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**INTERNATIONAL JOURNAL OF  
 ADVANCED RESEARCH (IJAR)**

Article DOI: 10.21474/IJAR01/4456  
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/4456>



### RESEARCH ARTICLE

#### IMPROVING CONTENT AND FORM IN WRITING USING MULTIMEDIA TECHNOLOGIES.

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#### Manuscript Info

##### Manuscript History

Received: 12 April 2017  
 Final Accepted: 14 May 2017  
 Published: June 2017

##### Key words:-

multimedia, L2 writing, content, form,  
 process approach, error analysis

#### Abstract

The present study explores the impact of the process approach in a multimedia environment. The role of multimedia technologies for the improvement of content and form in writing skills has not been empirically investigated. Hence, a Multimedia package for writing skills (MMPWS) was developed and implemented in the present study. After the implementation phase, the efficacy of the multimedia package was evaluated using a true experimental design. The sample size of the study comprised of 60 students with a control group of n=30 and experimental group of n=30. The experimental group was exposed to process approach in the multimedia language lab. The control group was also exposed to process approach in the traditional classroom environment. The impact of both the approaches was assessed using quantitative methods. The results revealed a positive correlation for content and negative correlation for form. Some interesting findings emerged from the study.

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#### Introduction:-

According to Parr (2013), there is no consensus on a suitable approach to writing. However, process writing is widely practised in the L2 writing classrooms at tertiary level in India. Leki (1992) argues that process approach has made dramatic and positive changes in ESL writing. Research by McCarthy & Ro (2011) advocates process approach to writing. Their study indicates that process approach is widely implemented with new technological additions such as graphic organisers. In international literature, we find a mixed response to a process approach. Graham and Sandmel (2011) has identified that process approach neither improved the motivational levels nor the improvement of writing skills. The efficacy of the process approach to writing has been extensively investigated in western countries. The empirical research in India on the process approach to writing is carried out in traditional classrooms. Even in the International literature, blending technology and process-oriented pedagogy for teaching writing is sparse. Universities across India have recommended interactive technologies for learning. Huge investments are made to enhance multimedia infrastructure. However, the role of the multimedia environment in the improvement of writing skills has not been investigated sufficiently. Flower and Hayes' process approach model (1981) stresses on the importance of task environment for improving writing skills. Using Multimedia technologies for teaching writing skills is not a new concept. There are a few interesting studies concerning this topic. New technologies for writing have been investigated a long time back by Pennington (1993), Kroll (1998) and Warschauer (1999). However, during those times the research context was confined to word processors and electronic literacies. According to Warschauer (2010), new tools such as automated writing evaluation and open source network computers have played an important role in writing pedagogy. Recently Blogs, Google Docs and

Wikispaces have been extensively applied for collaborative writing in India. However, applying multimedia software for teaching writing is at a nascent stage. An analysis of Rodriguez & Antoni's study (2014) demonstrates that universities and educational organisations have profited from multimedia applications and e-learning programmes. According to Mercier, Higgins & Joyce-Gibbons (2014), "to design technology for supporting learning is not enough; the classroom environment has to be altered for better outcomes" (p.2). Nerantzi & Gossman (2015) claim that the technology-oriented environment not only enhances learner engagement but also increases their performance. Tour (2015) also echoes the same opinion. He states "As the pedagogical effectiveness of using computers is widely recognised, all teachers are expected to use them as learning tools in their classrooms" (p.129). Topkaya (2010) asserts that Computer Assisted Language Learning (CALL) foster effective instruction. Other studies that favour computer aided instruction for writing is Ho, & Savignon, (2007) and Chang, C. F. (2012). Some theorists, such as Bruken, Seufert and Pass (2010) argue that learning environment may affect learning outcomes. Udo, Bagchi, & Kirs (2011) make the same claim. Their study indicates that conventional materials are predominantly used in L2 writing classrooms. Based on the research literature reviewed above it can be concluded that computer Aided Instruction (CAI) is a promising alternative to conventional classrooms. "As new technologies emerge, instructional designers and educators have unique opportunities to foster interaction and collaboration among learners, thus creating a true learning community" (Beldarrain, 2006, p.141)

### **Research Questions:-**

The aim of this study was to investigate whether the multimedia package applied in the present study influenced the learners to write better essays compared to the learners who were exposed to traditional instruction. If so, what is the magnitude of improvement in content? What is the magnitude of improvement in form?

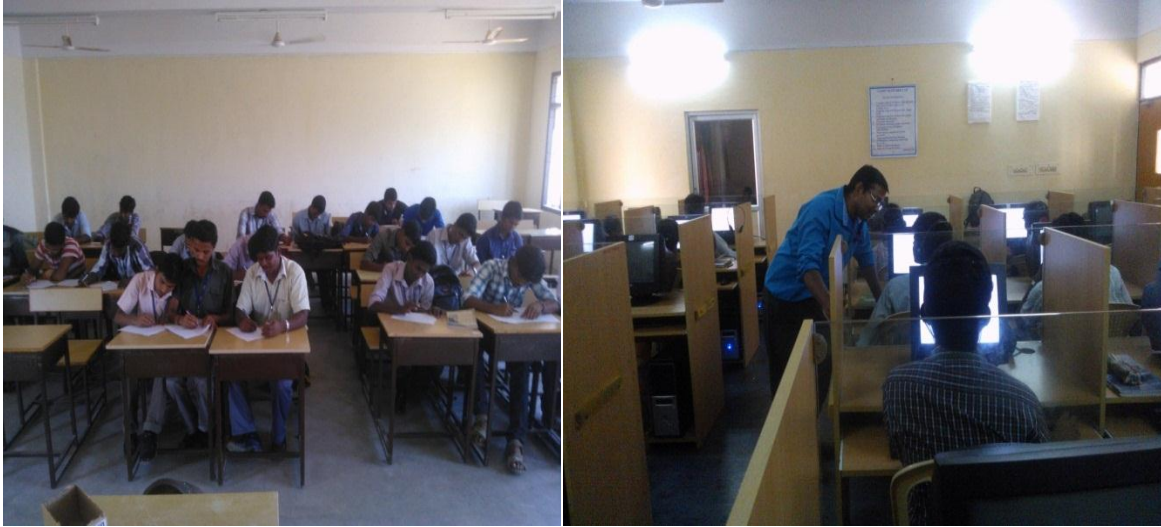
### **Methodology:-**

Generally speaking, experiments are carried out to explore the strength of relationships between variables (Nunan, 1992, p.24). A true experimental design was implemented in this study. To avoid selection bias, a Simple random sampling was employed. The participants of the study were provided sufficient information about the study. Duration of the study, procedures and the benefits of participating in the study were explained. To maintain uniformity both control and experimental groups were restricted to 30 samples each. Initially, a homogeneity test was conducted to ensure parity between control and experimental groups. The homogeneity test was considered as pretest. After the instructional phase both the groups were given a posttest. The scripts were subjected to error analysis. The performance of both the control and the experimental group was analysed based on their posttest performance. The independent variable in the study is the multimedia package exposed to the experimental group. The test performance is the dependent variable. To avoid experimental bias, the research was not carried out at the same institution where the researcher works. It was conducted at ASAN Memorial College of Engineering, a reputed engineering institution in India. The participants were in the second semester who typically attended 4 hours a week. The students were not revealed that there are two groups in the study namely control and experimental group. When students know that they are receiving a different treatment, it may affect the outcome. Hence this was controlled by using a double-blind technique. However, after the study, the participants were told who were in what group.

### **Classroom Setting:-**

The writing task for the control group was pen and paper based. The students were exposed to a series of writing activities using the prescribed course book. During the prewriting stage, there were discussions and brainstorming activities.

The Experimental Group was given training in the multimedia language lab of the ASAN Memorial College of Engineering which had 45 networked systems. Students were exposed to learning activities using computers. The multimedia toolkit used for this group and the pedagogical implications of the tools are explained in the later part of the paper. The time on task was identical for both the groups. The number of hours allotted for this study was six hours per group.



**Figure 1:-** Comparison on traditional and multimedia classroom at ASAN Engineering College.

### Procedure:-

The task chosen for writing was a discursive essay. The discursive essay was chosen because it corresponds to the writing requirements at the university level. Lancaster (2014) claims that discursive writing enables the learners to develop different patterns in writing. International exams like IELTS evaluate a candidate's discursive writing skills. Initially, both the groups were given a pretest. They were asked to write an essay on the impact of cinema on Youth. After the pretest, both groups were given instruction in different conditions. The control group was given instruction in traditional classroom condition and the experimental group in multimedia condition. After the instructional phase both the groups were asked to write an essay on global warming and solutions to prevent it. The instructional procedure of both groups is summarised in the table below.

**Table 1:-** Approach Employed for Control and Experimental Group.

S.No	Control group	Experimental group
1	Classroom discussion and brainstorming using Blackboard.	Brainstorming using a video clip from You tube.
2	Mind mapping using chalkboard	Concept mapping using the free online tool 'free mind'.
3	Vocabulary generation using classroom discussion	Task on creating word clouds using <a href="http://www.tagul.com">www.tagul.com</a> .
4	Teaching linking words, phrases and transitional words	Providing web-links to improve cohesion and transition word exercise from <a href="http://library.bcu.ac.uk/learner/writingguides/1.33.htm">http://library.bcu.ac.uk/learner/writingguides/1.33.htm</a> .
5	Blackboard instruction of grammar exercises such as adjectives, adverbs, conjunctions, determiners, prepositions, pronoun, sub-verb agreement, etc.	Web-based grammar tasks.
6	Focus on sentence variety, tense consistency, sentence combining skills and paragraph development	Focus on sentence variety, tense consistency, sentence combining skills and paragraph development using web-based instruction.
7	Out lining the essay using the guidelines given in the book	Outlining the essay using online graphic organisers
8	Revision using self -editing checklist	Revising using slick web-based writing tool named slickwrite. The free version is found at <a href="https://www.slickwrite.com">https://www.slickwrite.com</a>
9	Peer editing using exchange of tasks	Peer editing using open source online editor <a href="http://www.etherpad.org">www.etherpad.org</a>
10	Self- editing using checklist	Self-editing using <a href="https://spinbot.com">https://spinbot.com</a>

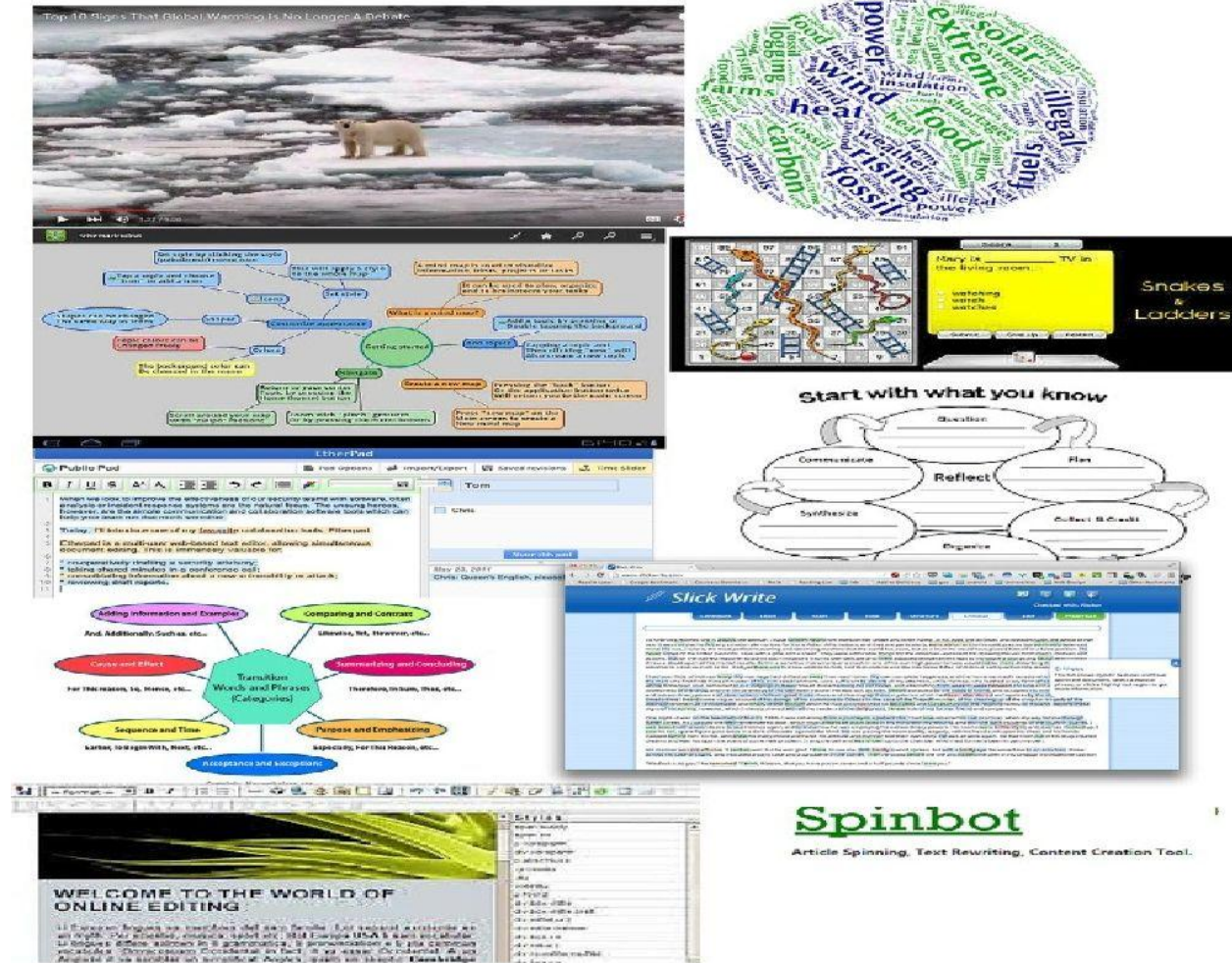


Figure 2:- Screen shot of the multimedia package used in the study

**Evaluation procedure:-**

The posttest scripts of both control and experimental groups were subjected to error analysis on two levels namely content and form. A deeper analysis of Coder’s work (1967), indicates that errors exemplify the effectiveness of the learning process. Anker (2000) claims that errors help the teacher to decipher the level of proficiency the learner has achieved. In line with these convincing arguments, Al-haisoni (2012) states that error analysis not only helps teachers to improve their teaching, but it also helps them to focus on areas that need reinforcement. Besides error analysis, IELTS band descriptors were also used to assess the scripts. The minimum scoring was band1, and maximum scoring was band 10.Each script was given an identification number for data coding. The overall mean of the pretests and posttests of content and form are presented later in this section.

**Data Analysis:-**

The goal of this research was to investigate the efficacy of the multimedia intervention package on student’s writing skills. The hypothesis formulated was, the students who are exposed to the multimedia intervention package will demonstrate improvement in both content and form.

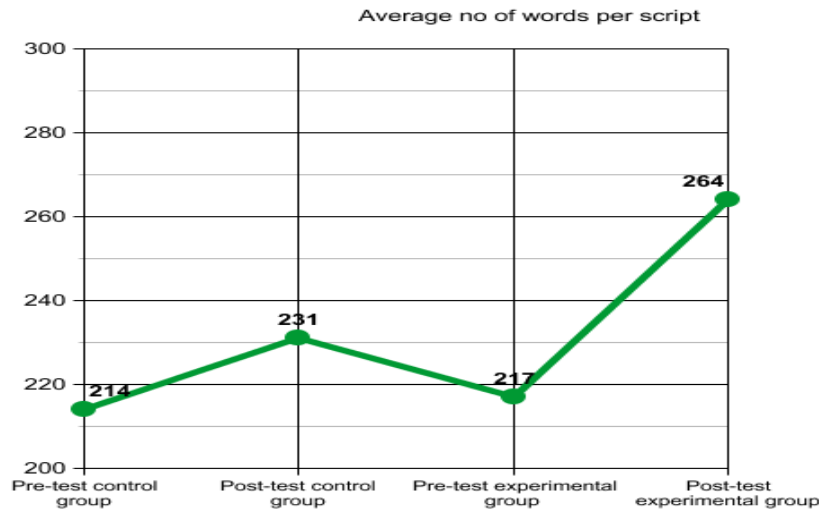
**Analysis of Content-Control group:-**

The parameters for assessing the content were the length of the essays and topic focus. The quality of ideas, development of details and examples used to support the ideas were assessed. To analyze the quantity of content the total number of words in all the 30 scripts were counted. The total number of words and the average word count per script is tabulated below. As Table-2 indicates the average number of words in the pretest of both control and

experimental group is more or less similar thus ensuring parity between groups. In the posttest, the average number of words prescript is 231 for the control group and 264 for the experimental group. This is graphically represented in figure 3.

**Table 2:-**Total no of words in the test scripts.

Control group/Pretest	Control group/Posttest	Experimental group/Pretest	Experimental group/Pretest
6,420	6,930	6,510	7,920
Average No of words prescript			
214	231	217	264



**Figure 3:-** No of words prescript in the pretest and posttests.

To analyse the quality of content, the scripts were given a rating of 1 to 10 based on test performance. Descriptive statistics such as mean and standard deviation were employed. Table-3 represents the mean and standard deviation of the pretest and posttest scores. In the pretest, the overall mean value is 4.23, and in the posttest, it is 4.47. The analysis indicated a marginal improvement.

**Table 3:-** Pretest and posttest mean scores of control group

Control Group	Pretest	Posttest
Mean	4.23	4.47
S.D	1.07	1.36
SEM	0.20	0.25
N	30	30

For further validation of results, inferential statistics was employed. A paired t-test was run using SPSS version 20. The summary of paired t-test results of the control group, the p-value and its statistical significance, confidence interval and intermediate values used in calculations are described in Table-4.

**Table 4:-** Paired t-test results of the control group.

T -Value	Mean difference	95% confidence interval	SED	Sig 2-tailed P value Experimental Group
-1.5639	-0.23	-0.54 to 0.07	0.149	<0.1287

As table-4 indicates, the two-tailed p-value equals 0.1287. This difference is not statistically significant. The mean of group one minus group two equals -0.23. The 95% confidence interval of this difference is from -0.54 to 0.07. The intermediate values used in calculations are t=1.5639. The standard error of the difference is 0.149.

**Test results:** The p value of less than 0.5 indicates test reliability. Since the alpha value of the test is more than 0.5, the test result is insignificant.

### Analysis of Content-Experimental Group:

Table-5 represents the mean and standard deviation of the pretest and posttest scores of the experimental group. In the pretest, the overall mean value is 4.33, and in the posttest, it is 6.70. The standard deviation and standard error of the difference are similar for both groups. Since the mean values indicated a discernible improvement the impact of the multimedia package in the improvement of content is evident.

**Table 5:-** Pretest and posttest mean scores of experimental group.

Experimental Group	Pretest	Posttest
Mean	4.33	6.70
S.D	1.12	1.26
SEM	0.21	0.23
N	30	30

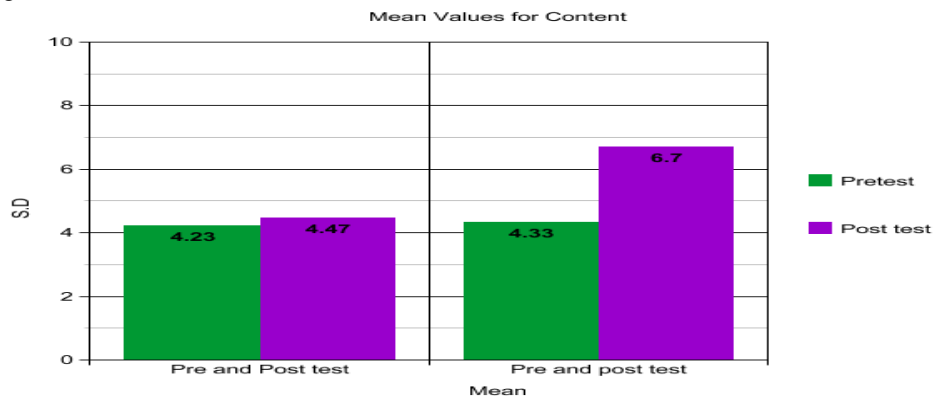
For further validation, a paired t-test was run. The summary of paired-t-test results of the experimental group, the p-value and statistical significance, confidence interval and intermediate values used in calculations are represented in the table-6 below.

**Table 6:-** Paired t-test results of the experimental group.

T -Value	Mean difference	95% confidence interval	SED	Sig 2-tailed P value Experimental Group
10.1860	-0.27	-2.84 to -1.87	0.232	<0.0001

As table-6 exemplifies the two-tailed p-value is less than 0.5. This difference is statistically significant. The mean of group one minus group two equals -0.27. The 95% confidence interval of this difference is from -2.84 to -1.87. The intermediate values used in calculations are  $t=10.186$ . The standard error of the difference is 0.232.

**Test Results:** The P value of less than 0.5 indicates test reliability. Since the alpha value is <0.001 the result is extremely significant.



**Figure 4:-** Comparative performance of pretest and posttest for Content.

Figure-4 indicates that the pretest scores of both control and experimental group are similar. The homogeneity between groups is evident in the pretest. However, in the posttest, the experimental group has outperformed the control group. The first research question that the quantum of improvement in content is discernible in the experimental group after the intervention of multimedia package is proved beyond doubt.

### Analysis of form-Control Group:-

Chin (2000) claims that effective grammar instruction takes place during the writing and revision process. Grammatical errors of the pretest and posttest of control group and experimental group are given below. The

number of errors in each category is tabulated in table-7 and the mean average of errors for every component is tabulated in table-8.

**Table 7:-**Total No of grammatical errors in test scripts.

Grammatical Errors	Control group/Pretest	`Control group/Posttest	Experimental group/Pretest	Experimental group/Posttest
Inappropriate tenses	90	47	91	64
Sentence fragments	69	47.7	60.9	58.2
Dangling modifiers	42.3	30.3	41.7	36.3
Determiners	56.0	39.6	54.3	48.3
Conjunctions	46.2	31.7	49.0	40.3
prepositions	60.3	41.7	59.7	42.6
Sub verb agreement	51.9	39.0	50.3	44.3
Use of pronouns	41.1	33.5	40.9	36.3

**Table 8:-** Mean average of grammatical errors in each category.

Grammatical Errors	Control group/Pretest	`Control group/Posttest	Experimental group/Pretest	Experimental group/Pretest
Inappropriate tenses	3.00	1.56	3.03	2.13
Sentence fragments	2.30	1.59	2.03	1.94
Dangling modifiers	1.41	1.01	1.39	1.21
Determiners	1.86	1.32	1.81	1.61
Conjunctions	1.42	1.05	1.63	1.34
Prepositions	2.01	1.39	1.99	1.42
Sub verb agreement	1.73	1.30	1.67	1.47
Use of pronouns	1.37	1.11	1.36	1.21

The average number of grammatical errors in the pretest of control and the experimental groups indicates homogeneity. Surprisingly in the post-test, the performance of the experimental group is not as good as the control group. For inappropriate tenses, the average number of errors in the control group is 1.56 whereas for the experimental group it is 2.13. For sentence fragments, the posttest of the control group is 1.59, and for the experimental group, it is 1.94. For dangling modifiers the average number of errors in the control group 1.01 and for the experimental group it is 1.21. Similarly, for determiners, the average number of errors in the post test of the control group is 1.32. On the other hand for the experimental group, it is 1.61. For prepositional errors, the percentage of the control group is 1.39, and for the experimental group, it is 1.42. In the case of subject-verb agreement, the average number of errors in the control group is 1.30 whereas for the experimental group it is 1.47. Finally, for the use of pronouns the average number of errors in the post test of the control group is 1.11, and for the experimental group, it is 1.21. Figure-5 given below exemplifies the proportion of grammatical errors in the pretest and posttest of both groups. It is quite clear from the analysis that the control group has performed better than the multimedia group regarding the form in writing. The analysis indicates that the multimedia intervention package has not helped the learners in the improvement of form.

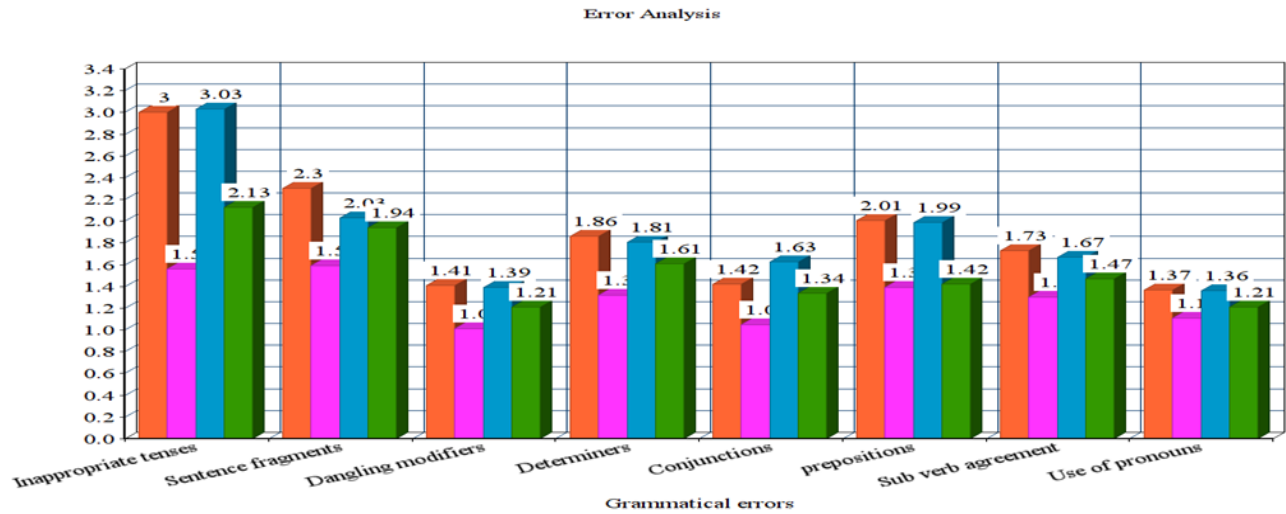


Figure 5:- Proportion of grammatical errors in each category.

The data was subjected to further validation. On further analysis, the scripts were given a rating of 1 to 10 based on test performance. Descriptive statistics such as mean and standard deviation were used for analysis. Table-9 represents the mean and standard deviation of the pretest and posttest scores of the control group. In the pretest, the overall mean value is 3.57, and in the posttest, it is 4.17. The evidence of improvement is noticeable.

Table 9:-

Control group	Pretest	Posttest
Mean	3.57	4.17
S.D	0.94	0.95
SEM	0.17	0.17
N	30	30

The summary of paired t-test results of the control group, the p-value and statistical significance, confidence interval and intermediate values used in calculations are described below.

Table 10:- Paired t-test results of the control group for form.

T -Value	Mean difference	95% confidence interval	SED	Sig 2-tailed P value Experimental Group
4.03	-0.60	-0.90-0.30	0.149	<0.0004

As table-10 indicates the two-tailed p-values is less than 0.5. This difference is statistically significant. The mean of group one minus group two equals -0.60. The 95% confidence interval of difference is from -0.90 to -0.30. The intermediate values used in calculations are t=4.03. The standard error of the difference is 0.149.

**Test Results:-** The P value of less than 0.5 indicates test reliability. Since the alpha value is <0.0004 the result is statistically significant.

**Data Analysis of Form-Experimental Group:-**

Table-11 represents the mean and standard deviation of the pretest and posttest scores of the experimental group. In the pretest, the overall mean value is 3.67, and in the posttest, it is 3.80. The standard deviation and standard error of the difference are similar for both groups. The mean values do not indicate an improvement in form.



**Table 11:-**

Experimental group	Pretest	Posttest
Mean	3.67	3.80
S.D	1.12	0.92
SEM	0.21	0.17
N	30	30

**Paired t-test Results:-**

The summary of paired t-test results of the experimental group, the p-value and statistical significance, confidence interval and intermediate values used in calculations are described below.

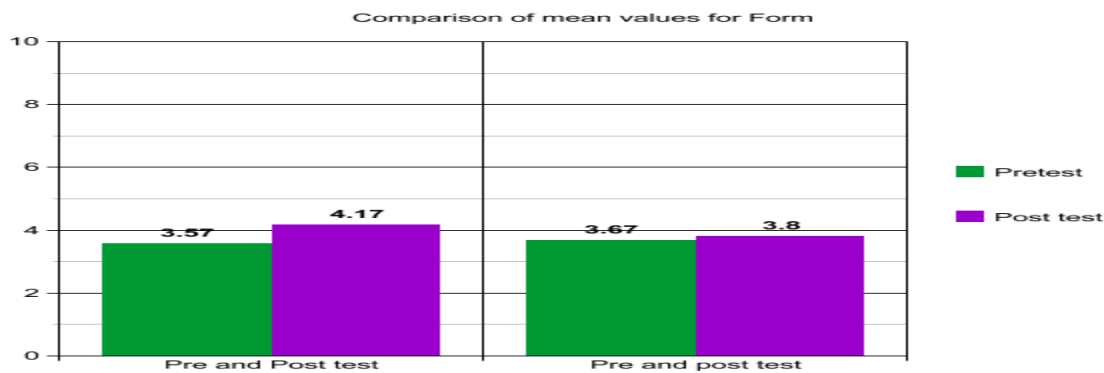
**Table 12:-** Paired t-test results of the control group for form

T -Value	Mean difference	95% confidence interval	SED	Sig 2-tailed P value Experimental Group
4.03	-0.13	-0.47-0.20	0.149	<0.4235

As table-12 indicates, the two-tailed p-value is less than 0.4235. By conventional criteria, this difference is statistically insignificant. The mean of group one minus group two equals -0.13. The 95% confidence interval of difference is from -0.47 to -0.20. The intermediate values used in calculations are  $t=4.03$ . The standard error of the difference is 0.149.

**Test Results:-**

Since the two-tailed p-value is  $<0.4235$  the test result is statistically insignificant. Figure-6 indicates that the pretest mean scores of both control and experimental group are similar. The homogeneity between groups is evident in the pretest. However, in the posttest, the control group has outclassed the experimental group. The second research question was related quantum of improvement in form is after the intervention package? The answer to this research question is that the quantum of improvement after the intervention was negligible. In fact, the performance was poor compared to the control group. The hypothesis formulated was, "the students who are exposed to the multimedia intervention package will demonstrate improvement in both content and form". The hypothesis was only partially proved. The students demonstrated statistically significant improvement in content and statistically insignificant improvement in form.

**Figure 6:-** Comparison of mean values of pretest and posttest.

The scoring percentage of content was higher than form. The comparison of mean indicates that technology integration does not make any significant impact in improving their form in writing.

**Discussion and Conclusion:-**

Fathman and Whalley (1990), in their seminal research on revision in L2 writing established that grammar and content feedback positively affect writing. The question that was raised in the study was, what effect does multimedia intervention have on students writing skills? Do scores on tests improve after intervention? From the above study, we can conclude that the target learners who are exposed to multimedia instruction benefited a great deal in content and no statistically significant benefit in form. This study implies that face to face instruction is efficacious than programmed software when for improving form in writing. However, for prewriting strategies and content generation multimedia materials could be useful.

Students who edited their drafts using online tools could not receive personal guidance. Further research is needed to explore the reasons as to why there is no improvement in form among the experimental group. The learners' proficiency in computing skills could be an important factor in performance. The researcher had no control over such confounding variables. The small sample size indicates that the results may not be conclusive. A large sample size may produce a different result. Moreover, six instructional hours would not be sufficient for grammar instruction. An extended timespan would have produced different results. There is scope for further research in this direction as a comparative analysis of content and form using technology intervention could lead to new insights on L2 writing. Measuring these constructs such as content and form using inferential statistical techniques will throw light in this area.

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