

Effectiveness of Graphic Organizers in L2 Instruction: A Meta-analysis

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Abstract—This study investigated the overall effects of using graphic organizers on Korean EFL students' L2 competence. A meta-analysis of 34 research findings in 31 articles was implemented to synthesize the results of these studies by calculating mean effect sizes. This study reviewed and analyzed results of previous studies in terms of school types, treatment period, and language skills. The results revealed that using graphic organizers in teaching English had the beneficial effects in general ($d = .618$). There was the statistically significant difference between the effect sizes of reading ($d = .618$) and writing ability ($d = .618$).

Research Keywords—English Language Education, Graphic Organizers, Schematic Knowledge, Meta-analysis, Research Synthesis

1 INTRODUCTION

Recently, discourse competence, one component of communicative competence, has become important in L2 use [1-2]. L2 learners should, therefore, analyze the structure and organization of language input, and they are required to use those knowledge in productive skills, such as speaking and writing [3-4].

Various teaching techniques that can be used for developing and facilitating L2 learners' awareness on discourse features have been developed and used to meet these needs in instructed L2 instruction fields [5-6]. One of them is graphic organizer. It can show the organization and structure of the text through lines, arrows and other visual elements, so it can help learners to understand the textual information much better [7-9].

Many experimental studies [10-13] have been implemented to identify the effects of graphic organizers in L2 instruction, especially English language, in the context of Korea. There are different results among those studies, so it is required to synthesize the research results on the effect of graphic organizers objectively through the quantitative meta-analysis.

The research questions are as follows:

1. First, what is the overall effect of utilizing graphic organizers in L2 instruction?

2. Second, are there any differences in the effect of utilizing graphic organizers in terms of variables, including school types, treatment periods, and dependent variables?

2 GRAPHIC ORGANIZERS

Humans organize and store various information in the form of network or semantic web [14-15]. Graphic organizer is the one way of describe these connections or links in schematic knowledges through table, diagram, flow chart, and so on. It can help the reorganization of background knowledge and the acquisition of new knowledge.

There are various types of graphic organizer. Robinson introduced concept map, flow chart, tree diagram, matrix, and so forth as the examples of graphic organizer [16]. Besides them, chain, time line, grid, and the integration of two or three types are the typical forms of graphic organizers [17].

3 RESEARCH

3.1 Subjects

The research on the effect of graphic organizers were collected through Korean electronic database such as RISS and KCI on September, 2017. The keywords used for searching were graphic organizer, graphic scheme, etc.

The collected studies were screened in terms of the following criteria:

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1. Experimental studies using graphic organizer as independent variable.
2. Experimental studies carried out in the context of Korea.
3. Experimental studies containing the statistical data (the number of participants, mean score, standard deviation, t-value, etc.) without omission.

Finally, 34 individual research cases from 31 studies were selected for the present meta-analysis after applying the aforementioned standards.

3.2 Instruments

To identify the differences in effects of graphic organizers, individual research cases were classified using the following criteria shown in Table 1.

Table 1. Analyzing Standards

Variables	Coding Values
1. School Types	(1) Elementary School (2) Middle School (3) High School;
2. Treatment Period	(1) Less than 8 Weeks (2) More than 9 Weeks
3. Dependent Variables	(1) Reading (2) Writing

After categorizing each research case, the results were entered and analyzed in CMA (Comprehensive Meta Analysis) 3.3, the statistical package for meta-analysis.

4 MEAN EFFECT SIZE OF GRAPHIC ORGANIZERS

Before calculating the overall mean effect size, test of homogeneity (Q test) was implemented to decide the adequate model of the present meta-analysis. The study results used in this study were not homogeneous ($Q=89.066$, $df=33$, $p=.000$), so REM (Random Effect Model) was adopted.

The mean effect size of using graphic organizers through EM was presented in Table 2.

Table 2. Mean Effect Size of Graphic Organizers

	<i>k</i>	<i>d</i>	95% CI	<i>p</i>
Reading	24	.495	.329~.660	.000
Writing	10	.914	.742~1.086	.000
Total	34	.618	.472~.764	.000

The mean effect size of graphic organizers in L2 instruction is .618 ($z=8.301$, $p=.000$), which means more than medium effect ($d=.50$). In other words,

graphic organizers had a positive effect on the students' English competence.

Next, the mean effect sizes were calculated by dividing dependent variables into reading and writing ability. The results showed that the effect was moderate in reading ability ($d=.495$, $p=.000$), and high in writing ability ($d=.914$, $p=.000$). The difference between reading and writing ability was statistically significant ($Q=22.828$, $df=1$, $p=.001$)

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