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THE EFFECT OF SIGNALING PRINCIPLES OF PRIMARY SCHOOL TEACHING UNDERGRADUATE PROGRAM STUDENTS ON PARAGRAPH QUESTIONS SUCCESS¹

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ABSTRACT

The aim of this research is to investigate the effect of signaling principles on the solution of paragraph questions. It is aimed to improve the skills of fourth grade students of Yozgat Bozok University Faculty of Education class teacher program to solve paragraph questions. In addition, it is aimed to examine the effect of signaling principles on the solution of paragraph questions. In this way, it is aimed to increase the success of the students who will take the Public Personnel Selection Exam. It is thought that the research results will be beneficial for the researchers working in the field of reading. In addition, it is expected to contribute to the researchers working in the field of Turkish teaching. The research is in experimental design with pre-test post-test control group which is one of the quantitative research methods. The population of the study consists of 150 prospective teachers who are studying in the last year of the Basic Education Department of Yozgat Bozok University Faculty of Education. The sample of the study consists of 55 students in the last year of primary school teacher education program. The experimental group consisted of 28 students and the control group consisted of 27 students. A paragraph test was created as a data collection tool. The experimental process was carried out on 04-29 March 2019 for a period of four weeks. The content of instruction prepared on the basis of signaling principle was applied. The test applied in the pre-test stage was used as the post-test. SPSS program was used for data analysis. Arithmetic mean, standard deviation and t-test were used for data analysis. As a result of this study, it was concluded that there was no significant difference between the experimental and control groups according to the posttest test scores. In addition, it was found that the experimental group did not show any significant difference according to the paragraph test pre-test and post-test scores. Within the scope of the research results, makes the following recommendations: The principle of signaling can be studied at primary and secondary level. With the researches, the solution of paragraph questions based on the signaling principle can be realized on the screen.

Keywords: Signaling principle, paragraph question, reading.

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INTRODUCTION

An important aim of reading instruction is to improve reading comprehension skills. Paragraph questions are one way to measure reading comprehension skills. There are paragraph questions especially in exams such as public personnel selection exam, higher education institutions exam, academic staff and entrance exam for graduate education prepared by Measurement, Selection and Placement Center. In the introduction part of this research, firstly the concept of paragraph and then the concept of signaling principle are discussed.

First of all, it is useful to define the concept of paragraph in order to better understand the subject. The word paragraph consists of the Greek words para (chapter) and graphos (Bilgin, 2013: 599). Prose writings are separated by their headlines (Turkish Language Association, 2019), each section that has integrity in itself (Bilgin, 2013: 599). Paragraph is a collection of sentences describing a thought (Yağcı, 2008: 270). Paragraph, an idea, thought, desire, emotion, proposal is a set of sentences that fully and in one way explain (Akalın, 2013: 14; Aktas and Gündüz, 2002: 87). Paragraph is a small unit which develops and develops one aspect of the subject in prose and forms a text within itself (Coskun, 2011: 54). The paragraphs that make up the text should have integrity and be compatible (Tok, 2015: 892). Paragraph is a unit of thought. There is a chained connection between the sentences. Thus, the integrity of meaning is provided (Bilgin, 2013: 599). Each paragraph has one main idea (Yağcı, 2008: 271). The paragraphs in the article provide easy reading of the article and also show that an idea has been switched from one idea to another (Aktaş and Gündüz, 2002: 87). Paragraphs are indicated by carriage return, but paragraphing is not only a formal arrangement but also a semantic integration. These sets of meanings complement each other and form the writing (Akalın, 2013: 15). Multiple choice questions for reading comprehension are asked for a paragraph and various questions about this paragraph. The use of multiple-choice tests in class or national examinations can be seen as the most economical and fair way (Basaran, 2013: 109). A well-established paragraph has all the characteristics of the manuscript. Thus, ease of reading is provided in the article and the interest in the reader is kept alive (Pilancı, 2011: 78; Elkatmış, 2017: 2).

The problems experienced in paragraph solving can be mentioned. For example, the information presented to students about initials is text-intensive, in which case it only addresses the learner's verbal channel. The signaling technique was used to address the non-verbal channels of the students in the signaling activities and paragraph solution.

Signaling serves to highlight relevant information without changing the contents of a multimedia message (Van Gog, 2014). The marking principle, also known as the marking principle, is based on the findings that people learn better when teaching materials contain relevant elements or clues that emphasize the organization of the material. The principle is also called the attention guidance principle, because most signs emphasize information to draw attention (Schneider, Beege, Nebel and Rey, 2018: 1,2). Signaling is to add clues that direct the student's attention to the basic material, a technique that can be called signaling. Marking of oral material (1) a draft or draft sentence at the beginning of the lesson, (2) keyed titles for the draft, (3) add clues such as

vocal emphasis on keywords, (4) pointer words like first” (Mayer, 2009: 109). In the content of instruction prepared according to the signaling principle, it is assumed that individuals can learn more effectively, transfer knowledge and knowledge can be more permanent (Sezgin, 2009: 32). As you can see, the signals are not to add new information, but to emphasize (or repeat) the basic material in the lesson. These are examples of verbal signaling, because it helps the reader to read and mentally regulate the main words for participation (Mayer, 2009: 109). Common features of verbal signaling are presented in Table 1.

Table 1. Common Features of Verbal Signaling

Feature	Example
Outline	A sentence at the start of the lesson saying that airplane lift depends on wing shape, air flow, and air pressure.
Headings	A phrase or short sentence inserted at the start of each section, keyed to the outline, such as: “Wing Shape: Curved Upper Surface Is Longer.”
Vocal emphasis	Saying key words in a louder and slower voice, such as for the bolded words in “the surface on the top of the wing is longer than on the bottom.”
Pointer words	Inserted words such as “first . . . second . . . third,” as in “First, how the top of the wing is shaped differently than the bottom.”

(Mayer, 2009: 110).

For a better understanding of signaling, it is useful to state it on an example. An example of a signaled paragraph is presented in Table 2.

Table 2. Signaling Paragraph Example

Ayşe and her brother Ahmet were going to their homes. It was getting *dark*. There was a **playground** on the way home. Ahmet wanted to play in the park. However, Ayşe wanted to go home because it was dark. On Ahmet's insistence, Ayşe had to let her brother play in the park. Ahmet played in the park for two hours. Ayşe was sitting thoughtfully on the bench at the side of the park. They were just going home so they saw their mother. Their mother was running towards them, *running and crying*. Her mother very curious and frightened that they did not come home. Ayşe and Ahmet were very *upset* that they played in the park without their mother's permission. They apologized to their mother.

Various studies have been carried out for signaling principle. Fowler and Barker (1974) showed the medium and high effect dimensions with a colored underline. Glover et al. (1988) examined the effects of preview sentences (signs in texts) on learning texts in four experiments and showed very high effect sizes for comprehension and remembering tests. Rickards, Fajen, Sullivan and Gillespie (1997) used the sign words used in the study, did not show the effect of enhancing reading comprehension. In the study conducted by Titsworth and Kiewra (2004), advanced organizers resulted in high effect size. Folker, Ritter and Sichelschmidt (2005) in

the study, the illustration made by color grouping, ineffective marking seems to be a sign. In the study conducted by Sung and Mayer (2012), five different signaling aids, which are examples of mixed signaling, provided a high effect size. As a result of the research conducted by Dönmez, Doğan and Baran (2018), according to the analysis of eye tracking data, the use of signal principle directed the students' attention to the related words and reduced their cognitive load. As a result of the research conducted by Başaran (2013), it was found that multiple choice questions aimed at constructing meaning from the paragraph can be answered without understanding the paragraph fully; in this respect, it is stated that Turkish teaching is not appropriate to the aims and principles. According to the eye movement data of Ozelik, Arslan-Ari and Cagiltay (2010), it was observed that the attention of individuals was directed to relevant information and efficiency and effectiveness were increased in terms of finding the necessary information.

With this research, it is aimed to improve the skills of fourth grade students of Yozgat Bozok University Faculty of Education class teacher program to solve paragraph questions. In addition, it is aimed to examine the effect of signaling principles on the solution of paragraph questions. In this way, it is aimed to increase the success of the students who will take the Public Personnel Selection Exam. It is thought that the research results will be beneficial for the researchers working in the field of reading. In addition, it is expected to contribute to the researchers working in the field of Turkish teaching. The problem with this research is:

- What is the effect of signaling-based paragraph-solving techniques on the success of primary school undergraduate students in solving paragraph questions?

METHOD

Research Design

The research is in experimental design with pre-test post-test control group which is one of the quantitative research methods. In the experimental design with pre-test post-test control group, experimental process is applied to the experimental group and no intervention is made to the control group (Creswell, 2012: 309). The reason why the experimental design with pretest and posttest control groups is preferred in this research is to examine the effect of signaling principle on the solution of paragraph questions.

Sample

The population of the study consists of 150 prospective teachers who are studying in the last year of the Basic Education Department of Yozgat Bozok University Faculty of Education. In the determination of the sample, simple random sampling method was chosen. The sample of the study consists of 55 students in the last year of primary school teacher education program. In order to identify the experimental and control group students, 55 sheets of paper were placed in a bag. 28 of these papers have "1", and 27 have "2". Number 1 refers to the experimental group and number 2 refers to the control group. The students pulled a piece of paper from the

bag. Thus, the experimental and control groups were determined by neutral assignment. The experimental group consisted of 28 students and the control group consisted of 27 students.

Data Collection Tool

The data collection tool was developed by the researchers. A paragraph test consisting of paragraph questions was created as a data collection tool. Paragraph test was firstly examined in the literature. Then a draft test consisting of 30 paragraph questions was created by the researchers. While determining the paragraph questions, the paragraph questions in the general talent section of the Public Personnel Selection Exam, which has been applied by the Measurement, Selection and Placement Center since 2009, were used. The draft test was presented to two faculty members working in the field of Turkish teaching. The experts stated that the number of questions should be reduced, as well as that the four paragraph questions were unsuitable for the purpose. Thereafter, the number of questions in the test was reduced and the mentioned paragraphs were omitted. Thus, the paragraph test is finalized. The data collection tool consists of two parts. In the first part, there is a section where the student's personal information is asked and the test instruction. In the second part, there are 20 paragraph questions.

Experimental Process

The research was conducted on 04-29 March 2019 for a period of four weeks. First of all, just before the start of the experimental process, the test and the control group were subjected to a paragraph test as a pre-test. Then, the teaching content prepared based on the signaling principle of multimedia principles was applied. The principle of signaling was explained to the experimental group students. The signaling principle is explained in the paragraphs. Then, in the four-week period, sample paragraph questions prepared according to the signaling principle were solved by the students. It was shown and applied how students can signal themselves in paragraph questions. In the experimental process, computers, interactive whiteboards, photocopying were used. Finally, the test applied in the pre-test stage was used as the post-test.

Data Collection

Data were collected by paragraph test. The students were given 40 minutes to answer the 20-item paragraph test. As a result of the paragraph test which was applied as a pre-test and post-test to all 55 students in the experimental and control groups in the sample, 110 test scores were obtained. Five points were given for each correct answer in the paragraph test. Wrong and empty answers were given zero points. Thus, the lowest score that can be obtained from the paragraph test is zero and the highest score is 100.

Data Analysis

The data obtained in the study were analyzed with SPSS 24 program. The suitability of the data for parametric tests, kurtosis and skewness values (in the range of -1, + 1), normal distribution curve, Q-Q Plot, Normal Q-Q

Plot was examined. It was determined that these values were close to the assumptions. After this process, t test and ANOVA with mixed design were employed for independent samples for data analysis.

Validity and Reliability

For the validity of the paragraph test, the expert opinion was hired. Cronbach's alpha reliability statistics were made in terms of the reliability of the paragraph test. Cronbach's alpha value was calculated as .92 in the whole scale. Tezbaşaran (1997: 47) states that a reliability coefficient that can be considered sufficient on a Likert type scale should be as close to 1 as possible. According to this result, it can be stated that the reliability of the paragraph test is high.

FINDINGS

The t-test results of the paragraph test pre-test scores according to the experimental and control groups are presented in Table 3.

Table 3. Paragraph Test Pre-Test Scores According to Experimental and Control Groups t-Test Results

Group	Number of Cases	Mean	Standard Deviation	df	t	p
Experimental group	28	74,64	13,53	53	1,51	0,255
Control group	27	77,96	6,54			

When Table 3 is examined, it is seen that the experimental group students are 28 students. The control group consists of 27 students. It was seen that the experimental group students had a pretest average of 74.67. It was seen that the control group students had a pre-test average of 77.96. It is seen that the experimental and control groups did not show significant differences according to the pre-test scores of the t test, $t(53)=1.51$, $p>0.05$. In other words, it can be said that the experimental group and the control group are equivalent to the paragraph test pre-test scores. The eta square calculated for our example is $\eta^2 = 0.024$. Accordingly, it can be stated that approximately 2% of the variance observed in paragraph test scores depends on the groups.

The t-test results of the paragraph test post-test scores according to the experimental and control groups are presented in Table 4.

Table 4. T-Test Results of Paragraph Test Post-Test Scores According to Experimental and Control Groups

Group	Number of Cases	Mean	Standard Deviation	df	t	p
Experimental group	28	75,35	8,59	53	0,27	0,78
Control group	27	74,62	11,00			

When Table 4 is examined, it was seen that the experimental group students had post-test average of 75.35. It was seen that the control group students had a post-test average of 74.62. It is seen that the experimental and control groups did not show significant differences according to the posttest scores of the t-test, $t(53)=0.27$, $p>0.05$. In other words, the signaling principles applied to the experimental group did not differ significantly from the control group. The eta square calculated for our example is $\eta^2 = 0.001$. Accordingly, it can be stated that approximately 1% of the variance observed in paragraph test scores depends on the signaling effect.

The results of the t-test for the significance of the difference between the pretest and posttest mean scores of the experimental group paragraph test are presented in Table 5.

Table 5. Experimental Group Paragraph Test Pre-Test and Post-Test Results According to the Average t-Test Results

Measurement	Number of Cases	Mean	Standard Deviation	df	t	p
Pre-test	28	74,64	13,53	27	0,23	0,81
Post-test	28	75,35	8,59			

When Table 5 is examined, Experimental group paragraph test pre-test score is 74.67. Experimental group post-test result according to the average is 75.35. it is understood that the experimental group does not show significant difference according to the paragraph test pre-test and post-test scores $t(27)=0.23$, $p>0.05$. In other words, the signaling principles applied to the experimental group did not contribute to the students to solve the paragraph questions. The eta square calculated for our example is $\eta^2=0.0019$. Accordingly, it can be stated that approximately 2% of the variance observed in paragraph test scores depends on the signaling effect.

CONCLUSION AND DISCUSSION

As a result of this study, it was concluded that there was no significant difference between the experimental and control groups according to the posttest test scores. In other words, the signaling principles applied to the experimental group did not differ significantly from the control group. In addition, it was found that the experimental group did not show significant difference according to the pre-test and post-test scores of the paragraph test. In other words, the signaling principles applied to the experimental group did not contribute to the students to solve the paragraph questions. Similar to the results of this study, sign words used in the study conducted by Rickards, Fajen, Sullivan and Gillespie (1997) did not increase the comprehension of reading. Folker, Ritter and Sichelschmidt (2005) in the study, the color grouping made by painting, marking was found to be ineffective. Stull and Mayer (2007) in which students read a ten-paragraph biology lesson on reproductive barriers that contained words and illustrations (nonsignaled group) or the same lesson along with graphic organizers showing the structure of the passage and of each paragraph using the same words as used in the lesson (signaled group). On a transfer test, students were asked to write answers to several questions about reproductive barriers. In Experiment 1, twenty-seven graphic organizers were used (i.e., approximately three

per paragraph) and there was no signaling effect. In Experiments 2 and 3, eighteen and ten graphic organizers were used respectively (i.e., approximately two or one per paragraph respectively) and there was a medium-sized signaling effect. Thus, it appears that graphic organizers can serve as effective signals when they are not overused. Mautone and Mayer (2001) did not find any evidence that visual signaling aided student learning. One explanation may be that learners use the verbal script to guide them when looking at the graphic, so the visual signaling is not needed. Harp and Mayer (1998), some students (nonsignaled group) read a paper-based lesson on lightning such as the one described in the previous chapter and then took a transfer test. For other students (signaled group), the text was modified by adding an organizational sentence listing the main steps (using the same words as in the text) and then inserting numbers such as “(1)” to correspond to each step as it was described in the lesson. This modest form of signaling produced a small effect size. As a result of the research conducted by Dönmez, Doğan and Baran (2018), while the MS Power Point presentations with signal principle were applied to the students who participated in the experimental group, stresses were made on the important points and the control group was shown not to emphasize on the same presentations. In this experimental study, while independent variable is presentation types, dependent variable is the pre-test, post-test and retention test results and fixation time, fixation number and initial fixation times obtained from eye tracking method. In the study, pre-test, post-test, recall test and eye tracking method were used to collect data. The results show that the fixation time and fixation numbers obtained from the experimental group during the performance of the given task are lower than the control group. However, when the fixation time and the number of fixations on the information containing important points were examined, it was seen that the participants in the experimental group had higher values than the control group. However, as a result of the analysis, no significant difference was found between the experimental and control groups in terms of these eye data (fixation time and fixation numbers). In addition, no significant difference was found between the post-test and recall test scores of the experimental and control groups.

However, Fowler and Barker (1974) emphasize the medium and high effect dimensions with colored underline. According to signaling principle: People learn better when cues that highlight the organization of the essential material are added (Mayer, 2009, p: 108). But in this research, there is not significant difference. Glover et al. (1988) examined the effects of preview sentences (ie, signs in texts) on learning texts and concluded that they showed very high effect sizes for comprehension and remembering tests. In the study conducted by Sung and Mayer (2012), five different signaling aids, which are examples of mixed signaling, provided a high effect size. According to the eye movement data of Ozcelik, Arslan-Ari and Cagiltay (2010), it was observed that the attention of individuals was directed to relevant information and efficiency and effectiveness were increased in terms of finding the necessary information.

Within the scope of the research results, makes the following recommendations:

- This research was conducted at higher education level. The principle of signaling can be studied at primary and secondary level.

- In the research, pre-test and post-test were applied via paper. With the researches, the solution of paragraph questions based on the signaling principle can be realized on the screen.

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