The Impact of Literacy and Numeracy Drive (LND) on English Language Learning in Rural and Urban Public Schools of Gujranwala, Punjab

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Abstract The study examines the impact of Literacy and Numeracy Drive (LND) on the English language learning outcomes and environment at primary sections of rural and urban public schools of district Gujranwala, Punjab, Pakistan. The data were gathered from two public schools: one from a rural area and another from an urban center. The partakers, N=60, served in the controlled and experiment groups. The control group was imparted the prescribed syllabus with the traditional method. In contrast, the experimental group was trained through LND's systematic learning objectives (SLOs), Tablet PCs, specific booklets, and tests. Three pre-tests were conducted before the treatment, and three post-tests were administered after two months of instruction. The study used quasi-experimental methods, and the gathered data were analyzed using SPSS 25. The results show a significant improvement in the outcomes of the experimental group, while no significant change was observed in the case of the control group. The results demonstrate that systematic SLO-based language teaching, technological assistance, and hand training help improve the English language pedagogy. The study suggests that such interventions can enhance the overall English language teaching environment. As a result, the reach of LND should be extended to other sections of public schools.

Introduction

This investigation examines the impact of Literacy and Numeracy Drive (LND) on the primary section of the public schools in Punjab, Pakistan. LND is an initiative of the Punjab Government to revolutionize English, Urdu, and Mathematics instruction at the primary level of Punjab's public schools. The traditional methods of teaching these subjects are no more serving the purpose. The most vital part of this drive is introducing tablets and laptops in the teaching process. The induction of tablets, iPods, and laptops in classrooms is an increasing phenomenon worldwide (Al Dhaheri & Ezziane, 2015; Hubber et al., 2016; Kucirkova, 2014; Percival & Claydon, 2015; Pruet et al., 2016). The increase in electronic devices for educational purposes is enormous in this decade and takes over the traditional pen and paper approach (Ellaway & Masters, 2008; Wollscheid et al., 2016). Only in the USA, during 2010, some 4.5 million iPads were purchased by educational institutions (Kocak, 2015).

In Pakistan, the use of these devices are new (Khuhro et al., 2016; Merchant & Ahmed, 2021), and the Punjab government, for the first time, introduced the use of electronic devices in the primary sector, which they named Literacy and Numeracy Device (LND). This study focuses on judging the impact of introducing these devices and processes on English language teaching (ELT) out of the aforementioned disciplines: English, Urdu, and Mathematics. The study is an effort to analyze how much this technological intervention to the traditional ELT atmosphere of

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public schools of Punjab, particularly at the primary level, has affected it and changed it for better or worse.

English is the most dominant language in Pakistan (Ali & Pathan, 2017; Ashraf & Tsegay, 2015; Shamim, 2008, 2017) and enjoys the most prestigious language. It is the official language of courts and the government sector (Channa, 2017; Rahman, 2018, 2020). Despite being the most influential language in the subcontinent, ELT's notion in Pakistan is relatively novel for primary level students in public schools. However, during the last two decades, English has attained the status of a compulsory subject at all primary schools across Pakistan (Coleman, 2010; Rahman, 2001; Shamim, 2008). It was taught traditionally as an information-based subject instead of a language. The teachers narrated a lesson and asked the students to learn it by heart or remember a few grammar structures or vocabulary items by heart; this method was commonly known as the Grammar Translation Method (GTM). This method traditionally caused public schools' students' failure in English language tests, generally at matriculation, intermediate, and graduation level. To meet this challenge and make the students of public schools learn the language instead of a subject, the government of Punjab recently introduced this technology. This study is an attempt to check its impact on the prevailing scenario of ELT at primary sections of government schools.

Moreover, the induction of technology is in the form of tablets and is provided to every individual school across Punjab by the government. Bannister & Wilden mentioned that "Using personal devices for learning will become a mainstream expectation over the next three to five years" (2013, p. 6). These tablets are different from portable machines like laptops which can be moved to varied places, don't have the ease of lesser size. The fame of moveable handheld devices has increased dramatically in recent years (Sampson et al., 2013; Song & Kong, 2015; Traxler, 2009). Mobile phone penetration stands at over 100% in most developed countries, reflecting ownership of dual devices. In Australia, mobile phone penetration stood at over 130% in mid-2012, while smartphone penetration was 52%. In contrast, tablet penetration by households in Australia stood at 18% in early 2012, with predictions it would reach 39% by the end of the year (Pegrum & Oakley, 2013). In September 2015, a report published in a magazine claimed that the Pakistan tablet market to grow due to m-education initiatives (Hanif et al., 2018)

The emergence of Pakistan's tablet market has caused an impact on almost every field of life, including education. It is essential to note the effect of the introduction of these devices is needed to be gauged so that the policymakers can make future decisions to enhance the effectiveness of these devices. Therefore, this study investigates the effectiveness of these devices on the primary level students studying in public sector schools. For this purpose, public sector schools from rural and urban areas of the Gujranwala district were selected. Students were divided into two groups: control and experimental. A comparative analysis of the proficiency tests' (a validated proficiency test administered by the researcher) results from the rural and urban students of Punjab's public schools. The difference in the impact of LND on both groups was recorded. This comparison was used to determine if there is any significant difference in the results between them; hence the impact of technology on two different population groups of the province was likewise judged through the study, which has almost the same facilities, as far as schooling is concerned. This study's proficiency test is a comprehensive test, which comprises different components, as arranged and prescribed by LND management. It is designed to measure the overall improvement and proficiency in the English language of rural and urban students.

Statement of the Problem

The study analyses the impact of introducing Literacy and Numeracy Drive, which is mainly a technology-based intervention into Government primary schools' teaching process. LND likewise operates through tablets. SLOs are centrally prepared, and monthly online assessments are administered by Monitoring and Evaluation Assistants focusing on English language learning, in particular, students of grade – 3, at primary sections of mentioned public schools.

Hypotheses

H_0: There is no significant impact of LND on English language teaching in both control and experimental groups.

H_a: There is a significant impact of LND on English language teaching in both control and experimental groups.

Significance of the Study

English, undoubtedly, has earned a great status in all circles of almost all the societies worldwide, leaving alone the syllabi. It is also evident that English has attained this extended importance, thanks to globalization. Since the state's inception, English has been given a very high place in educational schemes and planning; however, English language teaching to primary students is recently focused on and given special consideration. Though this focus has many dimensions, this study, in particular, tends to investigate the impact of induction of modern technological tools like tablets; which are a package-showcase to so many new things done, added and enhanced in the field of English language teaching in Punjab through Literacy and Numeracy Drive, like centrally prepared SLOs, ever-increasing question banks, monthly tests by Monitoring and Evaluation Assistants (MEA) and daily on hand practice by the students with the help of the teachers. Not much significant work has been done in this regard till now, so this study may prove significant and fruitful for many:

- Educators/ school teachers
- Teacher mentoring and grooming Institutions
- Syllabi developers
- Ministers/ bureaucrats / policy givers
- Overseers/heads of the institutions
- Learners
- Future researchers

Procedure

Since 2012, English has been taught as an essential subject at the Government primary schools of Punjab; however, it is very recent that LND has been introduced into these institutions. Students of class three usually get one class (period) of forty-five minutes for English language learning daily. However, during this study, the difference between control and experimental groups is the inclusion of tablets, standardized SLOs, and hand-on practice for each student. The experimental group taught the same course through tools and paraphernalia mentioned earlier, while the control group used the traditional learning pattern.

METHODS

The data collected for the study and the procedures employed for its analysis are introduced. The research has been done to examine the research questions. These questions have been pinned to observe, test, and analyse the impact of technology induction in the form of tablets on the English language teaching to students of public schools in Gujranwala, Punjab. The students of grade three from different backgrounds are tested in this regard, and the study inspects their differences and similarities regarding ELT. To explore the research problem, suitable procedures and methodology were picked to analyze different data types.

Data Collection

The study is quasi-experimental, as the data collected for the study lacks the key feature of classical experimental study: randomness. The data were collected by administering the pre-tests and post-tests. Three LND tests were conducted as pre-tests of both groups, control and experimental in both schools. The experimental groups had three hours of the weekly LND based study of the English language and practice on tablets and laptops, planned daily for half an hour for eight weeks. The control groups took the regular English classes on the traditional pattern in the teaching space, without using tablets and following LND SLOs. It was taken care that the teaching material remains almost identical and followed similar SLO's after these eight weeks; the LND tests were given again to experimental and control groups as post-tests. For the pre-test, three tests of English language proficiency were administered. Likewise, for post-test, the same groups appeared in three tests. These tests had certain SLOs, connected with the questions. The test had seven MCQs for each student carrying the items given below. The test had 30 marks overall. The marks division is mentioned below:

Table 1. Marks division.

S. No	Items	Marks
1.	Alphabet series completion	5
2.	Correction of spellings	5
3.	Recognition of pictures	5

S. No	Items	Marks
4.	Completion of sentence (has, have/ is, are, am)	5
5.	Comprehension	10

The tests strictly follow the pattern, which is provided by the official application for LND.

This standard LND test for the pre-test and post-test is a different reading and comprehension examination administered on tablets. There was a gap of two days between the three pre-tests, and the same distance approach was opted between the post-tests.

Population

This study's population is the grade-3 students of District Gujranwala's public schools as they experience learning through LND.

Sampling Technique

The purposive sampling technique was used, as the selection of the control group members and the experimental group in this study depended upon the researchers' selection. Purposive sampling is non-random. The sample gathered through this technique is based on the 'previous knowledge of that sample, hence making that representative. The other reason for picking that sample is that they have the required information.

Sample

As the study population was grade-three of the public schools of Gujranwala, the sample had to be picked from these schools. The two schools were picked from two different backgrounds; rural and urban; these were public schools from Hazrat Kailianwala and Ali Pur Chatha, a village and a town. The researchers chose these schools due to the convenience of the approachability and location. These two public schools were from Tehsil Wazir Abad, District Gujranwala. The school with a rural background, according to the classification made by the Government of Punjab, is Govt. High School Hazrat Kailianwala.

This school is set in Hazrat Kailianwala, Tehsil Wazir Abad, District Gujranwala, Punjab. According to the latest census, Hazrat Kailianwala, situated on some 964 acres area, is 48km away from Wazir Abad and 43 km away from Gujranwala, with an approximate population of 11,647, conducted by the Government of Pakistan. The village is home to a community connected to agriculture and fish farming-related businesses and labour.

About forty-seven percent of the population is literate; 827 males and 515 females couldn't cross the barrier of matriculation examination, while 337 males and 154 females are matriculated. One-third of the population resides in semi-Kacha (mud and concrete) housing. This high school is the only public school for boys, located within 3Kms. Students' total strength in this school is more than 700, with twenty males and females serving as faculty members. First control and experimental groups of thirty each of class three from this school made the study participants sixty (60) students. These students were picked non-randomly, as the first sixty out of sixty-three students were equally distributed into two groups based on their annual academic results of the previous class.

So, these were a total of two groups, picked from students of class three, comprising sixty students, thirty from each school. One control group, which studied according to the traditional method, opted for ELT at most public and private schools in Pakistan. In comparison, there was one experimental group, each one of thirty students from both schools. One hundred and twenty students took part in the entire study, sixty students each, from both schools. These children were between nine to ten years in third class.

Table 2.

Urban School (Govt. Primary School No.1)	
Group 1	Group2
Control	Experimental
30 students	30 students
Rural School (Govt. High School Hazrat Kailianwala	
Group 1	Group2

Urban School (Govt. Primary School No.1)	
Control	Experimental
30 students	30 students

Data Analysis

This study is set to investigate the effect of technology-centered intervention made by the program, "Literacy and Numeracy Drive," on grade-three students' English language teaching and learning. Therefore, data collected from the assessment were compared and analyzed through IBM SPSS 25. Paired t-test was used for this, as the t-test had been used to measure the difference between the means of control and treatment groups in social sciences' research studies. There was a gap of two months maintained between pre-tests and post-tests.

The data was also processed to see the difference of results between rural and urban data set to check if the pre-test and post-test data results showed any difference in the two groups of each set; rural and urban one or not. For the data analysis, SPSS 25 was explicitly used. The Shapiro-Wilk test was applied to assess the normality of the pre-test data. The mean and standard deviations were used to analyze numerical variables. Simultaneously, box and whisker plots and histograms with standard curves were used to display numerical data. For comparing scores after LND tests, conducted as

Per LND standards, paired t-test was applied to assess the average change in students' English language proficiency after learning through LND. $P < 0.05$ was employed for significant results at a 95% confidence level with two-tail.

Normality Test

Checking the normality of a data set is considered a must in all statistical and numerical investigations, as it justifies the credibility and authenticity of the data selection/generation process. Though there is a different viewpoint, normality checks can be ignored if a data set is p >30,40. As the small values of W are evidence of departure from normality, it is better to be checked. For the applied test to perform effectively and efficiently, the data variation must be unchanged throughout the data set. They name it as homogeneousness of the variance. SPSS uses more than one test for checking normality; however, Shapiro-Wilk was used in this study. The following are the results of this test. The data is tested with the H_0 assumption that data is usually distributed, while H_a stands, the data is not normally distributed.

H_0: Data is normally distributed.
H_a: Data is not normally distributed.

Table 3. Test of Normality

Description of Rural vs. Urban Data set				Statistic	Std. Error
Place of Residence					
Pretest Obtained marks	Rural	Mean		45.0000	1.78664
		95% Confidence Interval for Mean	Lower Bound	41.4249	
			Upper Bound	48.5751	
		5% Trimmed Mean		45.4630	
		Median		45.0000	
		Variance		191.525	
		Std. Deviation		13.83927	
		Minimum		10.00	
		Maximum		70.00	
		Range		60.00	
		Interquartile Range		20.00	
		Skewness		-.357	.309
		Kurtosis		.247	.608
	Urban	Mean		54.0833	1.36797
		95% Confidence Interval for Mean	Lower Bound	51.3460	
			Upper Bound	56.8206	
		5% Trimmed Mean		53.9815	
		Median		55.0000	
		Variance		112.281	

Description of Rural vs. Urban Data set		
Place of Residence	Statistic	Std. Error
Std. Deviation	10.59628	
Minimum	35.00	
Maximum	80.00	
Range	45.00	
Interquartile Range	15.00	
Skewness	.194	.309
Kurtosis	-.533	.608

Table 4. Test of Normality

Rural Data set vs. Urban Data Set							
	Place of Residence	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Pretest Obtained marks	Rural	.133	60	.010	.965	60	.085
	Urban	.117	60	.041	.970	60	.144
a. Lilliefors Significance Correction							

Table 5. Tests of Normality

Control Group vs. Experimental Group				
	Respondent's group	Shapiro-Wilk		
		Statistic	Df	Sig.
Pretest Obtained marks	Control Group	.965	60	.082
	Experimental Group	.961	60	.053

Table 5 shows that the data set is almost normally distributed, considering the Shapiro-Wilk test. Since the p-value is larger than 0.05 in most cases, the researchers assumed normality above. Pre-test and post-test of urban and rural are presented in histograms given hereunder.
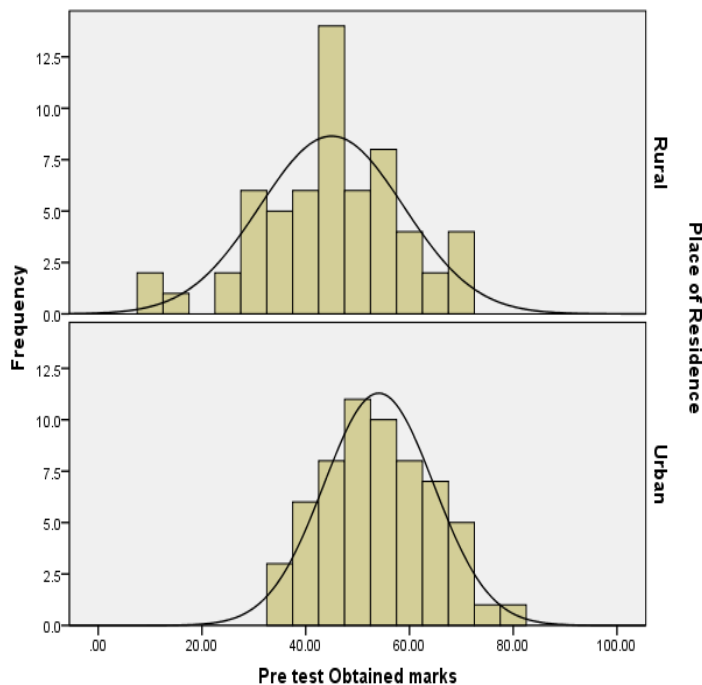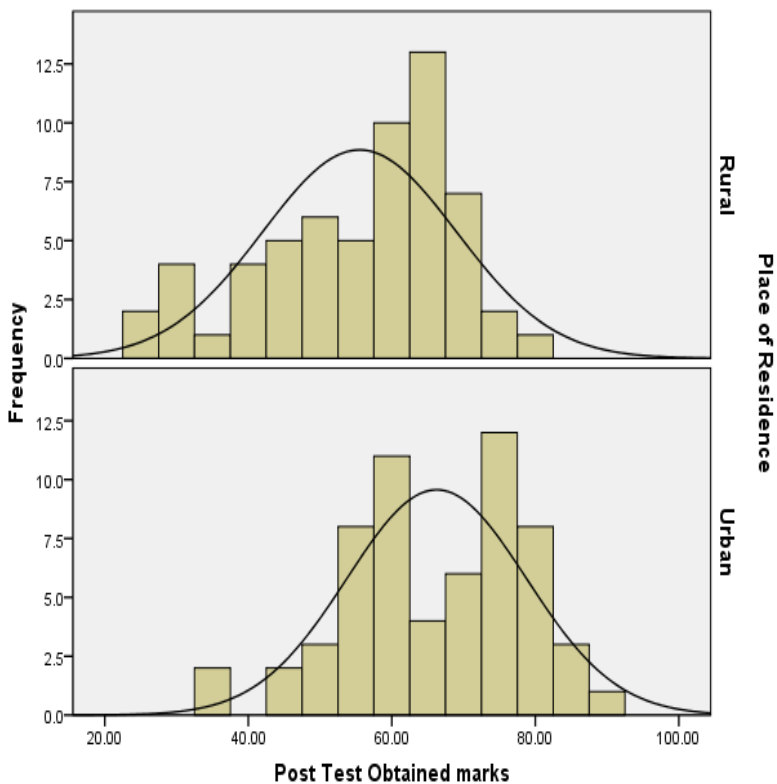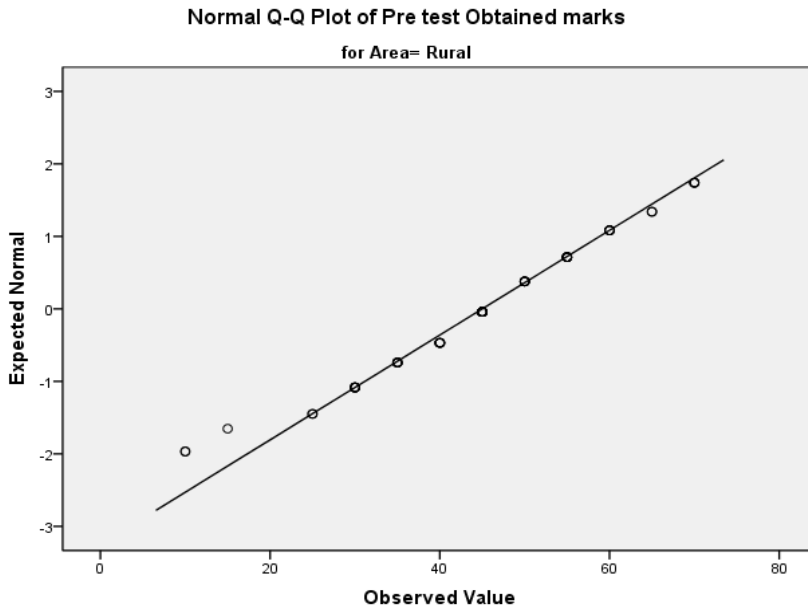

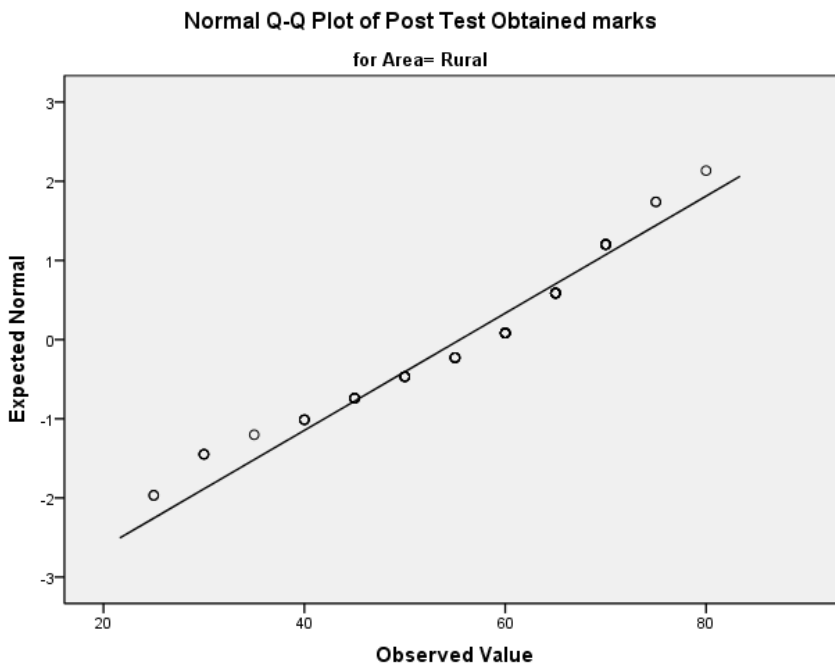**Figure 1:** Pre-tests obtained marks

Figure 2: Post-tests obtained marks

Figure 3: Shapiro-Wilk Normality Test

Figure 4: Rural Pre-test marks

Figure 5: Rural Post-test marks

The histograms demonstrated that the data distribution was almost normal. After the confirmation of the normality of the data, the paired t-test was applied to analyze the data, as the data set needs to be normal for getting precise results from the test. As SPSS states, a highly significant value "<.001" and the p-value is higher than .05 in maximum cases; therefore, it was determined that the data set was normally distributed. As the p-value is less than 0.05, the

investigators reject H_0, but the test data results are normally distributed in groups (experimental and control) and areas (urban and rural).

After completing the pre-test and post-test, the results of the tests were coded in SPSS, and the result of the experimental and control group is shown in the following table.

Table 6. Comparison of means, number of study participants, standard deviations, and standard error means.

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest Obtained marks	49.5417	120	13.09301	1.19522
	Posttest Obtained marks	60.8750	120	14.04768	1.28237

Table 6 shows that the number of students who participated in the pre-test from the control and experimental groups is *N=120*. The table illustrates that the post-test mean score raised from M=49.5417 to M=60.8750, which is for sure, a notable increase.

Table 7. Overall difference of means, standard deviations, and standard error means.

		Paired Differences		
		Mean	Std. Deviation	Std. Error Mean
Pair 1	Pretest Obtained marks - Post Test Obtained marks	-11.33333	15.23945	1.39117

This table shows the difference between the means, standard deviations, and standard error means of marks of pre-tests and post-tests.

Table 8. Overall difference of means, standard deviations, and standard error means.

		Paired Differences		T
		95% Confidence Interval of the Difference		
		Lower	Upper	
Pair 1	Pretest Obtained marks - Post Test Obtained marks	-14.08798	-8.57869	-8.147

Table 9. Mean the number of participating students and the standard deviation of pre-tests and post-tests of control and experimental groups separately to be tallied.

Respondent's group		Mean	N	Std. Deviation
Control Group	Pretest Obtained marks	49.7500	60	16.00913
	Post Test Obtained marks	52.0833	60	12.69898
Experimental Group	Pretest Obtained marks	49.3333	60	9.45402
	Post Test Obtained marks	69.6667	60	8.91897

Table 9 shows the mean and standard deviation of control and experimental groups, bifurcating their pre-tests and post-tests. The control and experimental group's improvement has a clear difference.

Table 10. The standard error means tallied pre-tests and post-tests of control and experimental groups

Respondent's group		Std. Error Mean
Control Group	Pretest Obtained marks	2.06677
	Post Test Obtained marks	1.63943
Experimental Group	Pretest Obtained marks	1.22051
	Post-Test Obtained marks.	1.15143

Table 10. Presenting the paired differences of means, standard deviations, the standard error means lower and upper limits and significance of pre and post-tests of the experimental group collectively at rural and urban centers.

H_0: $\mu_{before} = \mu_{after}$ (No change)

H_a: $\mu_{before} = \mu_{after}$ (Change)

	Paired Differences							
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Pretest Obtained marks - Post-test Obtained marks	-11.33333	15.2394	1.39117	-14.08798	-8.57869	-8.147	119	.000

At a 95% confidence interval, p-value <0.05, it is clear that H_0 is rejected, but H_a is accepted. Hence results are statistically significant, which means a visible improvement in results and change without LND with (mean ± SD) 49.54±13.09 and 60.88 ±14.05 with LND teaching activities in control and experimental groups, respectively.

The mentioned tables and histograms presented the rural and urban centers results separately, then collectively. The control and experimental group results were also presented through these tables and histograms. The comparison of results and outcome of classically taught control groups and the group taught through LND techniques, named experimental groups, was made. This last table shows that the experimental group students, who were taught through LND techniques, performed far better in the post-tests, as the mean of their results rose to M=69.6667 from M=49.3333. The number of students in this group was N=60, 30 from each center, urban and rural. On any standard, this improvement can be termed as a significant one. On the other hand, the control group's pre-test's mean is M=49.7500, while their post-test mean is M=52.0833. This shows that in contrast to Literacy and Numeracy Drive's modern teaching methods employed to teach experimental groups, the efficacy of classical and traditional ELT methods used to teach the control group is far less.

The results exhibited that the selected students taught English through traditional teaching methods showed minimal improvement. On the other hand, those who were taught in LND fashion, SLOs based teaching, individual and group activities, daily practice on tablet PCs, and others like these showed vital improvement, whether they were from a rural background or an urban one. However, there was a slight difference between rural and urban schools' results, as urban center students' results were slightly higher than the rural school results. An essential feature of LND based learning is that students feel more comfortable with the technology tool, and thus, they show a great interest in learning new things.

In light of the researcher's study results and observations, some recommendations were made for the English language teachers, particularly those who were teaching at primary schools. Precisely, they were suggested to utilize the technology interventions more and more to accelerate their learning. Instead, supporting the students to use technology interventions like tablet PCs proved a fruitful experience in different parts of the world. The use of individual and collective activities in the classroom while teaching English, as proposed and guided by LND management, is also helpful. Teachers must utilize them to improve their students' results.

The results demonstrated that H_a is accepted while H_0 is rejected because the use of LND has made a significant difference. The difference is significant at a 95% confidence interval with a p-value <0.05.

Discussion

The results showed that the overall mean of both groups' post-test is greater than that of the mean of both groups' pre-test. The mean of the pre-test of both the groups is M=49.5417, while the mean of the post-test is M=60.8750. The table also declared that the total number of study participants was sixty students participating in the study from each center, the rural and urban

ones. The development in the mean scores was M=11.33. These values show significant improvement in the overall English language learning if we deal with all the students collectively on the first hand.

The tables found that the *p-value* was 0.000, as SPSS 25 calculated. This value indicated that the students' improvement, which was started in the previous finding, was statistically significant, as per the findings of descriptive statistics.

It has been found that the control group comprising of sixty students from Government High School Hazrat Kailianwala and Government Primary School No. 1 Alipur Chatha showed the mean result of M=49.75 in pre-tests and later produced results with M=52.0833 in post-tests collectively. This shows that the improvement made by these students is not significant in contrast with the overall results of pre-tests and post-tests means of all the participants. It implies that the students taught through classical means of ELT at both the centers showed lesser improvement.

The findings also demonstrate that the experimental group, consisting of sixty students from Government High School Hazrat Kailianwala and Government Primary School No.1 Ali Pur Chatha, displayed the mean result of M=49.3333 in pre-tests and M=69.6667 in post-tests collectively at both the centers. This vast difference between the means of pre-tests and post-tests shows that the students significantly improved the experimental group. These were the students who were taught through LND techniques.

Conclusions

Subsequent conclusions were drawn based on data analysis, observations, and findings. First, integrating technology into the ELT processes and environment is a healthy and fruitful step, especially at the primary level. The students felt excited, especially using modern technology; hence it remains a productive endeavor. Another important thing about using LND is that most of the students are more engaged in all the activities than those taught from the traditional methods. Henceforth, computers and technology help students and is also an excellent aid for the teachers. Second, the attraction of technology-based interventions for young English language learners is proved. The integration of LND has only been experimented till grade 5th. Thus it is suggested to use it for all the classes. Third, the impact of LND on the primary sections of public schools of Gujranwala, Punjab, is vital, clear, and has a lot more favourable prospects for the future. Fourth, there is not much difference as far as the learning ability and aptitude are concerned between rural and urban centers. Perhaps the lack of students in rural centers is due to socio-cultural and economic factors and the availability of teaching staff.

Moreover, the control group showed a slight improvement with traditional teaching methods and traditional patterns of ELT. The experimental group showed a great response. A considerable difference in the mean scores of pre-tests and post-tests was recorded, which clearly states that the modern trends mentioned earlier proved greatly helpful. Finally, an essential aspect of using technology in the classroom is that the teachers are also interested in learning it. Still, there was a lack of interest on the government's part. It should be made mandatory that the teacher be given proper training before using such technology tools. It should also be backed by training sessions so that the teacher can refresh their knowledge. Research on the primary section in the Pakistani context is scarce; hence, it is also suggested that more studies should be administered to facilitate and cater to the needs of students in the primary sector.

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