

A program Based on Cognitive Load Theory to Develop Secondary Stage Students' EFL Writing Performance and Reduce Their Writing Apprehension

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ABSTRACT

The current study aimed to develop the secondary stage student's EFL writing performance and reduce their writing apprehension through a program based on cognitive load theory. To achieve this aim, sixty first-year EFL experimental secondary stage students from Alzawahrea, Alhussinia Directorate, Sharkia Governorate, Egypt, were assigned into two groups: thirty students for the experimental group and thirty for the control group. The researcher administrated a pre-test and a post-test for the purpose of data collecting and analysis. The researcher measured the EFL writing performance and writing apprehension level by designing an EFL writing performance and writing apprehension test before and after the treatment. A scale was designed to measure the effect of the suggested program based on cognitive theory. The instruments were administered before and after the treatment. Finally, the results of the study showed that the suggested program based on cognitive load theory and project-based learning has a positive effect on developing the EFL writing performance of secondary stage students and reduce their writing apprehension.

Key words: writing performance, project-based cognitive load theory, writing apprehension

INTRODUCTION

Writing is a fundamental communication tool that allows us to put our thoughts, feelings, and ideas into words. With the use of this powerful tool that transcends time and space, we are able to transmit information and stories across generations and civilizations. Writing is essential in many areas of our lives, be it for an honest letter, a point-making essay, a business report that is brief, or an interesting novel. Ahmed and Karunakaran (2013) stated that Writing is, in general, a two-dimensional cultural innovation. Writing is, on the one hand, only a way to store information for later use and retrieval. Writing appears to be a technique of thinking or a tool for thinking it over. Writing, if one looks simply at the first dimension, is a technology, an invention of humans; that sets us apart from other creatures by enabling us to write down our thoughts. Through the use of technology, individuals or groups can share knowledge with others who are spread across multiple time zones and geographical locations. All things considered, writing is a powerful technological instrument for encoding, sharing, and gaining access to knowledge conveyed in language codes.

Writing performance

Trang and Anh (2020) emphasized that writing is an additional communication technique as well as oral communication in one language. Nawal (2018) defined writing as a difficult endeavor that requires precise execution and a strong structure in order to produce material that is linguistically suitable. Because writing requires a large amount of cognitive labor, L2 learners must give it their whole attention and focus. Hussein (2015) defined writing performance as the act of performing writing tasks, in terms of content, organization, vocabulary, grammar and mechanics. Amin (2016) defined writing performance as Essays written by EFL students should have clear paragraph organization, adequate, sufficient, and pertinent topic and content development, and adhere to proper norms. For example, sentence structure, word usage and mechanics...

Yahiaoui (2012) explained that writing skills are more comprehensive and include grammar, use, and spelling, in addition style, and discourse forms. Abu Shaaban (2003) described writing as a complicated process including the structure of documented messages on paper or on some other material. We also see writing on a computer screen

Cognitive load theory

Pass et al. (2010) said that cognitive load theory is considered one of the most significant theories in instructional design, a highly effective guide for the design of multimedia and other learning materials. The theory can be applied to a broad range of learning environments because it links the design characteristics of learning materials to principles of human information. Sweller (2016) conceived that cognitive load theory as a framework for designing instruction aligned with human cognitive processes. He claimed that human architecture is composed of working memory and long-term memory. Unlike the working memory which has a limited capacity, the long term memory has unlimited capacity to organize and store new information in the form of schema. Sweller et al. (2011) claimed that cognitive load theory explains that information will be first processed by short-term working memory before it can be stored in long-term memory through the building of schema, which determines the level of an individual's performance in each area. Sweller (2017) revealed that the purpose of cognitive instruction is to facilitate the storage of relevant information in long-term memory. Learning means storing information in long-term memory.

Writing apprehension

Writing apprehension is defined as a " situation and subject specific individual difference associated with a person's tendencies to approach or avoid situations perceived to potentially require writing accompanied by some amount of perceived evaluation" (Daly and Wilson,1983 p.327). Khelalfa (2020) defined anxiety as a feeling of worry, stress, or panic associated with learning a foreign language and is recognized to be separate from general anxiety. Anxiety among students may be rooted in their self-concept. Al-Ahmed (2003) supposed that writing anxiety is a real problem that ESL/EFL students encounter, and measures should be adopted to reduce students' fear, according to every comment made by researchers in the field. He went on to say that writing anxiety is more difficult in the ESL/EFL since it has a more detrimental effect on the students' work.

Context of the Problem

As a teacher of English, the researcher observed that EFL experimental secondary school students showed poor performance in EFL writing performance. The researcher conducted a pilot study with a chosen group of EFL students in order to check the performance of EFL secondary school learners in EFL writing performance and reduce their writing apprehension.

Statement of the problem

Secondary school students showed poor performance in EFL writing. The current study attempts to use a program based on cognitive load theory on developing writing performance and reduce writing apprehension of secondary school students.

The study questions

The current study aimed to answer the following main questions:

1. What are EFL writing performance skills expected from the first-year secondary stage students?
2. What are the features of the tasks and activities based on cognitive load theory for developing the EFL writing performance for the first-year secondary students?
3. How far is the proposed theory effective in developing EFL writing performance skills for the first-year secondary stage students?
4. How far is the cognitive load theory effective in reducing first-year secondary stage students EFL writing apprehension?

Research Hypotheses

The study tested the following hypotheses:

There is a statistically significant difference between the mean post-test scores of the experimental group and the control group on the EFL writing performance test, favouring the experimental group.

There is a statistically significant difference between the pre-test and post-test mean scores of the experimental group on the EFL writing performance test, indicating improvement.

There is a statistically significant difference between the mean post-test scores of the experimental group and the control group on the writing apprehension scale, favouring the experimental group (i.e., lower apprehension).

There is a statistically significant difference between the pre-test and post-test mean scores of the experimental group on the writing apprehension scale, indicating reduction in apprehension.

Study design

The descriptive analytical method was used to identify writing performance level and the quasi-experimental to apply the program based developing writing performance.

Participants of the study

Participants of the study were selected from Alzawahrea secondary school at Alhussinia, Alsharkia. The participants were assigned to an experimental group and a control group. The treatment group was taught according to the suggested program and the control group was taught through the regular method.

Statistical analysis

Data was analyzed using SPSS 21 (Statistical Package for the Social Services) (SPSS). The findings were displayed using tabular formats. Results were displayed using standard statistical measures such as means, medians, standard deviations, and confidence intervals. P value of 0.05 or less was judged statistically significant.

RESULTS & DISCUSSION

The first hypothesis:

It was hypothesized that there is a statistically significant difference between the mean score of the control group and the experimental group in the post-EFL writing performance test results favoring the experimental group. To verify this hypothesis, the researcher used the independent sample t-test to compare the mean score of the control group with the mean score of the experimental group. There was a statistically significant difference at (0.01) level between the attained mean scores of the experimental and that of the control one in favor of the experimental group in the post administration of the writing performance test. The mean scores of the experimental group was (M=58.680) and that of the control group was (M=30.840), this meant that the score of the experimental group's post writing performance was better than that of the control group. The estimated T- value was (18.819). It was significant at (0.01) level in favor of the experimental group (**Table 1**).

Table (1) Independent samples T-test for the study groups of the post writing performance test

Group	No.	Mean	SD	df	T-value
Post Experimental	30	58.680	2.015	48	18.819
Post Control	30	30.840	6.932		

The second hypothesis:

It was hypothesized that there is an effect of the cognitive load theory on improving the writing performance of the experimental group (Table 2). To verify this hypothesis, the researcher used the following formula:

$$\eta^2 = \frac{T2}{T2+df}$$

$$ES= d= \sqrt{\frac{\eta^2}{1-\eta^2}}$$

Table (2) Indicators for evaluating the Effect Size (ES) values according to η^2 and d2

Effect Size				
Tool Large	Low	Medium	Large	Very
η^2	0.01	0.06	0.14	0.20
d2	0.2	0.5	0.8	1.10

The third hypothesis:

It was hypothesized that there is a statistically significant difference between the mean scores of the experimental group and the control group in the post scale results of the writing apprehension in favor of the experimental one. There was a statistically significant difference at (0.01) level between the attained mean scores of the experimental and that of the control one in favor of the experimental group in the post administration of the writing apprehension scale. The mean scores of the experimental group was (M=104.160) while that of the control group was (M=41.080), and the estimated T- value was (59.141) (Table 3).

Table (3) comparing the post administrations of both the experimental group and control group in the scale of writing apprehension

Post-test	N.	Mean	SD	df	T-value	Sig.
Experimental g.	30	104.160	4.279	48	59.141	0.000
Control g.	30	41.080	3.487			

The fourth hypothesis:

It was hypothesized that there is an effect of the cognitive load theory on improving the EFL writing performance of the experimental group. To verify this hypothesis (Table 4), the researcher used the following formula:

$$\eta^2 = \frac{T2}{T2+df}$$

$$ES = d = \sqrt{\frac{\eta^2}{1-\eta^2}}$$

Table (4) Indicators for evaluating the Effect Size (ES) values according to η^2 and d2

Effect Size				
Tool Large	Low	Medium	Large	Very
η^2	0.01	0.06	0.14	0.20
d 2	0.2	0.5	0.8	1.10

Results of the pre- and post-EFL writing performance and writing apprehension tests proved that the program based on cognitive load theory has positive effects on EFL secondary school students' performance in EFL writing and reduce their writing apprehension. This conclusion was reached through the difference between the mean score of the control group that received traditional teaching methods and the experimental group that was taught via the suggested program.

CONCLUSION & RECOMMENDATIONS:

1. Writing should be given greater importance and emphasis as an act of communication. Students should be provided with chances to share and discuss their writings with teacher or other students.
2. EFL Teachers and instructors need to be provided with training to explore the usefulness of cognitive load theory in teaching English as a foreign language.
3. English language teachers should emphasize the development of the students' writing performance and reducing writing apprehension in the early educational stages to improve them in the following ones.
3. Cognitive load theory based on writing activities should be integrated with the learning curriculum, relating them to the objectives of the course.
4. Students should be given the opportunity to choose the topics of writing according to their interests.
5. Integrating writing with content is recommended at every level of instruction because it helps students develop their ability

to communicate effectively in different contexts.

6. EFL teacher should change his role from examiner who assesses students' writing to a guide, facilitator, advisor and an organizer to the learner ideas.
7. Students should have the opportunity to practice writing skills regardless of time and effort needed to master these skills.
8. EFL teachers should give the students chances to make interpretation, analysis, evaluation and inference.
9. EFL teachers are recommended to integrate different techniques and activities into their classes for promoting the students' writing performance and reducing writing apprehension.
10. EFL teachers should not provide students information in a direct way. They should encourage students to use their experience and prior knowledge to ask them questions with various answers to enhance their writing skills.
11. Curricula designers should design more effective language courses depending on cognitive load theory in teaching English language.
12. School and class environment should be provided with motivating factors for enhancing students' enthusiasm, engagement and attitude in the educational process.
13. More time and effort should be exerted to develop writing performance and reducing writing apprehension in the Egyptian EFL classes...

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