



## FROM TEXT TO TECHNOLOGY: AN EXPERIMENTAL STUDY OF DIGITAL HUMANITIES–BASED WRITING INSTRUCTION IN ESL CLASSROOMS

*Aeman Phool, Dr. Mehwish Muzaffar, Noor ul Ain, Waheed Shahzad*

*Institute of Humanities and Arts, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan [aimanp574@gmail.com](mailto:aimanp574@gmail.com)*

*Institute of Humanities and Arts, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan [mehwish.muzaffar@kfueit.edu.pk](mailto:mehwish.muzaffar@kfueit.edu.pk)*

*Institute of Humanities and Arts, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan [noor.ain@kfueit.edu.pk](mailto:noor.ain@kfueit.edu.pk)*

*Institute of Humanities and Arts, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan [waheed.shahzad@kfueit.edu.pk](mailto:waheed.shahzad@kfueit.edu.pk)*

ORCID ID: 0000-0002-2237-8237

Corresponding author: [waheed.shahzad@kfueit.edu.pk](mailto:waheed.shahzad@kfueit.edu.pk)

### **Abstract**

*By incorporating Digital Humanities (DH) in the English as a Second Language (ESL) classrooms, this paper has examined how the use of such tools can support writing skills in the study of students. With the rising need of English skills in our digitalized world, there are urgent demands of leaving behind conventional grammar-based model of instruction delivery and switching to technology-augmented pedagogies. Pre-tests and post-tests were conducted on two groups; experiment group and control group all composed of undergraduate students of ESL. The experimental group also got the training assistance of DH tools, whereas in the control group the traditional methods were used. The SPSS statistical analysis found that there was a remarkable difference in writing performance in the experimental group compared to results in content, organization, vocabulary, grammar, and mechanics. It was a quasi-experimental study that was conducted on a sample associated with 44 undergraduate students that were split into an experimental group and a control group (n = 22 each). The control group was guided through the traditional learning techniques.*

**Keywords:** *Digital Humanities, ESL (English as a Second Language), English Writing Skills, Technology-Enhanced Learning, Experimental Study, Writing Proficiency, Digital Tools in Language Learning*

### **INTRODUCTION**

The world is increasing in its globalized and digital aspects, making the demand for effective communication in English. English is a gateway to education and career opportunities for many learners. But for non-native speakers, English can be incredibly difficult to learn (especially when it comes to writing) (S.J. 2023). This study explores the possibility of how DH could enhance ESL students' writing skills through the various strategies for incorporating digital tools into writing instructions. (Adas & Bakir, 2013). In an era of rapid development of technology, Digital Humanities (DH) has emerged in technology, including education. The introduction of Digital Humanities in language learning, especially in improving English writing skills, represents a profound change from traditional methods to new learning models with technological assistance. (Suryani et al., 2024). As the world's demand for English language skills increases, the



role of Digital Humanities in language teaching is receiving increasing attention from educators, linguists and technologists. (MA Ahmed, 2016). This study examines how to effectively use cognitive tools, media, and techniques to improve English writing skills and comprehensively presents the relationship between language learning and Digital Humanities. (Liu,S.& Kunnan, A. J.( 2018). Mastering English writing is a complex task that requires a thorough understanding of grammar, vocabulary, syntax, and style. For non-native speakers, these elements can be very difficult to navigate. Although traditional classroom instruction is superior, it often lacks feedback on individual and language development. (Ferris, D. R. 2006). This is where Digital Humanities comes in and a variety of apps from grammar correction tools to advanced writing assistants – can provide instant feedback, suggest improvements, and help with style choices. Platforms such as Grammarly, Quillbot, and GPT-based models have made significant progress in this area allowing language learners to improve their writing skills with intelligent and automated support.(MAEAS Ahmed, 2016). Digital Humanities systems are created to examine substantial data sets to detect patterns for offering insights into written content. These intelligent systems can spot grammatical mistakes, suggest more appropriate word selections, and provide guidance on the structure and coherence of sentences, aiding students in enhancing their writing skills in real time. (Ranalli, J. 2018). The use of DH in language learning offers advantages but faces challenges like privacy concerns, over-reliance on technology, and the need for digital language skills. While DH helps with technical writing skills, it lacks an understanding of cultural and emotional nuances brought by human instructors.(Balaman Uçar, 2016) This study aims to highlight DH’s role in enhancing English writing skills while examining its limitations and ethical considerations.(Chen, 2024). DH has the proficiency to support writing tasks and cope with certain writing jobs, but these new methods at present have no cultural and even emotional background that the experienced human instructors used to produce when teaching languages. That is why this research seeks to investigate not only the benefits of using digital humanities in academic writing but also the drawbacks and the main issues concerning this method. (Albiladi & Alshareef, 2019).

Therefore, the human/instructor-taught form of DH can help transform the teaching of English writing since it offers feedback based on a student’s individual writing problem and offers solutions to fix the issue.(Balaman Uçar, 2016) This research wants to find out how the tools powered by DH can be utilized to improve writing tasks for learners as well as teachers. DH application in technologically-driven foreign language learning, this work advances knowledge of technology-enhanced foreign language learning and opens new avenues for future growth in educational technology. (Pitychoutis, 2023)

### **Research Objective**

To explore the effects of Digital Humanities tool based feedback on the acquisition of English writing skills in ESL learners and how teachers feel about integrating the tools.

### **Background of Study**

The introduction of technology in education in the modern era has reshaped the education and learning of language skills. Classrooms in English as a Second Language (ESL) are not an exception, and teachers constantly search new approaches to enhance linguistic competence in students, especially the writing skill that is still one of the most problematic among learners of English as a Second Language. (Lifiani). Conventional methods of teaching writing usually use repetitive tasks, grammar-based drills, teacher-focused feedback, which can constrain the



creativity, interest, and practical use of language skills amongst students. (Berry, 2012; Svensson & Goldberg, 2015). It allows students to progress from learning grammar rules in isolation and make them use real English because real English is different from the rule students learn in specific grammatical patterns (Burdick, A., et al. 2012). It also creates new possibilities of combined activities, like using primary sources and looking at the material which students themselves use at the moment, in addition to making the writing for ESL students more diverse (Baker 1996: 2001)

### **The Interdisciplinary Nature of Digital Humanities**

Digital Humanities is an evolving Interdisciplinary nature which adapts various humanities methodologies from the field of literature, history, languages, philosophy and cultural studies to the approach assisted by informatics technologies (Unsworth, J.Eds.2016). It improves human understanding of culture and history and explore linguistics, supported by computation, visualization, and interactive technologies. Also combining formalized scholarly approaches with contemporary technology, Digital Humanities introduces fresh paradigms for thinking, studying and learning and offers new potential to approach and solve multifaceted queries to reveal new potential for discovery (Arnold, M. 2009). One of the characteristic features of Digital Humanities is its innovational orientation. It questions the traditional approached used in humanities research and provides new tools of data analysis including text-mining, data visualization, network analysis, and geospatial mapping (Schnapp, J.2012)

### **Computational Technologies in Digital Humanities**

One important component involved in digital humanities is computational. These techniques consist of using algorithm and data analysis tools to perform large analyses that would be unfeasible to do otherwise. Others are text mining, networks analysis, and geographical information systems commonly abbreviated as GIS (Dr Edward Vanhoutte, 2013). One of the basics of computational technologies in DH is the visualization tools. Interactive systems for geospatial, stoichiometric, and time-series data let researchers express information in an easily understandable manner, including maps, charts, and timelines. For example, an application known as GIS (Geographic Information Systems) enables the historian to locate trade routes or migration patterns which give the raw historical story a spatial dimension. (Clark, 2010; Jacobs, 2012). Likewise, techniques used in network analysis help researchers examine patterns of connections in social, political or literary works, providing greater insights as to related events or ideas {Dogan and Robin, 2008, p. 902}.

### **Advantages of a High Level of Digital Humanity**

The incorporation of Digital Humanities in educational instruction generates multiple advantages which improve teaching practice and student learning activities.(Meythaler et al., 2023). The introduction of interactive technology alongside multimedia materials leads students to develop stronger motivation in writing development.(Malik, 2019) Software platforms produce flexible educational settings which let students directly take part while digging into educational content through novel approaches.(Valentyna et al.) Individuation of education is a prime benefit that stems from Digital Humanities learning platforms. Analytical writing tools evaluate unique writing patterns of students to supply customized feedback which helps them develop their distinct weakness. (Holm et al., 2015) By tailoring educational plans to individual needs the method lets students develop at their preferred speed to overcome specific problems in grammar and vocabulary as well as composition formation. (Parker, 2013)



Qualitative data obtained from Digital Humanities tools provides educational benefits for teachers. The generated performance data of these systems enables teachers to plan instruction based on sound analytic findings. (Cai, 2024) Instructors improve classroom effectiveness through the identification of shared writing problems and the observation of student development which enables them to develop teaching techniques that strengthen student learning. (Hockey, 2016)

### **METHODOLOGY**

This study employs a mixed-methods quasi-experimental design combining both quantitative and qualitative approaches.

Pre-Test/Post-Test Writing Assessments (Quantitative)

Interviews (qualitative)

### **3 Research Design**

**Quantitative Component:** The quantitative component focuses on experimental research with control and treatment groups. The participants are divided into two groups: one will use all tools to teach writing, the other will receive traditional instruction from the teacher. Pre- and post-tests are conducted to evaluate the writing skills of both groups, focusing on criteria such as grammatical accuracy, coherence and word diversity.

**Qualitative Component:** The qualitative part will attempt to understand more of the experiences of teachers in relation to DH-based instruction. The semi-structured interviews collect the data, and the perceptions, attitudes, and beliefs about the effectiveness of Digital Humanities tools in the ESL writing instruction are explored.

**Experimental Group (n = 22):** Received writing instruction which was integrated with Digital Humanities tools such as Voyant Tools; chatgpt; Padlet; Story Map JS; Digital storytelling Platforms; Padlet; Pro Writing Aid; Grammarly; and Quill Bot.

**Control Group (n = 22):** Traditional approach to writings without the incorporation of the Digital Tool.

### **Population and Sample**

It was carried out in Aspire college Kanpur with the concentrate on ESL students undertaking academic writing course. There were 50 students in the total population and the sample size of 44 students was taken according to the sampling table of Krejcie and Morgan (1970).

**Sampling technique:** There was random sampling as each student was randomly assigned to either Experimental (n = 22) or Control (n = 22) group.

### **4 Data Analysis, Results and Findings**

The comparison of the experimental and control groups' pre-test and post-test outcomes is the basis of this study's quantitative conclusions. While the control group was instructed using conventional techniques, the experimental group got training that incorporated Digital Humanities (DH) tools. According to the findings, the experimental group's writing abilities significantly improved after the intervention. The control group, on the other hand, only made slight improvements. The significant performance difference between the two groups was validated by statistical analysis. These results indicate the efficacy of technology-enhanced education in the classroom and imply that the incorporation of DH tools improved students' writing skills.



**Summary Table of Test**

| Test                       | Purpose   | Test type                |
|----------------------------|---|--------------------------|
| Paired Samples t-test      | Check improvement within groups (pre vs post)           | Quantitative (pre/post)  |
| Independent Samples t-test | Compare <b>between</b> groups (experimental vs control) | Quantitative (post-test) |
| Descriptive Statistics     | Summarize data (means, SD, etc.)                        | Quantitative (post-test) |
| Qualitative Analysis       | Explore teacher attitudes and beliefs                   | Interview transcripts    |

**Descriptive Statistics**

Descriptive Statistics was computer for both groups to examine the mean, standard deviation, and overall performance in retest and posttest assessments. These statistics provided inside into the writing abilities of students before and after the intervention. (Hashim et al., 2019).

This section presents the qualitative findings of experimental study which aim to explore the impact of digital humanities DH tools on the writing skills of ESL student the data was collected through pretest and posttest administrative to both experimental and control group each consisting of 22 students.

The results of the experimental study carried out to analyze the effect of the integration of Digital Humanities (DH) tools on the English writing of ESL learners are provided in this chapter. The performance of the students in writing was measured through five core variables; content, organization, grammar, vocabulary and mechanics based on an analytical rubric that had a 1 to 5 scale used to mark the performance. Statistics and paired t-tests were used to analyze pre-test and post-test scores in the experimental and control groups by applying descriptive statistics.

- **Comparison of Five Specific Features of Students Writing Quality Before Treatment (pre-test)**
- **Independent Sample T-test**

**Table 1:**

| Group | Pre-test |       | Independent Sample T-test |                 |         |        |
|-------|----------|-------|---------------------------|-----------------|---------|--------|
|       | F        | Sig   | d/f                       | Mean difference | Lower   | Upper  |
| CG    | .023     | .879  | 42                        | .18182          | -.24376 | .60739 |
| EG    |          |       | 41.735                    | .18182          | -.24384 | .60747 |
| CG    | .027     | .932  | 42                        | -.13636         | -.67535 | .40262 |
| EG    |          |       | 41.942                    | -.13636         | -.67537 | .40264 |
| CG    | .000     | 1.000 | 42                        | .00000          | -.36253 | .36253 |
| EG    |          |       | 42.000                    | .00000          | -.36253 | .36253 |
| CG    | .006     | .939  | 42                        | .18182          | -.21450 | .57814 |
| EG    |          |       | 40.910                    | .18182          | -.21482 | .57845 |
| CG    | .718     | .402  | 42                        | .09091          | -.21790 | .39972 |



|    |  |  |        |        |         |        |
|----|--|--|--------|--------|---------|--------|
| EG |  |  | 41.988 | .09091 | -.21791 | .39972 |
|----|--|--|--------|--------|---------|--------|

These results imply that the experimental and control groups were similar in writing performance prior to the intervention statistically. No significant differences were found between the pre-test scores of the two groups regarding any writing variable which indicates that the two groups appropriately balanced ones were used at the beginning of the study. This achieves the requirement that any differences noted in the post-test can be ascribed to the treatment (i.e., Digital Humanities feedback tools) as opposed to the initial group differences.

➤ **Independent-Sample T-Test for the Quality of Writing Tasks on the Pre-Test Across Control and Experimental Groups**

**Table 2**

| Group | Levene's Test for Equality of Variances |       |        | T-test for Equality of Mean |       |       |
|-------|---|-------|--------|-----------------------------|-------|-------|
|       | Mean                                    | F     | Sig    | T                           | df    | SD    |
| CG    | 2.6364                                  | 0.774 | 0.8304 | 0.036                       | 42    | 0.688 |
| EG    | 2.5455                                  | 0.774 | 0.8304 | 0.036                       | 41.72 | 0.647 |

The findings in the Independent Samples T-Test have shown that the scores obtained by the experimental group and the control group in the pre-test writing were statistically insignificant in all of the five features. Average differences per variable are very low, both positive and negative and the Sig. (2-tailed) values of all the variables are more than 0.05 denoting non-significance. This implies that the two groups were at roughly the same level regarding writing quality prior to applying any intervention. Thus, any change observed during post-test can be regarded with more confidence related to treatment rather than pre-existing disparities in abilities.

➤ **Comparison for five specific features of Students Writing Quality after Treatment (post-test)**

➤ **Independent Sample T-test**

**Table 3**

| Post-test                   | Group | Features     | N  | Mean   | SD      | Sig   |       | T      |
|-----------------------------|-------|--------------|----|--------|---------|-------|-------|--------|
|                             |       |              |    |        |         | P1    | P2    |        |
| Equal variances assumed     | C     | Context      | 22 | 2.5909 | 1.18157 | <.001 | <.001 | -5.985 |
|                             | E     |              |    |        |         |       |       |        |
| Equal variances not assumed | C     | Organization | 22 | 2.3182 | 1.04135 | <.001 | <.001 | -9.940 |
|                             | E     |              |    |        |         |       |       |        |



|                             |   |            |    |        |        |       |       |        |
|-----------------------------|---|------------|----|--------|--------|-------|-------|--------|
| Equal variances assumed     | C | Grammar    | 22 | 2.8182 | .95799 | <.001 | <.001 | -7.466 |
| Equal variances not assumed | E |            | 22 | 2.8182 | .95799 | <.001 | <.001 | -7.466 |
| Equal variances assumed     | C | Vocabulary | 22 | 3.1364 | .94089 | <.001 | <.001 | -6.872 |
| Equal variances not assumed | E |            | 22 | 4.6818 | .47673 | <.001 | <.001 | -6.872 |
| Equal variances assumed     | C | Mechanics  | 22 | 3.0000 | .75593 | <.001 | <.001 | -6.100 |
| Equal variances not assumed | E |            | 22 | 4.3636 | .72673 | <.001 | <.001 | -6.100 |

All writing components were higher in experimental group when compared to the control group. Context means were: 4.41 (EG) and 2.59 (CG),  $t = -5.985$ ,  $p = 0.001$ . In the case of organization, EG had a score of 4.73 as compared to CG at 2.32 with  $t = -9.940$  and  $p = 0.001$ . EG also had higher means in grammar ( $t = -7.466$ ,  $p < 0.001$ ), and sentence structure, word selection, and punctuation, spelling, and capitalization accuracy also demonstrated an overall better performance in writing, as it was evident

**Table 4**

| Group | Levene's Test for Equality of Variance |      |        | 95% Confidence Interval |          |          |
|-------|--|------|--------|-------------------------|----------|----------|
|       | F                                      | Sig  | d/f    | Mean difference         | Lower    | Upper    |
| CG    | 5.860                                  | .020 | 42     | -.1.81818               | .2.43125 | .1.20511 |
| EG    |  |      | 36.815 | -.1.81818               | -2.43382 | .1.20255 |
| CG    | 10.235                                 | .003 | 42     | -2.40909                | -2.89819 | -1.92000 |
| EG    |  |      | 28.783 | -2.40909                | -2.90494 | -1.91324 |
| CG    | 2.896                                  | .098 | 42     | -1.72727                | -2.19415 | -1.26039 |
| EG    |  |      | 32.005 | -1.72727                | -2.19851 | -1.25603 |
| CG    | 11.683                                 | .001 | 42     | -.1.54545               | -1.99928 | -1.09163 |
| EG    |  |      | 31.116 | -.1.54545               | -2.00403 | -1.08688 |
| CG    | 1.585                                  | .215 | 42     | -1.36364                | -1.81480 | -.91247  |
| EG    |  |      | 41.935 | -1.36364                | -1.81483 | -.9124   |



According to the results of the Independent Samples T-Test in the table, there is also a statistically significant difference between Control Group (CG) and Experimental Group (EG) in all the measured variables. The differences between the means are always negative, which means that the experimental group surpassed the control one each of the times. All the p-values (Sig.) are less than 0.05 and 95% CI of the mean differences exclude zero, which proves the significance of these results. As demonstrated by Levene’s Test for Equality of Variances, the equality of variance was not assumed, in some instances (e.g. Sig. less than .05), nevertheless the outcome line up with both groups.

**Table 5**

| Group | Levene’s Test for Equality of Variances |        |       | T-test for Equality of Mean |        |       |
|-------|---|--------|-------|-----------------------------|--------|-------|
|       | Mean                                    | F      | Sig   | T                           | df     | SD    |
| CG    | 2.4091                                  | 32.259 | 0.067 | -5.195                      | 42     | 0.647 |
| EG    | 2.5455                                  | 0.0000 | 0.000 | -5.195                      | 34.131 | 0.688 |

Table 5 shows Independent Samples T-Test of the post-test writing of the Control Group (CG) and Experimental Group (EG). The CG has 2.4091 (SD = 0.647) and EG has 2.5455 (SD = 0.688), an almost minute improvement in the experimental group.

Levene’s test on equality of variances expresses an F-value of 32.259 and Sig. value at 0.067 i.e. slightly greater than 0.05 so assuming equal variances may not be wrong but it is near to the limit. T-test finding provides a value of  $t = -5.195$ , and  $df = 42$  (CG) and  $34.131$  (EG). This huge negative t value, together with a p value of 0.000 shows that there is a very great statistical significance between the two groups. This implies that the Experimental Group had better scores than the Control Group in the post-test.

- **Comparison of five specific features of Students Writing Quality pre and posttest of control group**
- **paired Sample T-test**

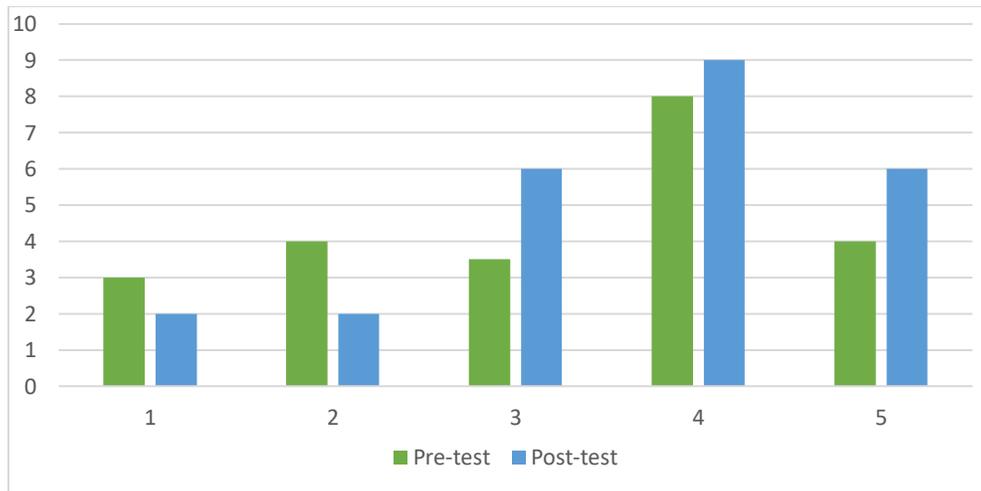
**Table 6**

| Group      | Component    | Stages    | Mean   | N  | St      | D/f | T      |
|------------|--------------|-----------|--------|----|---------|-----|--------|
| Experiment | Context      | Pre-test  | 2.6364 | 22 | .72673  | 21  | .157   |
|            |              | Post-test | 2.5909 | 22 | 1.18157 | 21  |        |
| Experiment | Organization | Pre-test  | 2.6364 | 22 | .90214  | 21  | .892   |
|            |              | Post-test | 2.3182 | 22 | 1.04135 | 21  |        |
| Experiment | Grammar      | Pre-test  | 2.5455 | 22 | .59580  | 21  | -2.027 |
|            |              | Post-test | 2.8182 | 22 | .95799  | 21  |        |
| Experiment | Vocabulary   | Pre-test  | 2.7273 | 22 | .95799  | 21  | .2001  |
|            |              | Post-test | 3.1364 | 22 | .94089  | 21  |        |
| Experiment | Mechanic     | Pre-test  | 2.5000 | 22 | .51177  | 21  | -2.925 |
|            |              | Post-test | 3.0000 | 22 | .75593  | 21  |        |

The findings indicate that in the context and organization, the change between the scores of pre-test and post-test is not statistically significant ( $t = .157$  and  $.892$ , respectively), which means that

there were no significant changes in this area or that the changes in this area were minimal. Nevertheless, in case of grammar ( $t = -2.027$ ), vocabulary ( $t = -2.001$ ), and mechanics ( $t = -2.925$ ), the  $t$ -values show that changes will be notable in post-test in favor of the post-test, this shows that the experimental group made improvements in these areas after the intervention.

**Graph**



**Table 7**

| Time      | Levene’s Test for Equality of Variances |        | T-test for Equality of Mean |      |
|-----------|---|--------|-----------------------------|------|
|           | Mean                                    | T      | df                          | SD   |
| Pre-test  | 2.582                                   | -5.195 | 21                          | 0.69 |
| Post-test | 2.772                                   | -5.195 | 21                          | 0.98 |

Table 7 shows the comparison of performance of experimental group in writing skills at 2 periods of time pre-test and post-test. The scores recorded were higher in mean, whereby the scores at pre-test were 2.582, and post-test had 2.772 showing improvement in quality of writing after receiving the intervention.

The pre-test value of  $t$ -test of  $-1.18$  demonstrates that there was no significant difference with treatment, which indicates that the group was at the consistent level at the start.

The degrees of freedom ( $df = 21$ ) and the standard deviations ( $0.69$  prior to the intervention and  $0.98$  post-intervention) indicate that there was variability in the scores with the slight difference in the variability after intervention.

The results, on the whole, indicate that the post-treatment performance of the experimental group in writing was partly improved with the corresponding post-test mean higher than the baseline.



- Comparison for five specific features of Students Writing Quality pre and posttest of experimental group
- paired Sample T-test

**Table 8**

| Group      | Component    | Stages    | Mean   | N  | St     | D/f | T       |
|------------|--------------|-----------|--------|----|--------|-----|---------|
| Experiment | Context      | Pre-test  | 2.4545 | 22 | .67098 | 21  | -7.551  |
|            |              | Post-test | 4.4091 | 22 | .79637 | 21  |         |
| Experiment | Organization | Pre-test  | 2.7727 | 22 | .86914 | 21  | -7.318  |
|            |              | Post-test | 4.7273 | 22 | .45584 | 21  |         |
| Experiment | Grammar      | Pre-test  | 2.5455 | 22 | .59580 | 21  | -9.165  |
|            |              | Post-test | 4.5455 | 22 | .50965 | 21  |         |
| Experiment | Vocabulary   | Pre-test  | 2.5455 | 22 | .59580 | 21  | -10.132 |
|            |              | Post-test | 4.5455 | 22 | .50965 | 21  |         |
| Experiment | Mechanic     | Pre-test  | 2.4091 | 22 | .50324 | 21  | -11.672 |
|            |              | Post-test | 4.3636 | 22 | .72673 | 21  |         |

The results of paired sample t-test shown in the table include comparisons between scores of experimental groups on pre-test and post-test on five writing features, including context, organization, grammar, vocabulary, and mechanics. The five areas have statistically significant evidence between pre-test to post-test. Contextually, the mean changed to 4.4091 upholding significance of relevance and clarity of ideas rising up by 2.4545 with t-value of -7.551. There was also significant improvement in organization with the score about this variable increasing to 4.7273 ( $t = -7.318$ ) which meant there was an improvement in structure and flow in the writing of the students. If we come to the grammar part, we have the evidence in the improvement of 2.5455 to 4.5455 ( $t = -9.165$ ), which points to a definite gain in accuracy of sentences and application of language. Equally, vocabulary increased by large amount (2.5455-4.5455,  $t = -10.132$ ) which demonstrated more word choice and expression. Lastly, the mechanics recorded the highest improvement where the mean scores increased by 2.4091 to 4.6364 ( $t = -11.672$ ), demonstrating a huge advancement in spite of spelling, punctuation, and capitalization. On the whole, these findings prove that the intervention in the experimental group produced a very positive and statistically significant impact on all evaluated dimensions of writing quality.

**Graph**





Table 9

| Time      | Levene's Test for Equality of Variances |        | T-test for Equality of Mean |        |
|-----------|---|--------|-----------------------------|--------|
|           | Mean                                    | T      | df                          | SD     |
| Pre-test  | 2.5455                                  | -9.168 | 21                          | 0.6470 |
| Post-test | 4.5182                                  | 0.000  | 21                          | 0.5996 |

The Table 9 shows how the writing performance of the experimental group has improved during pre- and post- testing stage. The average score rose by a considerable margin of 2.5455 to 4.5182 in the post-test signifying a huge improvement in the writing skills as a result of the intervention. At the pre-test stage, the t-test value of -9.168 indicates that there is a high level of difference between the two time points and this shows that the treatment has been effective. Its SDs indicate that there is slight decrease in SDs, going down to 0.5996 in the post-test against 0.6470 in the pre-test, indicating increased consistency by the participants in the post-test when compared to the situation in the pre-test.

The average writing score increased significantly by 2.55 in the pre-test to 4.52 in the post-test in the experimental group as indicated in Table 10. This growth portrays a very large improvement in writing abilities after the intervention. Also, the standard deviation went down to 0.60 compared to 0.65, which means that the correlation among the scores of the students grew more homogenous after the treatment. On the whole, the results provided in Table 10 indicate the efficacy of working program in writing quality development and balancing the progress in the group.

### Teachers' Attitudes and Beliefs Toward Digital Humanities

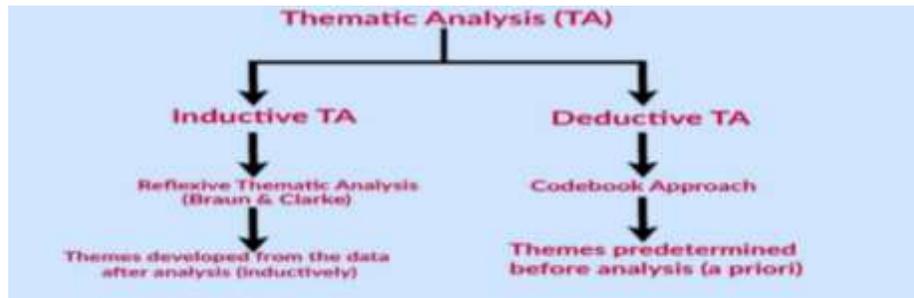
#### Thematic Analysis

Thematic analysis describes a method of qualitative analysis of data in which patterns of meaning, or themes, within a data set are identified, analyzed and reported. In the current research, a thematic analysis was used to analyze the data based on interviews of teachers of the English language, discussing their experiences and opinions on the use of the Digital Humanities (DH) tools in an ESL classroom.

Thematic analysis was adopted and it went through the six steps approach by Braun and Clarke, (2006). The initial phase was the process of getting acquainted with the information by reading and re-reading the interview transcripts to acquaint themselves with the material thoroughly. The first impressions and initial thoughts were recorded to start getting preliminary thoughts. The second process involved the creation of initial codes that involved systematic pointing of important features throughout the data set and giving them brief descriptive names. These codes were significant portions of the data that were important in the research questions.

During the third stage, the coded information was reviewed in search of larger patterns, which resulted in generation of first themes. The fourth process was review and refinement of these themes, and this was done to ensure that they were clear, boundary, and followed the data well. The weak or overlapping themes were edited or removed. The fifth step was to clearly define and name each theme and bring out the essence and relevancy of the theme to the study. Lastly, the sixth procedure involved writing up the findings whereby themes were reported in narrative form and were accompanied by

To facilitate the analysis, NVivo software was used and it was convenient to arrange, conceptualize and control large quantities of qualitative.



Within inductive thematic analysis, instead of introducing themes in consideration of the preconceived ideas, it extracts them straight out of the data. This discussion adheres to six steps in the approach of Braun & Clarke (2006).

### Tree Map of Thematic Codes



This tree map is graphical profiling of themes and the sub-themes regarding their frequency and level of hierarchy according to the number of coding references in the qualitative interview data. The bigger and darker blocks such as Institutional Support and its sub codes like Training Recommendations, and Overloaded schedules show that they were the most commonly voiced issues

### Teachers Interview

#### Code

| Name                                    | Description   |
|---|---|
| Accessibility and Use of Tools          | Refers to the availability and ease of use of DH tools in classroom environments. |
| Curriculum revision to include DH tools | Suggests updating the ESL curriculum to formally include Digital Humanities tools |



| Name   | Description   |
|--|---|
| Challenges in Implementation                 | Covers various barriers teachers face in integrating DH tools in teaching practice.         |
| Curiosity about innovative methods           | Reflects teachers' interest in exploring new and creative teaching techniques.              |
| Institutional Support                        | Shows teachers' willingness to adopt technology in their teaching methods.                  |
| Willingness to experiment                    | Indicates teachers' openness to trying new tools and teaching strategies.                   |
| Effect on student learning                   | Represents the positive outcomes observed in students due to DH tool usage                  |
| Overloaded schedules and time constraints    | Describes how heavy workloads prevent teachers from adopting new digital methods.           |
| Exposure to global knowledge                 | Shows how DH tools help students access and engage with international content.              |
| Poor Internet Connectivity                   | Weak or unreliable internet limits DH tool usage  |
| Lack of Devices                              | Classrooms lack enough devices for students or teachers.                                    |
| Integration of DH tools in teacher education | Recommends incorporating DH tool training into pre-service and in-service teacher programs. |
| Unfamiliarity with DH Concepts               | Understanding of DH tools and their use.  |
| Fear of Using Tools                          | Teachers are hesitant or anxious about using unfamiliar technology.                         |

**Sunburst Chart Showing Thematic Distribution and Hierarchy**







A word frequency query in NVivo produced a word cloud of the most frequent words used by the research participants. It is important to note that such words as training, tools, students, infrastructure were used the most, which means that there are regular issues and ideas discussed in terms of the usage of DH tools in this process of integration.

### **Conclusion**

This paper aimed at investigating the efficiency of the use of Digital Humanities (DH) tool in the ESL classroom, incorporating it into the improvement of English writing in particular. The use of both quantitative and qualitative data allowed the study to find clear evidence of the fact according to which DH tools not only enhance writing performance but undergo the process of changing the learning experience of students. The highly positive difference in the post-test results of the experimental group, as compared with that of the control group with their insignificant positive improvements, proves that incorporation of DH tools introduces students to more communicative, interactive and effective means of acquisition of writing skills.

Grammarly, Padlet, Google Docs and StoryMapJS digital tools provided immediate feedback, promoted collaborative learning and created independence in learners. Such sites gave the students a chance to be critical of their rough works, do revision intelligently, and become more confident of their writing skills. As students used technology to go through the writing process, there was an improvement in control of grammar, organization, vocabulary, and mechanics elements of academic writing.

Finally, this research creates a larger body of knowledge in favour of technology-enhanced language instruction. Through stating the pedagogical relevance of integrating DH, it motivates learning institutions and teachers to rethink the ESL writing classrooms in terms of using the digital advancements with the more basic learning about writing. The study provides a conclusion that the DH tools aimed at the enhancement of writing outcomes of the ESL students can be considered as a tool that contributes to the independence of learners, becomes a supportive component of the education, when applied with thoughtfulness.

### **Recommendations**

Digital humanities tools like online archives, blogs, and multimedia, and digital storytelling platforms must be incorporated into ESL writing instruction as a way of improving the engagement and creativity of the learners. ESL educators ought to be given the appropriate training and professional development in order to realize digital humanities-based instruction methods in the classroom. The issue of digital humanities-informed writing tasks in ESL syllabus is being promoted to curriculum developers and policymakers due to the necessity to organize and systematic skill acquisition. All ESL learners need to user-friendly digital tools and reliable internet access and online educational materials provided by their learning institutions. Constant evaluation and feedback within the digital/internet should be given to enhance grammar, coherence, vocabulary, and general proficiency in writing among learners.

### **References**

Abbasi, F., Waheed Shahzad, D. F. A., & Farooq, M. A. (2025). LANGUAGE PLANNING AND POLICY IN PAKISTAN: STAKEHOLDERS' INCLUSIVITY IN LPP DEVELOPMENT. *Contemporary Journal of Social Science Review*, 3(4), 1091-1013.



Albiladi, W. S., & Alshareef, K. K. (2019). Blended learning in English teaching and learning: A review of the current literature. *Journal of language Teaching and Research*, 10(2), 232–238.

Pitukwong, K. (2024, April 4). Exploring the effectiveness of digital writing tools on Thai EFL students' writing

Balaman Uçar, S. (2016). The impact of digital storytelling on English as a foreign language learners' writing skills. *Unpublished doctorate dissertation, Hacettepe University, Institute of Educational Sciences, Ankara.*

Chen, D. (2024). *A hybrid approach to teaching Chinese through digital humanities, CALL, and project-based learning.* Taylor & Francis

*Journal of Humanities and Social Science*, 8(5), 45–53.

Busa, R. (1980). The annals of humanities computing: The index thomisticus. *Computers and the Humanities*, 83-90.

Adas, D., & Bakir, A. (2013). Writing difficulties and new solutions: Blended learning as an approach to improve writing abilities. *International Journal of Humanities and Social Science*, 3(9), 254–266.

Lin, S.-H. (1993). *Effects of representational systems on text processing by first and second language readers of Chinese: An exploratory study of pinyin, zhuyin, and characters.* University of Massachusetts Amherst.

Malik, A. (2019). Creating competitive advantage through source basic capital strategic humanity in the industrial age 4.0. *International Research Journal of Advanced Engineering and Science*, 4(1), 209–215.

Meythaler, A., Baumann, A., Krasnova, H., Hinz, O., & Spiekermann, S. (2023). Technology for Humanity. *Business & Information Systems Engineering*, 65(5), 487–496.

Ramamuthie, V., & Aziz, A. A. (2022). Systematic review: The effectiveness of digital tools to improve writing skill of ESL students. *International Journal of Academic Research in Business and Social Sciences*, 12(3), 408–427.

Sarwat, S., Asghar, M., Shahzad, S. K., & Shahzad, W. (2024a). Impact of questioning strategies on reading comprehension of Pakistani O-Level students. *Spry Contemporary Educational Practices*, 3(1).

Sarwat, S., Iftikhar, I., Sahito, J. K. M., & Shahzad, W. (2024b). Impact of student engagement in language support classes through cooperative learning: A study of Pakistani educational institutions. *Research Journal for Societal Issues*, 6(1), 199-210.

Sarwat, S., Shahzad, W., Anees, M., & Shahzad, S. K. (2023). Willingness to communicate in English: Its influence on oral proficiency levels in ESL learners. *Qlantic Journal of Social Sciences*, 4(4), 232-246.



Shahzad, W., & Abbas, F. (2025). *Automated evaluation of ESL learners' English writing skills in EMI through AI writing analytics*. In *Proceedings of NexSymp 2025* (Multimedia University, Cyberjaya, Malaysia).

Shahzad, W., Shahzad, S. K., Ahmed, R. I., & Jabeen, R. (2018). The study of language planning in national educational policy (NEP) 2017 in Pakistan. *European Journal of English Language and Literature Studies*, 6(7), 5-19.

Sohail, M., Ain, N. U., & Shahzad, W. (2025). Impact of Bilingual Support on English Language Learning among Special Students in Multilingual Classrooms in Pakistan. *JELLL*, 3(1).

Suryani, N. Y., Rizal, S., Rohani, T., & Ratnaningsih, H. (2024). IMPROVING LEARNERS' ENGLISH WRITING SKILLS THROUGH DIGITAL TECHNOLOGY AND PROJECT-BASED LEARNING. *Jurnal Ilmiah Ilmu Terapan Universitas Jambi*, 8(1), 21–34.