971).

Text

Description automatically generated*Figure1: Some types of graphic organizer: Descriptive or Thematic Map, Network Tree, Spider Map*

(Hall & Strangman, 2008)

Digital graphics organizers in this study refer to computer based and online visual devices that depict information in a variety of ways. Most commonly, they employ lines, circles, and boxes, to form images which depict four common ways information is typically organized: hierarchic, cause/effect, compare/contrast, and cyclic or linear sequences. These images serve as visual cues digitally designed to facilitate communication and/or understanding of information by showing how essential information about a topic is organized.

*Figure 2: an example of the participant’s digital graphic organizer*

There are many studies pertaining the use of GOs in language teaching and learning. Wang (2019) studied the application of mind map in English grammar, which is also considered as one of GOs, can enhance the students’ initiative, promote the students’ interest in learning, the efficiency of learning and the ability of grasping grammar knowledge. Secondly, a study by Trisusana & Susanti (2020) explored the use of GOs in students’ descriptive and narrative writing. There were 16 participants joined in a paragraph writing class in English Education Department of UNESA, Surabaya, Indonesia. GOs were used to help students in the process of writing, and this showed that GOs can improve students’ writing ability especially in descriptive and narrative texts and most of the students reached good score in their writings. Yamagichi (2021) found that using GOs as learning materials during the students’ task activity to promote the acquisition of English language production. This study found that implementing an unfocused task with a set prompt and clear boundaries, in a form of visual aids by using GOs to generate useful expressions and patterns over the treatment period, results showed an improvement in the participants’ vocabulary knowledge, grammatical knowledge and overall L2 output. Furthermore, Styati & Irawati (2020) were investigating the effect of GOs on ELT students’ writing quality. The participants were the students of English Department, in a private university in Indonesia. The results showed that the students in the experimental group who used GOs performed better on writing quality in terms of content, vocabulary, and mechanics than the students from the control group which can be concluded that GOs have a significant effect on ELT students’ writing quality. Then, Alsuhaymi & Haydar (2019) investigated the effectiveness of using GOs strategy to improve grammatical knowledge for 40 intermediate students at Al-Imam Abdulaziz bin Mohammad School. The students belonging to class A who represented the control group were taught using grammar translation way while those belonging to class B who represented the Quasi-experimental group were taught by using GOs Strategy. The results indicated that using GOs strategy in teaching grammar improved students' proficiency in learning English grammar.

1. **Research Methodology**

This study aimed to investigate the students’ English grammar learning ability after using digital GOs as online learning tool that 80% of the participants get the scores on the English grammar test over 80% and to explore the aspects of using digital graphic organizers to improve the undergraduate students’ English grammar learning ability. The participants of this study are 60 undergraduate students (40 females and 20 males) from English major, who enrolled in Fundamental English Grammar Course of the academic year 2021 from the Faculty of Education, Khon Kaen University, were selected using purposive sampling technique. Their ages ranged from 18 to 19 years old. These participants had learned English when they were in high school for six years before entering to this university. The pre-experimental research design with a one-shot case study was used in this study. The data collection was collected in the first semester of academic year 2021. At the first phase, the 3 teaching lessons were taught, each lesson last 3 hours (9 hours in total). At the end of each lesson, the students were assigned to create digital GOs to revise, explain and generate their ideas of understanding about what they had learnt. After that, a 60 item English grammar test was used to evaluate the quantitative data in order to answer the first research question that after using digital GOs as learning tool, the students can improve their English grammar ability or not. At the second phase, a set of semi structured interview questions was used to explore the qualitative data in terms of gaining a better understanding about aspects of digital GOs help the students to learn English grammar to answer the second research question. The average score (%), mean score (𝑥̅) and the standard deviation (S.D.) were employed for the data analysis.The process of collecting data is presented as the following table.

***Table 1****: Teaching topic, learning activity and research instruments*

|  |  |  |  |
| --- | --- | --- | --- |
| Lesson | Topic | Student Activity | Instrument |
| *Phase 1: Quantitative data collection* | | | |
| 1st lesson (3 hrs.) | Articles | After each lesson, students create a digital graphic organizer to revise learnt content | A 60 item English grammar test |
| 2nd lesson (3 hrs.) | Clause and Phrase |
| 3rd lesson (3 hrs.) | Comparative and Superlative |
| *Phase 2: Qualitative data collection* | | | |
| Semi-structured interview | | | A set of Interview questions |

1. **Results**

The results are presented according to the research objectives as indicated above. The initial results demonstrate the students’ English grammar ability after using digital GOs as their learning tool and reveal the students’ points of view in relating to learning experiences using the digital GOs after each learning topic.

**Results of English grammar test**

After conducting the 3 teaching lessons and using digital GOs intervention, the 60 item English grammar test was employed to check the students’ English grammar learning ability which the results as shown in the table 2.

***Table 2****: the results of* *the students’ English grammar test after using digital GOs*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Number of students | Total score | Students’ average score () | Students’ average score (%) | Std. Deviation | The highest score | The lowest score | Number of students passing the 80% criteria |
| 60 | **60** | **49.28** | **82.13** | **4.44** | **57** | **38** | **41 (63.3%)** |

It can be concluded that after the intervention, the students’ average score of the quantitative data is 49.28 (82.13%). The standard deviation is at 4.44. The highest score of the students test is 57 (out of 60) and the lowest score is 38. The results show that the number of students who passed the 80% criteria is 41 people (68.3 %).

**Qualitative Results**

To explore the aspects of using digital GOs for the students’ English grammar learning, the second phase is constructed. The set of semi structured questions was used to explore the students’ perspective on how digital GOs help them in learning English grammar. The nine students who participated in the second phase were labeled as S1 to S3 (Excellent category), S4 to S6 (Moderate category), and S7 to S9 (Weak category).

Qualitative results revealed that the majority of students agreed that digital GOs create positive effects on their learning. The following verbatim responses indicate their experiences in using digital GOs after each lesson.

*“In my opinion, it is a good way to make me understand grammars better because I can ‘see everything from the high view’ like an eagle. Digital GO is the way to make the information neat, easy to read and easy to understand as it is summarized and selected only the cores of the information to be in the graphic organizer….. without GOs my grammars knowledge would be mixed up.” (S1)*

*“I like to use digital GOs because they help me organizing my knowledge which lead to deeper understanding the lessons. They also represent information in a pattern, and I can stay focus on the learnt information and put it in boxes….. I can apply this in every subject I want”. (S2)*

*“…..making graphic organizer can make me remember the lesson by summarizing it into a mapping on one page. So, I can see the connections between the topics ….. I feel pretty relaxed when I can express my own ideas and my style on it…. the result after making graphic organizer is I got a good grade for the grammar class.” (S3)*

*“….. It makes the whole lessons go through easily by just summarizing the whole materials into clarification boxes. Importantly, it's a better way to study grammar ….. making it shorter and specifying the color of each box and other details of each topic, gives me a simple explanation to be clear on every lesson”. (S5)*

*“…. creating a graphic organizer is beneficial because it makes me subconsciously revise what I’ve learned. In addition, it improves my creative skills and making a graphic organizer is easier to read than reading a whole thing. In short, summarizing the lesson by making a graphic organizer is one of the efficient ways to review the lesson.” (S7)*

Generally, results revealed that there is no obvious difference in using digital GOs as English grammar as learning tool. When the students were required to explain how digital GOs help them to learn English grammar, most of them refer to their positive impacts. For example, they help organizing the students’ knowledge, their features such the variation of using colors and boxes deliver clear and simple explanation which help the students to easily revise their learning in a shorter time. The cute cartoon and the ways they want to decorate the organizers motivate, engage and interest them to learn more.

*“I prefer reading texts from the graphic organizer instead of a very long information. Also, graphic organizer is easy for memorization. I can remember all of the information in shorter times instead of reading the whole boring thing.” (S4)*

*A picture containing diagram

Description automatically generated“I always excited after you* (the instructor) *asked us to create the digital GOs after the lessons because I would search for some cute stickers to put on my work. This is so much fun. I love it! (S8)”*

***Figure 3****: The examples of the decorated digital GOs created by the participants*

However, when the students were asked to analyze if there is any limitation in using digital GOs, there were littles limitations mentioned. The first limitation is to create digital GOs, some students had to spend quite a longtime to complete it and other reasons is one of the students was not familiar with transferring long piece of information into a page. The following verbatim responses from students can support the identified limitations:

*“… And I usually grab graphic organizers to help me revise before the test. However, some topics that I used to do the graphic organizers have a lot of required materials, so it was not easy to make it concise in one paper.” (S6)*

*“Although it makes me fun and enjoy summarizing information every time I make it, it’s hard to compile all of my knowledge in 1 page.” (S9)*

1. **Conclusion and Discussion**

This study examined the effects of using digital graphic organizers in English grammar learning of ESL undergraduate students. Analysis of the quantitative data showed that after the intervention, average score of the students’ English grammar ability was 49.28 (82.13%). In terms of English grammar ability, the students’ average score meets the set criteria (the test score over 80%). This result exposes that after using digital GOs as the learning tool, the students preformed well on the grammar test, which can be said that digital GOs did help the students’ English grammar ability. This is considered that digital GOs are effective in helping the students to generate ideas and revise the learnt content. This line with Styati & Irawati (2020) that using GOs, the students can perform better in using target language in accordance to the aspects of content, vocabulary, and mechanics. As well as Yamagishi (2021) also found that there is a substantial difference in the grammatical content like words and phrases used in the posttests.

On the other hand, the number of the passed students did not meet the goal. Even if the results of the students’ English grammar test after using digital GOs successfully reached the determined criteria which students’ average score was at 82.13 percent, the number of students who met the determined criteria was only 63.3 percent (41 out of 60 students). As the results, it was necessary to explore the aspects of using digital GOs for English grammar learning in order to gain deeper understanding if there were any supported reasons of using digital GOs related with the quantitative results. Therefore, the qualitative data collection was employed as the second phase. The results of the interview showed that the majority of students agreed that digital GOs created positive effects on their learning. There were several reasons had been mentioned, for example, digital GOs help organizing the students’ knowledge, their features such the variation of using colors and boxes delivered clear and simple explanation which help them to revise their lesson within a shorter time. It is line with Baxendell (2003) that says GOs create students more creative since they can express their ideas consistent, coherent, and integrated. Moreover, Egan (1999) also supports that GOs is an effective method to help students to explore their learning. Learners tried to make flow chart to connect relationship of each grammar points. It is an important way for students to draw upon experiences from lessons, observe what is going on around their thoughts, and recognize the learnt content which helps students complete their gap of knowledge. The cute cartoons or the ways the students decorated their digital GOs also engage and motivate them to learn more. As Fredericks et al. (2004) claimed that students can behaviorally engage in the learning task by creating a visual aid freely as the way they want.

However, there were some limitations had been mentioned such as time consuming and unfamiliar strategy which required a lot of tools to convert amount of data into limited space. As the students 6 and 9 referred to their difficulty when they try to transform information into one page, it did take some time to finish the task. Trisusana & Susanti (2020) also pointed out that using GOs in creating narrative composition was quite difficult for students since there were many components or aspects that had to be completed. It was different from descriptive text that was easier.

1. **Suggestions**

This study has some limitations. It is hard to tell if digital GOs could successfully lead more than 80 percent of the students to reach the set goal. It needs to be caution that sometimes the academic achievement test itself does not tell or has relationship to the number of the passing students. According to the results on the other hand, there is no obvious evidence showing why there were only 41 students passed the determined criteria. Therefore, the higher statistical analysis is needed to prove if there is any relationship between number of students and their academic achievement performance. It is also recommended that the instructor should conduct deeper interview in order to gain a better understanding about using GOs as a language learning tool. However, it is obvious that this study has shown several positive effects of using digital GOs on the undergraduate students’ English grammar learning ability. Digital GOs help the students’ academic performance as they can see the overall content and its connections of difference topics on one page. Digital GOs also bring creativity and comfort learning environment by giving chance for the students to express their likes and ideas. It is recommended that instructors can implement digital GOs into any teaching and learning activity for different ESL contexts.

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