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Effects of Data-Driven Teaching on Learning and Retention of English Prepositions by Intermediate Kurdish EFL Learners

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Abstract
The current study aimed to examine the effectiveness of the data-driven learning (DDL) method in helping intermediate Kurdish students learn six English prepositions, which were in, on, at, to, behind, in front of, between, besides, over, and under. The participants of the study were 100 intermediate EFL Kurdish learners aged 18 to 20 from Lebanese French University in Kurdistan, Iraq. Those participants whose grades were +_1 above or below standard deviation were selected and then they were divided into two groups, one experimental and one control group (50 in each group). The present research adopted quantitative research as quasi-experimental research which was fulfilled in the form of a pre-test and a post-test. The uniformity of the EFL students was ensured using the Oxford Placement Test (OPT). The researcher created the pre-test and post-test in this study to assess the participants' learning and retention before and after the intervention. The experimental group received a data-driven teaching method while the control group received the traditional teaching method regarding teaching prepositions of in, on, at, to, behind, in front of, between, besides, over and under. The results revealed that DLL method had a greater impact on English preposition learning in comparison with rote learning. Thus, this study has some pedagogical implications for English language teachers in Iraq to be aware of cognitive linguistic usage as a frequent practice in the EFL classroom.

Keywords: Cognitive linguistics, Data-Driven learning, English prepositions, Kurdish learners

INTRODUCTION

According to the research, not all methods of L2 teaching have the same outcomes (DeKeyser & Sokalksi, 2001; Ellis, 2005), and language constructions differ in terms of learning ability, implying that some structures are acquired sooner than others (Goldschneider & DeKeyser, 2001). Besides, later (Maniam et al., 2021) Prepositions are one of the problematic English grammar issues for teachers to teach EFL learners (Delija & Koruti 2013). According to (Inezan & Najim, 2010) EFL face difficulties in choosing prepositions and they omit the required prepositions or use unnecessary ones. A variety of reasons were stated to explain that learning prepositions are hard for EFL learners. (Chelli, 2013) believed that the main reason of the misuse of a prepositions is because of Interlingua transfer that happens when speakers try to translate English prepositions in their L1, and intralingua transfer that happens when speakers overgeneralize the rules (cited in Delija & Koruti 2013). Kurdish learners also face problems in learning prepositions (Zahid Javid & Umer, 2014; Abdul, 1990).

Until now, the most typical teaching technique to teach prepositions has been the cognitive approaches in order to teach the numerous

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senses of prepositions. (Evans et al., 2007) "cognitive linguistics findings, which systematize the numerous senses of English prepositions, provide a basis for explaining prepositions and have an influence on the practices of second language learning, as well as the sociophysical involvement"(p. 2) and "applied cognitive linguistics" describes the implementation of academic visions from the cognitive linguistics.

CL" examines the connection between language, mind, and socio-physical involvement" so, it is an effort to provide a systematic and descriptive method to language learning and teaching (Evans et al., 2007. The phrase Applied Cognitive Linguistics describes the application of theoretical ideas from the CL framework. On the other hand, Data-driven learning, or DDL for short, has drawn a lot of interest in the past twenty years in both the general educational setting and in the education of English language. It has shown to be successful in developing students' writing abilities as well as other linguistic abilities (Johns, 1991); (Barabadi & Khajavi, 2017). A corpus, which is crucial to this learning technique, produces a vast amount of language learning resources which (Mishan, 2004) described as being rich in both linguistic and cultural content. These characteristics serve as the true motivators for learners (Yang et al., 2013). Additionally, DDL encourages "discovery learning" and gives students the opportunity to examine things critically (Gilquin & Granger, 2010). It allows students to explore different contexts and deepen their grasp of the patterns of the language (Schmidt, 1990). In doing so, the students are urged to increase their awareness of language learning (Flowerdew, 2012), pay attention to linguistic aspects, and become familiar with its modalities before forming words. The EFL teaching community has generally endorsed this strategy in theory. However, while some studies (Kennedy & Miceli, 2001) indicated that DDL tasks discouraged learners.

In conclusion, the analysis of earlier studies calls for more study into the use of data-driven learning-based education for learning the English prepositions. So, by addressing the following research question, we aimed to empirically evaluate if this strategy may be more successful than the rote learning in a Kurdish EFL teaching setting.

RQ. *Do the data-driven, and traditional instructions have differential effects on intermediate Kurdish EFL learners in learning English prepositions?*

LITERATURE REVIEW

For non-native English speakers, prepositions are viewed as a source of several challenges and difficulties. "Prepositions have developed a reputation for complexity, if not outright unpredictability," writes (Pittman 2000). According to Takahaski, "the correct use of prepositions is the greatest issue for English learners" (as cited in (Alameddine, 2012)). (Tahaineh, 2010) looked at whether or not prepositional errors can be attributed to the mother tongue. He examined a sample of 162 pieces written by English majors at a Jordanian institution. The study found that the majority of errors are caused by interference from L1 languages. More particular, if the equivalent is not utilized in their native tongue (Tahaineh, 2010).

For Kurdish L2 English learners in particular, prepositions in English pose a hurdle (Abdul Rahman & Abid, 2014). Despite the widespread use of EFL programs in the Kurdish world, Kurdish L2 students still have difficulty comprehending English prepositions (Hashim, 1996). It is thought that second language learners frequently associate their L1 with the usage of L2 prepositions.

That is why, the purpose of this research was to test how the data-driven learning method can update teaching and whether it is worth to rely on this method in language learning. Before we talk about practical application, it is significant to consider what this theory has to propose.

Previous studies indicated that data-driven learning can be applied to teaching English prepositions with positive results. Data-driven learning plays a significant corrective role. Learners can get the assistance to correct their interlanguage and thereby progress their writing by comparing their writing with data generated by (native) and skillful writers or by look up a corpus where mistakes have been marked. Findings from data-driven learning have been

known for teaching various aspects of grammar, specifically polysemous ones ((Boers, 2000), (Csábi, 2004)), figurative terminologies ((Boers & Demecheleer, 2001); (Boers et al., 2004); (Boers & Lindstromberg, 2008)). However, there has been little discussion of how DDL can benefit in the learning of prepositions.

The current study focused on learners' errors and challenges while using English prepositions of place and time, as well as some difficulties. Nevertheless, the current research focused on the prepositions in, on, at, to, behind, in front of, between, beside, over and under which have extremely different meanings, and are commonly used in both spatial and non-spatial contexts.

The aim of this study was to create a methodological alternative that is guided by data-driven learning method to solve existing challenges in the pedagogical and teaching of prepositions. The present study can have implications for the teachers who will be able to instruct students more effectively and assist them develop the ability to employ prepositions in context when they are aware of the approach to teach the prepositions. Students should have a variety of cognitive perspectives on prepositional polysemy. Additionally, teachers should focus more on data driven than rote dictionary meaning instruction.

The study's conclusions can also be useful for training language teachers in terms of teacher professional development. It implies that recommendations may be made to in-service instructors at universities as well as other educational levels, such language schools or high schools, to be discussed, for example, in yearly workshops, seminars, or training courses for English teachers. Teachers can debate and understand the purposes of cognitive linguistic-based education with the use of examples of real-world scenarios from the recordings where data driven teaching has been employed. Teachers may learn more about data driven learning and the advantages of meaningful learning over rote learning.

METHODOLOGY

Participants

The participants of this researchwere100 intermediate Kurdish L2 learners aged 18 to 20. The sample was used to choose participants from the Lebanese French university in Kurdistan, Iraq. The researcher gave them a proficiency test, and chose only the participants whose grades were +_1 above or below standard deviation and others were considered as outliers. Due to the regulations of the university we asked the principal to divide the courses into the Data-driven Group and the RL (rote learning) Group using randomization. The participants were made aware of the study's aim prior to the experiment. Each group had 50 students in it.

Instruments

Three measuring tools were utilized by the researcher to gather the study data: an OPT test to guarantee initial group homogeneity, and two written tests used as the pre-test and the post-test. Cronbach's alpha was used to determine the test (Pre-test and Post-test) reliability.

1. The Oxford Placement Test (OPT) was used to measure the participants' competence levels and the degree of performance of a language learner in English. The OPT consists of 60 items to be answered in a restricted amount of time. Hence their scores at that test was averaged and compared to find out any probable significant differences. Learners who have very low or high average scores were excluded from the study. So after OPT those who have +_1above or below standard deviation were selected.
2. Pre-test: After splitting the classes into two groups, the participants took a preposition test that consisted of 30 multiple-choice questions. The validity of the items, which were created by the original Exam View software, was confirmed. The exam lasted 25 minutes. The researcher chose the questions from the TOP NOTCH, third edition of book by Joan (Saslow et al., 2006) at the intermediate level with the use of the Exam View test software because the participants were learners at the intermediate level. Additionally, the participants did not even know the test items. That means they were not given the items before the test.
3. Post-test**:** To ascertain whether teaching prepositions using the data-driven learning method, had any discernible impact on the

participants' overall preposition accomplishment, the exact same preposition achievement test (from the TOP NOTCH third edition) was used as the post-test, but in order to reduce the degree of familiarity, the order of the items was changed or the content of the items was changed, but the prepositions were the same. This exam had a time limit of 25 minutes for 30 items. The test comprised 30 multiple-choice and completion tasks, close to the pre-test. The prepositions were chosen at the pre-test stage and were taught to the treatment group during the treatment have served as the basis for that exam.

4. The prepositions in, on, at, to, behind, in front of, between, beside, over and under were used in all of the domains.

Table 1

	Spatial domain	**Temporal domain**	**Abstract domain**
IN	*In the house*	*In 1995*	*In love*
ON	*On the street*	*On Thursday*	*24hour on call*
AT	*At the door*(A0D2658)	*at10.30 p.m.*(KIB1007)	*At war* (A7C1322)
TO	*Next to the table*	*5 to ten*	*It is to the point*
EHIND	*Behind the door*		*The entire country is behind the times*
IN FRONT OF	*In front on the desk*		*In front of God*
BETWEEN	*Between the two rivers*	*between 9 and 10 o'clock*	*This is between me and you.*
BESIDE	*She sat beside her*		*Besides her role as a mother of three, Mary runs a charity organization.*
UNDER	*Under the desk*	*Under 18 (age)*	*He is under arrest*
OVER	*Over the city (plane)*	*Over fifty (age)*	*Overmind (science fiction)*

Procedure

The OPT test was taken at first. Before the treatment, participants also received a pre-test from the researcher that consisted of 30 questions drawn from their own books (TOP NOTCH, third edition). Pre-test was done to gauge the participants' proficiency of prepositions (in, on, at, to, behind, in front of, between, beside, under, and over). After that, they received the treatment, lasting 50 minutes for each session once a week that did not interfere with their normal education. The study lasted for fifteen sessions.

According to teaching hypotheses based on data-driven learning, the participants of the experimental group, the data-driven group with the exclusion of those of the control group, were requested to involve in learning materials that explained the application of the propositions using the CL approach which is the data-driven learning method so as to address the tackle the research question. This was done while utilizing prepositions and being aware of their environment and its components during the treatment period.

As for the experimental group which was the data-driven one, the purpose here was to adapt the corpus-based approach when teaching grammatical points to EFL Kurdish learners. The conventional method relied on grammar and dictionaries that was prescriptive in character and did not provide much opportunity for students to be exposed to a diversity of scenarios. (Cowan, 2008) so the researcher chose the challenging prepositions that were in the placement test since it was likely that the participants had never studied these prepositions deeply. Additionally, some of these prepositions have equivalent meanings in Kurdish, which may confuse Kurdish EFL students. Therefore, exposing students to these prepositions in various contexts might help them understand their many uses.

The participants should were made familiar with the words and sentence structures in the lines that were chosen because if there were too many unfamiliar words or complex grammatical structures (Braun, 2007).

Due to the students' English competence and cultural background, the DDL activities in the class were "teacher-led" tasks that were planned by the researcher before (Gilquin & Granger, 2010). Additionally, since this

method was unfamiliar to them, they require a teacher to lead them through the activities and prevent overgeneralization on the side of the participants. (Sripicharn, 2010)); as a result, the researcher was present in the class to explain the assignment and to answer any concerns that were raised.

The participants used the given spreadsheet to present their findings after working in small groups, analyzing the data, and examining the samples. The learners were then asked to present their results to the classmates and finish the writing assignment using their generalized guide lines. The study lasted for fifteen sessions.

The post-test consisted of 15 items of gap filling. The post-test was given immediately after the six weeks of instruction. This was done to find out how they felt about studying using the DDL approach.

For the control group, however, we merely provided some writing practice or workbook exercises. The technique for the current study's control group was based on conventional techniques such as rote learning. The meanings of the prepositions (in, on, at, to, behind, in front of, between, beside, under, and over) and examples for each target preposition were provided to participants in lists (OALD-Wehmeier, 2005). The design based on the traditional method consisted of fifteen sessions relating to the three domains in order to arrange for comparable teaching setups (spatial, temporal, and abstract domain). However, the participants were not aware of this classification. The teacher went through each target preposition's definition from (OALD-Wehmeier, 2005) along with examples that correspond to it in the first session on the spatial usages of in, on, at, to, behind, in front of, between, beside, over, and under. The participants were next asked to attempt to construct sentences on their own after a detailed explanation and associated expressions.

The participants participated in a post-test a week after the last session. The questions on this test were the same as those on the pre-test, and the format was the same as well.

RESULTS

Results of Oxford Placement Test

So as to be sure about the homogeneity of the participants, the researcher conducted the reading and writing subsections of Oxford Placement Test (OPT) as a proficiency test to 109 participants of the study. Table 2 shows the descriptive statistics of the participants' proficiency test scores.

Table 2

Descriptive Statistics of Iraqi Intermediate Participants' Proficiency Test Scores

Group Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Oxford Placement Test Scores	Control Group	55.00	32.71	8.77	1.18
	Experimental Group	54.00	32.04	6.17	.84

Table 2 displays, the mean score of control group was 32.71with the standard deviationof 8.77 (M= 32.71, SD= 8.77) and the mean score of experimental group was 32.04 with thestandard deviation of 6.17 (M= 32.04, SD= 6.17). The researcher used an independent samples t-test to determine if the proficiency scores of the individuals were homogeneous. Table 3 displays the findings of the independent samples t-test.

Table 3
Independent Samples T-test for Iraqi Intermediate Participants' Proficiency OPT Test Scores

Independent Samples Test										
	Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Oxford Placement Test Scores	Equal variances assumed	3.42	.07	.46	107.00	.65	.67	1.46	-2.21	3.56
	Equal variances not assumed			.46	97.00	.64	.67	1.45	-2.21	3.55

Levene's test for equality of variances, which was applied to Table 3, yielded a significant result of.07, indicating that equal variances were presumed and that the data from the first row should be taken into account. It was discovered that there was no significant difference in the participant's proficiency test results since the P value was larger than the alpha level, which is.05; t (107) = -.65, p=.66; this means that participants from Iraqi intermediate level were proficient to the same degree.

Results of the Pre-test Preposition Learning

First to compare the mean scores of participants' pre-test preposition learning scores in control and experimental groups, the researcher used the descriptive statistics. Table 4 displays the results.

Table 4
***Descriptive Statistics of Iraqi Intermediate Participants' Pre-test Preposition learning Scores* Group Statistics**

	Group	N	Mean	Std. Deviation	Std. Error Mean
Pre-test of Preposition Learning	Control Group	55	27.40	8.26	1.11
	Experimental Group	54	26.96	6.78	.92

As it is shown in Table 4, the mean and standard deviation of the participants' pre-test preposition scores in control group were M=27.40, and SD=8.26, and those of students in experimental group were M=26.96, and SD=6.78. It means that the intermediate participants' pre-test preposition learning scores were somehow similar. Before directing an independent samples t-test, it was necessary to know the normality distribution of the participants' pre-test preposition learning scores in control and experimental groups. That is why, the researcher conducted the One-sample kolmogorov-smirnov. Table 5 shows the result of it.

Table 5
One-Sample Kolmogorov-Smirnov Test for Iraqi intermediate Participants' Pre-testPreposition Scores in Control and Experimental Groups

One-Sample Kolmogorov-Smirnov Test			
		CGP	**EGP**
N		55	54
Normal Parameters[a,b]	Mean	27.40	26.96
	Std. Deviation	8.26	6.78
Most Extreme Differences	Absolute	.16	.10
	Positive	.16	.08
	Negative	-.09	-.10
Kolmogorov-Smirnov Z		1.18	.77
Asymp. Sig. (2-tailed)		.12	.60
Exact Sig. (2-tailed)		.11	.56
Point Probability		.00	.00

a. Test distribution is Normal b. Calculated from data

The results that are shown in Table 5, the p-value for the pre-test scores in control group was .11 (p=.11>.05), and those of the participants in experimental group was .56 (p= .56 >.05), indicating that Iraqi intermediate participants' pre-test preposition learning scores had a normal distribution. Denoting, the normality assumption was met. Then, Independent samples t-test was run to see the significant difference between the participants' pre-test preposition scores in control and experimental groups. Table 6 identifies the results of the independent samples t-test of the pre-test.

Table 6

Independent Samples T-test for Iraqi Intermediate Participants' Pre-test Preposition Scores

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pre-test of Preposition Learning	Equal variances assumed	2.58	.11	.30	107.00	.76	.44	1.45	-2.44	3.31
	Equal variances not assumed			.30	103.78	.76	.44	1.45	-2.43	3.31

Table 6 reveals that the p-value in Levenes' Test for pre-test preposition learning scores was .11>.05. So, the equal variances were assumed and the data of the first row should be read. So, there was no significant difference between participants' pre-test preposition scores in control and experimental groups, t (107) =.30, p= .76 > .05. In other words, the intermediate participants had the same preposition knowledge.

The first null hypothesis stated that data driven instruction has no significant effect on Iraqi intermediate EFL learners' preposition learning. After the treatment, the preposition learning test was given as a post-test to Iraqi intermediate participants of the two groups. After that, the researcher did the descriptive statistics of the post-test preposition scores. Table 7 exhibits the descriptive statistics for the post-test scores.

Table 7

Descriptive Statistics of Iraqi Intermediate Participants' Post-test Preposition Learning Scores **Group Statistics**

	Group	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Post-test of Preposition Learning	Control Group	55	33.24	8.124	1.095
	Experimental Group	54	37.00	6.735	.916

As it is explained in Table 7, the mean score and standard deviation of the participants' post-test preposition scores in the control group were 33.24 and 8.124 (M=33.24,SD=8.124), and the mean score and standard deviation of the participants in the experimental group were 37.00 and6.735 (M= 37.00, SD= 6.735). That is why, the intermediate participants in the experimental group outpaced the participants in the control group.

As well, to know the normality distribution assumption of Iraqi intermediate participants' post-test preposition scores between control and experimental groups, One Sample Kolmogorov-Smirnov test was used. The result of this test is shown in Table 8.

Table 8

One-Sample Kolmogorov-Smirnov Test for Iraqi Intermediate Participants' Post-test Preposition Scores in the Control and Experimental Groups

One-Sample Kolmogorov-Smirnov Test			
		CGPOST	EGPOST
N		55	54
Normal Parameters[a,b]	Mean	33.24	37.00
	Std. Deviation	8.12	6.73
Most Extreme Differences	Absolute	.14	.09
	Positive	.14	.07
	Negative	-.12	-.09
Kolmogorov-Smirnov Z		1.06	.67
Asymp. Sig. (2-tailed)		.22	.76
Exact Sig. (2-tailed)		.20	.72
Point Probability		.00	.00

a. Test distribution is Normal b. Calculated from data

In Table 8, the significant value of the participants' post-test preposition scores in control group was .22 (p= .22> .05) and the participants of experimental group was .76 (p= .76> .05). It means the intermediate participants' post-test preposition scores had a normal distribution. On the other hand, to check the significant difference between Iraqi intermediate participants' post-test preposition scores, the researcher employed the parametric test of independent samples t-test. Table 9 demonstrates the results of this test.

Table 9

Independent Samples T-test for Iraqi Intermediate Participants' Post-test Preposition Scores

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Post-test of Preposition Learning	Equal variances assumed	1.89	.17	-2.63	107.00	.01	-3.76	1.43	-6.60	-.93
	Equal variances not assumed			-2.64	104.09	.01	-3.76	1.43	-6.60	-.93

As Table 9 demonstrates, the p-value in Levene's test for equality of variances produced p value of .17. So, the equal variances were assumed and the results of the first row should be considered. Since t(107)= -2.63, p= .01<.05, it was exposed that there was a significant difference between the intermediate participants' post-test preposition scores in the control and experimental groups. So, the first null hypothesis was rejected and the answer to the research question was positive.

DISCUSSION

The goal of the current study was to look at the effect of teaching data driven based instruction on preposition learning at the intermediate level by Iraqi learners. The statistical data gathered provided new insight into the possibility that data driven based preposition teaching has a more positive effect on English preposition learning than traditional methods. Not many studies focusing on preposition learning are available, particularly in Iraqi EFLA learners

for whom preposition learning is difficult. (Alshammari, 2019) argued that regular classroom teaching is not effective in attracting learners' attention to preposition while dealing with spoken skills because importance is not given to these grammatical features or they are overlooked. This is so even in writing classes where the main focus is on the content writing rather than forms. This in turn results in failure in developing EFL learners' speaking and writing skills.

One of the reasons of the effectiveness of DDL approach is the context. Since context is very important in preposition use, it contributes to the understanding of prepositions. DDL method helps learners to make a connection between the form and their meanings in context (Lin, 2021). Besides this approach creates an opportunity for learners to come across with different prepositions in different contexts. Similarly, (Boulton, 2008)believed that DDL method results in preposition learning because concrete examples help the learners to connect to their suitable usage. This, in turn, increases the possibility that learners to understand prepositions very well.

In summary, the results of the present study are in line with those of other studies in terms of the effectiveness of data driven learning in developing language skills including grammatical skill (Lin, 2021), writing development (Luo, 2016), (Luo & Zhou, 2017) , and vocabulary learning (Boulton, 2008); (Chambers, 2010); (Guan, 2013); (Barabadi & Khajavi, 2017).

Additionally, the findings of the study by (Al Mubarak, 2017) from Al Imam Al Mahdi University of Sudan in 2017 were consistent with this discovery. He discovered that the English preposition is a formidable opponent when speaking English as a second language. Despite how tiresome it may seem, English preposition must be learned because poor performance in this area will lead to low level of English language ability and misunderstandings of the language.

The findings of the present study are consistent with those of a number of other studies, including that of (Song, 2013), who demonstrated the need to employ a particular and effective teaching and learning strategy depending on the participants' varied skill levels and cognitive capacities. Higher proficiency participants can benefit more from meaningful learning motivated by DLL, while lower proficiency participants can benefit more from standard rote learning.

Kilimci, (2017) at UKUROVA University's Faculty of Education's ELT Department in Turkey looked at the effects of integrating the Cognitive Linguistics education into Data-Driven Learning on the students' acquisition of the over/under and above/below sets of English spatial prepositions. The study's quasi-experimental design included pre-tests, two teaching strategies, post and delayed post-tests, a control group, and an experimental group. During the two-week teaching on vertical prepositions, a total of 52 students participated. The treatment group (N=26) received concordance exercises and cognitive explanations based on the Principled Polysemy model during DDL-based CL-inspired training. The control group (N=26) received conventional training and relied solely on dictionaries (either print or electronic) for knowledge. Results from the pre-, post-, and delayed post-tests were later compared between the groups. Statistics revealed that students' grasp of vertical prepositions was significantly strengthened by both traditional training and DDL-based and CL-inspired education, with the latter producing greater learning and more information acquisition. The findings suggest that by combining the two instructional pedagogies, together with a meaningful presentation of the prepositional senses and a rich context for their uses, teaching spatial prepositions may be somewhat successfully completed.

CONCLUSION

In conclusion, teaching English prepositions to students at a moderate proficiency level, incorporating CL approach of teaching methodology and learning had significant effects compared to traditional rote learning, which was reflected in the achievements and improvements. The findings of this study, which took into account both the meaningful learning theories and the data driven model, support the conclusions of a significant amount of earlier research in this area. Participants with a greater proficiency

level can engage in formal operational reasoning, which enables the learners' successes and gains during the meaningful learning processes so it makes the benefits of the data driven learning clearer. But, the subjects with poorer cognitive capacity may acquire the definition of each preposition by cramming, even though rote learning is dependent on straightforward repetition.

The communication effects showed that the different teaching approaches had varying impacts when comparing the successes and improvements between the participants. Learners can therefore gain more from meaningful learning that is motivated by data driven learning. However, the medium track individuals still require more guidance and training to enhance their cognitive abilities in hypothetical-deductive reasoning. In the natural world, individuals' past knowledge has a significant influence on their accomplishments and advancements at various skill levels. For example, the spatial prepositional usages were taken into consideration as prior knowledge, and the number of relevant items in the examinations may have an impact on how well students learn the prepositional usages in all three domains.

The study also implies that it would be beneficial for language policy makers in Iraq to take data driven into account and work to systematize the schools from the start in order to improve students' cognition. It is vital to emphasize that in order to establish such a policy, teachers must be consulted, since they play a crucial role in both the language use in the class and the application of data driven learning. In order to improve prepositional learning and the teaching of intermediate courses, book or curriculum designers may be able to create or launch books based on the model.

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