

## EFFECTS OF CONTEXTUAL CUES ON LEARNING

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### Abstract

The problem of the present study was to investigate whether there is any effect of contextual cues on learning. Literature review indicated a lack of a reliable previous answer to the problem. The purpose of the study was to test whether any connection is created for contextual cues in the brain. It was hypothesized that each contextual cue creates a distinguished connection in the brain. If contextual cues remain identical throughout both practice and revision sessions, learning will enhance. Purposively drawing 36 students from class V, we randomly assigned them under two conditions, namely control and experimental groups. The results showed that the mean scores of control and experimental groups were 9.56 and 14.83 consecutively, which differ significantly at the  $p < .001$  ( $t = -6.752$ ) level. Since experimental group scored significantly higher than the control group, it was concluded that contextual cues play an important role on learning.

### Introduction

Learning is a relatively permanent change in behavior due to experience or practice. Learning can occur in many ways, for example, associative learning, classical conditioning, operant conditioning, observational learning, etc. We emphasized here connectionism introduced by Edward L. Thorndike which is related to our present concern<sup>(1)</sup>.

Thorndike (1898) earlier described learning as an association between sense impressions and impulses to action. Such an association came to be known as a 'bond' or 'connection'. Because it is the bond or connection which becomes strengthened or weakened in the making or breaking of habits, Thorndike's system has sometimes been called a 'bond psychology' or simply 'connectionism'. Thorndike presented three basic laws supporting his theory of learning namely, (a) law of readiness, (b) law of exercise, and (c) law of effect<sup>(2)</sup>.

The law of readiness states that when an action tendency is ready to conduct, conduction by it is satisfying. On the contrary, when an action tendency is not ready to conduct but is being forced for conduction, conduction by it is annoying. The law of exercise refers to the strengthening of connections with practice and to the weakening of

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connections or forgetting when practice is discontinued. It partially depends on the law of effect. Finally, the law of effect refers to the strengthening or weakening of a connection as a result of its consequences. When a modifiable connection is made and is accompanied by or followed by a satisfying state of affairs, the strength of the connection is increased; if the connection is made and followed by an annoying state of affairs, its strength is decreased.

When we read a passage, a connection is created in the brain with every single word in the passage. When we study the passage again and again, the respective connections become strengthened (law of exercise) and we say that we have learnt the material.

In addition, it is probable that there also creates a connection with every contextual cue presented in the passage during practice (Bergman *et al.*<sup>(3)</sup>). By 'contextual cue' we indicate the cues presented in the passage independent of the main concept, such as font sizes, types, page colors, etc. In a word, contextual cues cover all of the cues presented during practice sessions that may help students to recall information later. It should be noted that we were not concerned with the main concept of the passage nor with the exchange of even a single word. We were concerned only with the layout of the passage.

Godden and Baddeley<sup>(4)</sup> conducted a study titled as 'Context-dependent Memory in two Natural Environments: on Land and Underwater'. In a free recall experiment, divers learnt lists of words in two natural environments: on dry land and underwater, and recalled the words in either the environment of original learning, or in the alternative environment. Lists learnt underwater were best recalled underwater, and vice versa. A subsequent experiment showed that the disruption of moving from one environment to the other was unlikely to be responsible for context-dependent memory. Similar findings had been found by Mc Geoch<sup>(5)</sup>. It is clear that they were interested in the outside environment in which divers were operating but changed nothing in the test materials that they recalled. The purpose of the present study was to test whether there creates any connection for contextual cues in the brain. To address the issue, we investigated whether learning outcome enhances if we keep the contextual cues identical in both practice and revision sessions.

We were actually concerned with the following question, "Is there any effect of contextual cues on learning?" Consequently, we hypothesized that each contextual cue creates a distinguished connection in the brain. If contextual cues remain identical throughout practice and revision sessions, learning outcome will enhance<sup>(6)</sup>.

The findings of the present study may help us ensure whether contextual cues play an important role in learning. If we find that every contextual cue creates a distinguished connection in the brain and thus determine learning outcome, we can suggest students to keep their practice and revision materials identical. That means they should revise test materials from the same sheets or books from which they previously studied.

### **Materials and Methods**

To conduct the experiment, we needed two identical groups of participants, 18 in each group. At first, we purposively selected 36 students from class V. Then we randomly divided them into control and experimental groups. Fortunately, we found all of the students who were selected during the practice session. A between-group design was used to conduct this study. That means different groups of participants were tested under different conditions. Participants were randomly assigned to different conditions to avoid biasness.

The following materials were required for the study – (i) an informative Bangla version passage on History, (ii) 20 MCQs based on the passage, (iii) a stopwatch, (iv) A stapler, (v) Paper and pencil, etc.

At first, we took an informative passage from History. Specifically, the passage was about history of the liberation war and agriculture of Bangladesh. We selected the passage from the last part of their book which was almost unknown to them. Then we took a class with about 36 students on that topic. Before starting, each student was provided with a hardcopy of the passage and a pen. They were requested to write their name and an identity number on their own sheet.

Then the class started. At the beginning, students were informed that they would have to appear on an MCQ test following the class. This information made them more attentive and strategic. Then we taught the topic thoroughly. They were encouraged to underline or highlight important lines or points on the passage. They could also draw figure on the provided sheet if necessary. In a word, they could use any strategy needed to obtain a good mark on the following exam. Those underlining and drawing created the essential contextual cues on which we were interested.

At last, students were given the sheets with which they joined the class and asked to prepare them well on that topic on the following night. The next day we went to the school and, unexpectedly, for the purpose of research, took back all of the sheets provided.

After a week, we again reached at the previous school and called upon the students who attended in the previous class. Fortunately, we found all the 36 students taught before. We randomly divided them into two groups, namely control and experimental groups. Students in the experimental group were provided with the same materials given before the practice class. That means we assigned sheets for the experimental group based on the identity numbers given before. On the contrary, control group's students were provided with a new type of sheet with a different layout. The font sizes, types, and colors were changed. There were no underlines or drawings they made before on their own sheets. It should be noted that for control group, only page layout was changed, the concept, sentences, and words were same as the experimental group.

Both groups were given about 30 minutes to revise the material taught before. Control and experimental groups seated separately so that they could not know whether there was any change in the test materials. They were asked to revise silently. After revision, about 10 minutes were spent to allocate each student on exam seat. That time was enough to remove the information from short-term memory. After taking seat, they were provided with the same 20 MCQs. The test lasted for 12 minutes. Finally, the number of correct answers out of 20 questions constituted each student's score on the test. We used an independent group t-test to analyze the data obtained in the experiment.

### Results and Discussion

To investigate the significance of difference between the control and experimental group, an independent group t-test was applied. Table 1 displays descriptive values and subsequently Table 2 indicates their corresponding significance value.

**Table 1. Descriptive statistics of differences on learning between control and experimental group.**

Group	N	M	SD	SE
Control	18	9.56	2.064	.487
Experimental	18	14.83	2.5696	.612

From Table 1 we find that the mean score for the control group is 9.56 out of 20 and the mean score of the experimental group is 14.83 with standard deviations of 2.06 and 2.59 consecutively. Here we notice a difference between the two averages. To ensure whether these averages are statistically significant or not we needed to run a t-test mentioned below.

**Table 2. t-test results, comparing the control and experimental groups on learning outcome.**

Group	N	M	SD	t	p
Control	18	9.56	2.064	-6.752	.001*
Experimental	18	14.83	2.596		

\*p-value is significant at the  $p < .01$  level.

The t-test clarifies that the difference between the two groups is significant at the .001 level indicating that they differed significantly in terms of scores (learning). Since experimental group scored significantly higher than the control group, we concluded that contextual cues played an important role on learning. That means, every contextual cue creates a distinct connection in the brain. Finding that every contextual cue creates a

distinguished connection in the brain and thus determine learning outcome, we can suggest students to keep their practice and revision materials identical. That means they should revise test materials from the same sheets or books from which they previously studied. We wish that students will find learning more interesting using this theory (Islam & Uddin)<sup>(7)</sup>.

Two mentionable criticisms of the present study might be - it requires students read the test material by underlining or drawing (generating more independent contextual cues) which can be considered as student-specific, and it also requires students revise the test materials silently which can have a negative effect on students who are used to revise aloud.

Despite its criticisms, this study can still be informative and useful. For students, the use of effective learning strategy is a matter of concern. Now, we can awaken students about the important effects of contextual cues on remembering old information. Students may find learning interesting and more effective than ever before.

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