

The Mediating Role of Neuro-Associative Conditioning and Gamification Techniques in Increasing Primary School Students' Lexical Development

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Abstract

Nowadays, lexical knowledge is essential for learning vocabulary among primary school students. Primary students need to master a plethora of lexical techniques so as to be able in comprehending words' meaning. This pretest-treatment-posttest true-experimental study aimed to compare the effect of the neuro associative conditioning (NAC) technique in improving primary school students' lexical development, And the aim of this study is to investigate whether gamification techniques are effective in improving primary school students' lexical development and, finally, to examine the cumulative effect of NAC and gamification techniques on enhancing Primary school students' lexical development. To do that, four intact classes including 30 primary school students in a private primary school in Tehran were randomly assigned into one control and three experimental groups. The groups received the same amount of instruction, however differently, three receiving trance induction, guided imagery, and fling the teacher content generator game, respectively, and the other receiving traditional techniques (audio-visual and translation) instruction. The results showed that while receiving NAC technique did not offer a statistically significant advantage over the typical classroom setting, benefitting from integration of NAC and gamification techniques significantly improved the learners' ability in lexical development. Moreover, the result asserted the efficacy of gamification technique in improving lexical development among Primary school students.

Key words: *Gamification Techniques, Lexical development, NAC Technique, Primary School students.*

1. Introduction

As a pedagogical strategy, gamification is essentially new, but it has been used successfully in the business world. Gamification not only uses elements and game design techniques in non-game contexts, but also engages the learner with motivational skills toward a learning approach and sustaining a relax atmosphere (Werbach & Hunter, 2012). The type of input exposure students learning receive is often limited to the classroom environment. This condition does not favor

children learning a large amount of vocabulary neither simply from exposure nor in a short period of time. In primary school contexts, a remarkable amount of explicit vocabulary instruction is needed in order for students to learn vocabulary in relatively short period of time (Campbell & Dickinson, 2004). Neuro associative-conditioning addresses the question: what is it that all therapies have in common when they are successful in creating change for people? With NAC and its six master steps for creating change and the five areas of intervention, a therapist can rapidly create change in any human being so that a person's neuro-associations consistently lead to pleasure and consistently avoid pain (Anthony, 1995). By intrinsic motivation, we mean an internal desire to perform a task that results in qualified learning and creativity, whereas extrinsic motivation occurs when external rewards, not related to the task itself, drive the user to take an action, such as money, good grades, and awards (Ryan & Deci, 2000). Using games can increase students' motivation, since when they are faced with a challenging task, they will become quite engaged. Thus, to increase students' motivation, teachers can integrate game elements into work activities (Shneiderman, 2004). It is also shown that games may help learners to learn better when they are taking part in activities and having fun with their teachers and peers. Furthermore, colorful and interactive online games can attract players because they can stimulate more than one sense at a time. For instance, Hoogeveen (1995) mentioned several benefits in using multimedia to learn a language, including: (a) learners respond to multimedia in a complex way and give the feeling of experiencing information instead of simply acquiring it, (b) man-machine interactions are more friendly than face-to-face ones, and (c) students feel more engaged with multimedia; therefore, learning becomes an enjoyable experience (Deng & Hu, 2007). For applying gamification techniques to the teaching and learning process, five steps need to be followed. These steps will guide the teachers to plan their teaching according to the gamification aspects. This model was presented by the work of Huang and Soman (2013). These steps include: (a) understanding in the target and audience and context, (b) defining learning objects, (c) structuring the experience, (d) identifying resources, and (e) applying gamification elements.

In addition, neuro associative conditioning is a science of success conditioning, where a person may be conditioned to feel and behave in ways to support their goals, create success, and keep them away from the behaviors that create limitations or pain for them. Human destiny is usually based on neuro-associations of pain and pleasure linked in the nervous system to certain situations, people, ideas, emotions, or contexts. By changing these neuro-associations, we can change the way people evaluate, the way they feel, and hence the way they behave (Anthony, 1995). Neuro associative conditioning strategy has six steps for constant change, including: (a) Know What You Want, (b) Know What Is Preventing You From Getting What You Want, (c) Interrupt That Pattern or Break

the Old Behavior, Remove the Obstacles, (d) Choose and Install the New Behavior or Pattern You Want, (e) Condition Yourself for the New Behavior or Pattern, and (f) Do an Ecology Test for the New Behavior to See If You Have Successfully Installed and Conditioned It to Be Your New Automatic Response (Robbins, 1992). Moreover, NAC techniques involve guided imagery; trance induction; personal values and rules realignment; eliciting and changing sub-modalities to change internal negative neuro-associations; phobia cures with double dis-associative technique; transformational vocabulary; visual, auditory, and kinesthetic anchoring; and pattern interrupts.

Taking what is cited above into account, the present research is going to study using NAC and gamification techniques for improving primary school students' lexical development. As stated by Robbins (1992), the use of NAC empowers people to take immediate control of their mental, emotional, physical, and financial destiny. In addition, he claimed that NAC is a behavior change technique that can be used by anyone to change any behavior. Based on Anthony (1995), NAC is especially helpful for the athletes to become consistent in their mental game, as well as improving their actual physical ability to perform at their peak.

Gamification is the application of game elements in non-gaming situations, that is, to convert useful activities into game (Hammer & Lee, 2011; Muntean, 2011). But gamification is to bring a new way and combine it with technology and our human desire to play game in order to provide students with the best education possible (Kleman, 2013). Teachers need to make students aware of the fact that NAC techniques can help them increase their motivation in lexical acquisition so NAC creates the links between thoughts and emotions in our mind and shapes our behavior and performance results. Also gamification techniques are helpful in improving the learner performance because of the competitive atmosphere it creates, so gamification lets the learners' competition and gives the learners motivation. The following research questions were posed:

1. Is Neuro Associative Conditioning (NAC) technique effective in increasing primary students' Lexical development?
2. Are gamification techniques effective in increasing primary school students' lexical development?
3. What is the cumulative effect of Neuro Associative Conditioning (NAC) and gamification techniques on increasing primary students' Lexical development?

2. Review of Related Literature

2.1 Lexical Development

Lexical development is defined as a step-by-step process by which people acquire words, is a basic building block in both acquisition and learning of any language. Efficient vocabulary learning is a

productive, developmental, and continuous process that involves meaningful repeat encounters with a word over a long period of time (Decarrico, 2001, as cited in Adger, 2002).

According to Laufer (1991), lexical development has a dynamic and stretch nature from initial linking and storage of form meaning pair to a gradual change of these words to the active stock and eventually to an integration of words into the general linguistic competence.

2.2 Gamification

According to walker (2014), gamification is the content of applying generic elements of game playing to nongame application to makethem more fun and engaging. Gamification is the usage of narrative structures that pose learners on a progress and give rewards for players to implement desired tasks. The types of rewards differ from points, achievement, to badges. Werbach (2013, p. 2) defines gamification as “using design techniques from games in a business context or some other non-game context”. Terrill (2008) defines the gamification as taking game mechanics and applying them to other web properties to increase engagement.

2.3 Neuro Associative Conditioning

The science of NAC is a system that describes the process of change in human beings and is based upon the premise that there are two determining reasons for human behavior: (a) the need to avoid pain and/or (b) the desire to gain pleasure (Robbins, 1992). NAC is defined as neural pathways (embodied cognitive networks or schemas) with which mental representations are linked and meaning is created (Bowe, 1981,p. 23).

3. Methodology

This study aimed at exploring the effects of using Neuro Associative Conditioning (NAC) and gamification techniques for increasing primary students’ lexical development. This section provided some information about the methodology of the study explaining the participants, materials used, and the procedures in details. Subsequently, all the instruments and materials used in this study were explained one by one in details. Furthermore, the procedures followed to implement the treatment was discussed extensively. Finally, the employed statistical procedure to investigate the research questions were illustrated in brief.

3.1 Research Design

In this study, four intact classes of elementary learners were employed, the researcher, by necessity, chose a true-experimental design involving a pretest-treatment-posttest arrangement to answer the research questions of the study. The quantitative method intended to measure the participants’ lexical development, which served as the dependent variable, after applying different types of instruction (guided imagery and trance induction) and fling the teacher game content generator as the independent variables of the study. The initial performance and initial knowledge of lexicon

were controlled as the existing differences between learners' indifferent groups and served as the varied variable. Among all the four intact classes, one of them was assigned randomly as the control group of the study and the other three were treated as the experimental groups.

3.2 Participants

As many as 30 primary learners from a private primary school in Iran, Tehran, participated in the current true-experimental (the control group, pretest-treatment-posttest) study. Their age ranged from 9 to 12. All the participants speak Persian. The four classes were randomly assigned into one control and three experimental groups as follows. The first class, containing 7 learners, was assigned to the first experimental group. This group was instructed by NAC techniques and was supposed to receive *guided imagery* and *trance induction* techniques in terms of lexical development techniques. Moreover, Primary school learners in NAC group can be classified into three categories: *visual learners*, *auditory learners*, and *kinesthetic learners*. The first category was visual learners who tended to sit up straight and make eye contact, talk fast, and have shallow breathing high in the chest. The second category was auditory learners who often softly repeat what has been said to them and nod their heads as they listened. They were breathing more deeply and in a controlled way from diaphragm. Their tone, intonation, and speed of speech were also controlled. They tended to use a rich vocabulary. And the third category was kinesthetic learners who often were slumped down in their seats or fidget and speak much more slowly. If they were also tactical, they would feel a need to fiddle with their pen or papers whilst listening.

The second class in experimental group, as the gamification contained 7 learners and was supposed to receive instruction on gamification techniques. The third class in experimental group including 9 learners entitled the integrated techniques instruction group and benefitted from an integration of NAC and gamification techniques of lexical development. The fourth class with 7 learners was assigned to the control group and received no explicit teaching of lexical development techniques but a traditional method (visual, verbal, and translation) of instruction. They were reading their textbooks.

3.3 Instrumentation

In this study, some instrument was used.

3.3.1 Teacher Made Test

Teacher made test was used in order to check the participants of the different groups in terms of lexical development and lexical knowledge before and after the instructional sessions. This test consisted of 20 multiple-choice items. The study utilized a similar test to content and form vocabulary test for both pretest and posttest. According to the results of running a paired samples t-test using the two set scores, it was revealed that the difference between scores (the pretest and

posttest) was not statistically significant (at .05 level of significance). The result insured the researcher that neither the pretest nor the posttest was more difficult than the other. The reliability of the test was established using Kuder-Richardson 21(KR-21) approach. The estimated coefficients (0.77 for the proficiency test).

3.3.2 Course Book

The course book utilized in the current study, as the main basis of the instructional materials, was “family and friends series” (book2), written by Simmons (2009). The book provides learners of English with real world fluency development with supporting DVD, interactive online practice, new and updated assessment and testing material, and additional culture focus sections. The book included 15 chapters representing a wide range of genres.

3.3.3 Fling the Teacher Content Generator Software Game

The game used in the current study, as the main basis of instructional materials, was fling the teacher content generator retrieved from (<http://contentgenerator.net>). In this game, students have to answer 15 questions correctly to try fling their teacher away. The game can be used in a wide variety of situations, which is fantastic with an entire class via an interactive whiteboard and projector. The students based around multiple-choice questions together with help lines, take two away, take a vote, and ask a teacher. this game was selected to create the online vocabulary activity because it is similar to the television quiz show *Who Wants to be a Millionaire?* In the show, contestants are required to answer multiple-choice questions. Students have seen this game show before so they are familiar with the rules and can start playing the game right away without spending time exploring the instructions of the game. If students gave the correct answer, they gained the corresponding point value. If their answer was wrong, points would be deducted from the team. The team who obtained the highest mark won. As students were playing the games, they were subconsciously drilling the vocabulary.

3.4 Procedures

Four intact classes of elementary learners (including 30 learners) were randomly assigned into one control group and three experimental groups of the study. To check the participants’ level of English proficiency, the oxford placement test was administered to all learners. Based on the results of oxford placement test, the obtained scores of 30 participants ranged from 8 to 20 (out of 20) which met the determined standard range of proficiency test for elementary learners. Accordingly, the data from the participants, which were out of the specified range, were omitted from the study. The treatment phase included several stages. First, the participants of the four classes entered NAC and gamification course met thrice a week for one and half an hour (90 minutes) each session.

All groups received 12 sessions of treatment over the whole summer semester of the institute. Prior to the course, the teacher-made vocabulary pretest was administered to determine the relative knowledge of the participants on lexical knowledge and words prior to the treatment. All the three experimental groups received explicit instruction on lexical development techniques performing the following five successive steps.

Step one: By explaining the techniques, the researcher provided the learners with a fluent and concise definition of the technique focusing on the two questions: “what is it?” And “why is it helpful for lexical development?”

Step two: The researcher taught a list of vocabulary that was selected from the learners textbook and used a think guided imagery and trance induction techniques to share ideas about the meaning of words with learners. The researcher explained situations about the words so that she enabled learners to have clear idea of the situations.

Step three: In step three, the researcher asked the learners to work with a partner to apply the new technique.

Step four: In step four in order to ensure that learners know the technique and the process for using it, the researcher also invited learners to apply whole group. The researcher also invited learners to apply independent techniques of words on their own. Three weeks the learners in the experimental group were asked to carryout online game “fling the teacher” regularly in class and on their own. In the online game “fling the teacher”, a list of vocabulary from students’ textbooks was selected and used content generator (<http://contentgenerator.net>) to create interactive online vocabulary activity to review the target vocabulary with learners. The game is available online for free. Learners were taken to the computer lab to play this game to review the vocabulary items that they had learned. This game was considered for one player, but learners were also allowed to work in pairs. The researcher provided guidance in class and from time to time observed the learners’ works. The rationale behind such an arrangement was to familiarize the learners with the online “fling the teacher” game.

Step five: Finally, the researcher asked the learners to ideate on how using the technique helps them to comprehend the meaning of words by asking them to share their reflections in small groups or with the whole class. The researcher also discussed how they can utilize the technique when they are learning a word on their own. In the integrated technique, that consists of both NAC and gamification techniques receiving a total 60 minutes of explicit instruction as the lexical development technique employing the above-mentioned five-step process. In every session of the course, after a few minutes of personal practice to understand the words, the researcher randomly asked to give a summary about how they handled the techniques to discover the meaning of the

words in the class. The process of introducing and teaching a new technique was carried out every session until all techniques were taught and used to learn the meaning of the words in order to enhancing lexical knowledge.

During the remaining sessions (five sessions), the researcher asked the learners to use a mixture of all main techniques to understand the meaning of the words. The participants in the control group received technique training (techniques using in NAC and gamification for improving lexical development) but benefitted from a traditional method (visual, verbal, and translation) of vocabulary instruction. In the only control group, the participants were applying the activities and exercises in the course book irrespective of being aware of using various lexical development techniques. Eventually, the teacher-made vocabulary posttest was used to examine all the participants' lexical knowledge at the end of the course.

3.5 Data Analysis

a quasi-experimental design was used in this study. Accordingly, to examine whether receiving different types of techniques of gamification and NAC has significant effects in improving the primary learners' lexical development. One-way analysis of variance (ANOVA) was conducted to explore if there was any significant difference between groups in terms of lexical development. After controlling for the potential differences between them, the result of this test followed by related post hoc tests answered the questions of the study by presenting required evidence to reject or confirm the significance of the differences between the control NAC and gamification technique instruction groups. At last, it is important mentioning that all the above-mentioned data analysis procedures were conducted through statistical package for sciences (SPSS) software program, version 21.

4 Results and Discussion

The data collection procedure was carefully run and the raw data was entered into SPSS (version 21) to compute the required statistical analyses and deal with the research question and hypothesis of the present study.

4.1. Analysis of the First Research Hypothesis

H₀₁: NAC technique is not effective in increasing primary school students' lexical development.

This hypothesis supposed that there is no relation between using NAC technique and improving primary school students' lexical development. To examine this hypothesis one should study and compare the obtained pretest and posttest scores in NAC group, to find out whether there is significant difference between the pretest and posttest scores or not. As conclusion, if there is no significant difference between the pretest and posttest scores in NAC group, the **H₀₁** is confirmed. Otherwise, **H₀₁** is rejected.

Table 1. Comparing the Pretest and Posttest Scores of NAC Group

	N	Mean	Minimum	Maximum	SD	Vaiance
Pretest	7	13.1	8	20	3.6	12.9
Posttest	7	14.0	10	19	3.5	9.3

To compare mean the pretest and posttest scores in NAC group, paired samples t-test was used (Table 1). Results showed no significant difference between the pretest and posttest scores ($p>0.05$). Therefore, running NAC technique had no significant effect on language learning skill of students. Consequently, **H01** is approved.

Table 2. Paired Samples T-Test for the Pretest and Posttest Scores of NAC Group

		Paired Differences					t	df	Sig. (2-tailed)
		Me	Std.	Std.	95%	Confidence			
		an	Deviation	Error	Interval	of the			
				Mean	Difference				
					Lower	Upper			
Paired	Pretest	0.9	2.6	0.7	-0.5	2.4	1.4	14	0.182
r 1	Posttest						03		

4.2. Analysis of the Second Research Hypothesis

H0₂: Gamification techniques are not effective in improving primary school students' lexical development.

This hypothesis supposed that there is no relation between using Gamification technique and improving primary school students' lexical development. To examine this hypothesis, one should study and compare the obtained pretest and posttest scores in Gamification group in order to find out whether there is significant difference between the pretest and posttest scores or not. As conclusion, if there is no significant difference between the pretest and posttest scores in Gamification group, the **H₀₂** is confirmed. Otherwise, **H₀₂** is rejected.

Table 3. Comparing the Pretest and Posttest Scores of Gamification Group

	N	Mean	Minimum	Maximum	SD	Vaiance
Pretest	7	13.8	20	13.8	3.3	10.6
Posttest	7	16.8	12	20	2.3	5.5

To compare mean of the pretest and posttest scores in Gamification group, paired samples t-test was used (Table 4). Results showed significant difference between the pretest and posttest scores ($p<0.05$). Therefore, running gamification technique had significant effect on language learning skill of students. Consequently, **H02** is rejected.

		Paired Differences					t	df	Sig.	(2-
		Mean	Std. Deviation	Std. Mean	Error	95% Confidence Interval of the Difference				
						Lower	Upper			
Pair 1	Pretest Posttest	3.00	2.33	.60		1.71	4.29	4.987	14	<.001

4.3. Analysis of the Third Research Hypothesis

H0₃: Gamification and NAC techniques have no cumulative effect on enhancing primary school students' lexical development.

This hypothesis supposed that using Gamification with NAC technique had no cumulative effect on improving primary school students' lexical development. To examine this hypothesis, one should study and compare the obtained pretest and posttest mean scores in Gamification-NAC group, to find out whether there is significant difference between the pretest and posttest scores or not. As conclusion, if there is no significant difference between the pretest and posttest scores in Gamification-NAC group, the H₀₃ is confirmed. Otherwise, **H₀₃** is rejected.

	N	Mean	Minimum	Maximum	SD	Variance
Pretest	9	12.8	10	20	3.2	10.3
Posttest	9	17.6	14	20	2.1	4.3

To compare mean of the pretest and posttest scores in NAC & Gamification group, paired samples t-test was used (Table 6). Results showed significant difference between the pretest and posttest scores ($p < 0.05$). Therefore, running NAC & gamification technique had significant effect on language learning skill of students. In the other hand, comparing t statistics of gamification group (4.15) with t of NAC & Gamification group (9.798) in significance level of 0.001 and reliability level of %95 showed that using NAC combined with gamification group had significant cumulative effect of language learning skills of the students. Consequently, H₀₃ is rejected.

		Paired Differences					t	df	Sig.	(2-
		Mean	Std. Deviation	Std. Mean	Error	95% Confidence Interval of the Difference				
						Lower	Upper			
Pair 1	Pretest Posttest	4.8	1.9	.5		3.7	5.9	9.798	14	<.001

5. Conclusion

This study was motivated to seek an efficient and practical method of focusing on two instructional methods: NAC and gamification. Following the findings discussed in previous chapter, the concluding remarks are elicited as follows. Receiving explicit instruction on a guided imagery and trance induction of lexical development techniques referred to NAC technique can be effective on enhancing the rate and size of word recognition, and this technique might be a good tool for improving ability to recall meaning, infer meaning, understand better, and communicate easily. Applying the gamification techniques of teaching lexical knowledge can establish the fact that the use of gamification in lexical learning contributes positively to the learning experience based on the findings presented in Chapter Four. Gamification techniques in classroom enhance the lexical knowledge and motivates learners' collaboration and interaction in the classroom.

Applying an integration of NAC and gamification techniques of teaching lexical development explicitly would exploit the advantages of both NAC and gamification instructions while overcoming the disadvantages both techniques (NAC and gamification) suffered from and, consequently, may lead to the most efficacy on enhancing lexical development ability and, in turn, lexical knowledge of primary school students. Gamification and NAC are such recent concepts that have been explored in this research to determine any change in lexical knowledge and lexical development of learners.

The results revealed that using gamification and NAC techniques has led to an enhancement in competition and motivation of primary school students by analyzing their posttest scores which show significant improvement in their lexical knowledge. Gamification and NAC are such recent concepts that have been explored in this research to determine any change in lexical knowledge and lexical development of learners. The results revealed that using gamification and NAC techniques has led to enhancement in competition and motivation of primary school students by comparing the pretest and posttest scores which showed significant improvement in their lexical knowledge.

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