Applying Cognitivism to Develop an Interactive Online English Vocabulary Lesson

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Abstract

This study investigated the effect of using a prototype online computer-aided vocabulary learning developed by applying cognitive principles supported by visuals and elicitation. The content was prepared using *Articulate Storyline 360*, a software, to measure the effectiveness of vocabulary learning. Five English undergrad students from Sri. S. Ramasamy Memorial College, Sattur, Tamil Nadu, participated in the study. They were given a pre- and post-test on English vocabulary. On a four-point scale, they expressed their opinion on online vocabulary learning. Students' performance in the post-test was significantly better than in the pre-test. The findings conclude that online English vocabulary is facilitated when cognitive principles are used. Most of the students felt that online learning helps the development of vocabulary when visuals support it.

Keywords: Cognitive learning theory, computer-aided English vocabulary, *articulate storyline 360*

Introduction

Online language education has risen to prominence due to its numerous applications in aiding learners in acquiring and mastering language skills. Mastering basic vocabulary skills is essential to being proficient in language skills. There are numerous online English language courses on virtual platforms. YouTube, LinkedIn, and Massive Open Online Courses on Coursera and edX. These virtual environments offer autonomous learning but lack interaction. The uploaded videos are

usually not interactive. Students find it exhausting to learn vocabulary without any help. This paper applies cognitive learning principles to develop an online vocabulary learning model lesson.

Cognitive Learning Principles

The cognitive learning principles are derived from cognitivism, an umbrella term covering different cognitive learning theories. Cognitivism, according to Clark (2018), focuses on "thinking, remembering, perceiving, interpreting, reasoning, and problem-solving" (p. 176). There are various cognitive theories, such as, the theories of Jean Piaget, Lev Vygotsky, David Elkind, Lawrence Kohlberg, and Carol Gilligan, to mention a few. Although these theories differ, they are united by their emphasis on the involvement of internal mental processes for meaningful learning. They are concerned with how prior knowledge influences new learning, and how strategies like structuring, chunking and repetition are used to store long-term information. Studies have shown that charts, maps, and diagrams helps learners remember concepts more easily (Khan et al., 2020). They are also concerned with how interactions for mediation or scaffolding help in learning, including language learning (Vygotsky, 1978).

The cognitive principles drawn from these research studies helped to design the vocabulary lesson in this study. The study aimed to answer the following research questions.

Research Questions

1. To what extent does computer-aided interaction enhance vocabulary learning?
2. What are students' perceptions about the efficiency of online vocabulary learning with the help of pictures?

Literature Review

The literature review has looked at three types of studies, as below:

a. The effect of pictures on teaching vocabulary
b. The effect of interaction on online word learning
c. The effect of using the interactive authoring tool—*Articulate Storyline* on learning

The Effect of Pictures on Teaching Vocabulary

In what way do pictures or visuals help in vocabulary learning? This question has been the topic of several studies. Carpenter and Olson (2012) reported that when foreign language words were paired with their English translations, supported with pictures, it facilitated word learning. In a study by Tahiri (2020), learners, irrespective of their levels of language proficiency, elementary, pre-intermediate and intermediate, reported that pictures aided learning. Joklová (2009) related pictures to emotions to teach vocabulary to primary school students. The teacher showed the pictures, explained the lesson's content and asked questions about the pictures to engage learners. The students had to identify pictures based on the words learnt to measure vocabulary learning. The findings showed that students could retain a majority of the new pictures and their words effectively. Although there are many positives in using pictures, Travers (1969) cautions that visuals must not be complex or unfamiliar to learners since they might prove to be a disadvantage, especially at lower levels. Similarly, Pham and Nguyen (2018) observe that it is essential for teachers to select pictures suitable for learners.

The Effect of Interaction on Online Word Learning

The role of interaction in learning has been investigated in some studies**.** Arockiasamy (2017) mentioned the beneficial effects of practice activities, gaming, and simulations. Al Fadda (2013) studied two groups of students—those who were presented with PowerPoint with pictures and texts (the experimental group) and those learning vocabulary using the traditional classroom method (the control group). The findings showed that students performed better in the experimental group than in the control group. Students in the experimental group could click on the right answers and get performance feedback on retaining vocabulary. Studies have also explored the effects of autonomous word learning. Mayer and Chandler (2001) found that learners who had control over learning content performed better in tests that focused on retention than the students who did not have autonomy. In a computer-aided study that included interaction, Mula and Kavanagh (2009) report that click-based interaction resulted in better student participation than computer-aided instruction without such interactions. Wentao et al. (2017) conclude that click-based interactions aid learning and retention.

The Effect of Using Articulate Storyline on Learning

Articulate Storyline is an e-learning authoring tool that develops courses with simulations, quizzes, and other content like assessments and integrates multimedia materials.

Three studies have investigated the use of *Articulate Storyline,* an interactive teaching tool. Yolanda et al. (2022) used *Articulate Storyline* to teach speaking. The findings, comparing the pre- and post-test scores, show an increased motivation improved speaking skill among learners. Uzmi et al. (2023) designed an interactive English learning lesson using the *Articulate Storyline.* The findings show that learners are actively engaged in learning and show better learning outcomes. The researchers recommend the involvement of teachers in creating online courses that cater to the needs of different learners. The third study (Hadza et al., 2020) tried to validate the software usage. The findings highlight the positive perceptions of teachers and experts regarding the use of interactive software for learning.

The Study

The Interactive Online Vocabulary Module Used in this Study

First, an interactive Computer-Aided Online learning module for English vocabulary was developed using the principles of cognitivism. These principles are given below.

Principles Used in the Interactive Computer-Aided Online Module

These principles are drawn from cognitivism and the research studies on English vocabulary learning. The principles that underlie the module are as follows:

- The module must incorporate scenarios involving logical thinking, questioning, and solving problems.
- The examples must be related to life experiences.
- Relevant charts and pictures must be included to help the retrieval and retention of vocabulary.
- The lessons must follow repeated patterns or rules.
- The information must be chunked and presented in a meaningful way.

- Activities must be authentic and communication-oriented.
- Each word must be supported with pictures.

These principles were applied to develop a prototype vocabulary learning lesson.

The study used *Articulate Storyline 360* software to teach vocabulary. The participants were required to learn five words describing people, and they could also listen to the authentic pronunciation of the words. They were required to answer three to four interactive questions, and they indicated their answers by clicking on the correct word or picture. They get positive feedback and move to the next screen if their answer is right. If the answer is wrong, they return to the word and get another chance to find the right answer. Once they learn the vocabulary and meaning, the software takes them to the assessment screen where they must answer multiple-choice questions and are expected to get full marks. They take the test again if they do not get the full marks. This process continues till they get all the answers right. Along with the total score, the software also gives the number of attempts participants took to get all the correct answers. Getting all the correct answers was a means of checking whether the participants had acquired words and their meanings.

Methodology

The study used a mixed design with both quantitative and qualitative methods. A convenience sampling was used to select five learners studying an English course as first-year undergraduates in Sri S. Ramasamy Naidu Memorial College, Sattur in Tamil Nadu. They were given a pre-test and a post-test using Google Forms. The pre-test consisted of a quiz on target vocabulary. The post-test used the words in different contexts to include higher-order thinking. After the pre-test, the learners accessed the online interactive vocabulary module. The module presented words with visuals, and learners had to click on the correct answer and move forward**.** Feedback on the learners' answers was provided automatically, as in regular classrooms. Since learners could make multiple attempts to answer, they were encouraged to get all the correct answers. As a part of the post-test, the learners were required to express their opinion on a Likert-like four-point scale with options from strongly agree to strongly disagree.

Findings and Discussions

The data on the pre- and post-tests were analysed to determine the number of correct answers. The difference in performance was compared using a paired t-test. The findings are given in Table 1.

Table 1: *T-test Findings on Pre- and Post-Tests, Along with the Descriptive Statistics*

Tests	*Mean*	*N*	*SD (Standard Deviation)*	*t(df)*	*P*
Pre-test	2.8	5	.447	4.8 (4)	.009
Post-test	4.6	5	.547		

The findings show that the participants differ in their pre-and post-test scores significantly (0.05 level). Learners have scored more in the post-test, indicating that they have benefited from using interactive *Articulate Storyline 360*. Their vocabulary has increased significantly. The findings are in line with the claim that interaction has a positive influence on learning (Vygotsky, 1978). The findings also implicate the role of the click responses in improving participation (Mayer & Chandler, 2001; Mula & Kavanagh, 2009).

Findings on the Participants' Opinions

The second research question was to find out the participants' opinions on online learning English vocabulary. The findings are given in Table 2.

Table 2: *Participants' Opinions on Online English Vocabulary Learning*

Rank	*Statements*	*Frequency*
1	I was able to learn vocabulary online.	3.6
2	The pictures helped me learn vocabulary words.	3.4
3	The questions or elicitation in the activities helped me understand.	3.2
4	Clicking and learning vocabulary helped me.	3.0
5	The feedback, correct or incorrect, helped me learn the vocabulary.	2.6

Table 2 shows that participants strongly agreed that they could learn vocabulary online and that using words supported with pictures helped them learn along with the elicitation and clicking. These findings agreed with earlier studies (Uzmi et al., 2023; Yolanda et al., 2022) that learners

are actively engaged in learning and show better learning outcomes in online learning. This study also supports other studies stating that using cognitive principles of supporting words with pictures enhances vocabulary building and retention (Carpenter & Olson, 2012; Joklová, 2009; Tahiri, 2020). In line with the findings of Mayer and Chandler (2001) and Mula and Kavanagh (2009), the participants have reported that using clicks has helped vocabulary learning. The study showed limited use of feedback as a way of helping participants learn the vocabulary. Al Fadda (2013) also found that participants did not find feedback valuable. It is unclear why we obtained a limited agreement on feedback since there was no way of interacting with the participants. Nevertheless, this is an area where the module can improve.

Conclusion

While the study results are encouraging, they have a few limitations that future research can address. Future studies can increase the sample size and the number of model lessons. Studies could have varying English language proficiency levels or control the language proficiency level. The feedback could be more nuanced in future studies. To conclude, this study highlights the usefulness of cognitive principles in designing engaging online lessons to improve English vocabulary.

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