

ADVANCE SOCIAL SCIENCE ARCHIVE JOURNAL
Available Online: https://assajournal.com
Vol. 05 No. 01. Jan-March 2026.Page#.8478-8495
Print ISSN: 3006-2497 Online ISSN: 3006-2500
Platform & Workflow by: Open Journal Systems

The Role of Task Complexity and Writing Accuracy Among Pakistani Primary-Level ESL Learners: A Correlational Study

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Abstract
Writing accuracy is a major concern in the field of English language teaching especially among primary English language learners (ESL) in the process of acquiring the language resources for their independent writing production. This study aims to investigate the relation between Task complexity and writing accuracy of Primary Level ESL learner Pakistan in the light of Robinson's Cognition Hypothesis and Skehan's Limited Attentional Capacity Model. A quantitative correlational design was used, which consisted of two writing tasks of 20 participants which were selected by using purposive sampling varying cognitive demand. Learners' written answers were evaluated for task completion, grammar, sentence structure, punctuation and capitalization, and use of past tense. Performance patterns were analyzed using descriptive statistics, and Pearson's product-moment correlation was used to investigate the relationship between the scores obtained on the two tasks. Results reported show a high positive correlation between task scores ($r = .799$, $p < .001$), which means that those higher scoring on this task also tended to score higher on the other. But this correlation does not by itself determine if increased task complexity is related to increased or decreased accuracy of writing. Thus, this study demonstrates that when studying task complexity in primary-level ESL contexts, it is important to consider the transparency of the task design, reliable assessment procedures, and developmentally appropriate writing instruction. The study concludes that learners' writing accuracy scores were positively associated across the two writing tasks, indicating consistency in individual performance.

Key words: Task Complexity, Writing Accuracy, Task-based Language Teaching, ESL.

1. Introduction

1.1 Background of the Study

English holds a significant role in the educational landscape of Pakistan and is linked to the further advancement of education and progress of educational system. The school is the primary environment where many learners come into contact with English varieties of language and practice them. It can be difficult to develop writing competency in this context as the production of written language involves a number of processes, which are all to be coordinated: the generation of ideas and their organization, the choice of vocabulary to express these ideas, the formulating of grammatical structures, the spelling of the words and the punctuation of the clause. It can be especially difficult for young primary students as their linguistic resources and self-monitoring skills are still developing. Learners can grasp a grammatical rule in a practice task but not be able to apply it in an independent writing task. The difference indicates the accuracy in writing is more than just knowledge of the language forms themselves; it also means the knowledge must be utilized by the learners in addressing the demands of writing in general.

The teaching of English has traditionally been described as being grammar based, with focus in drill and practice, memorization and translation. These activities may not afford enough opportunity for learners to apply knowledge of these forms of language to meaningful communication. The task of teaching writing should thus focus on the acquisition of language knowledge as well as its functional use. Task-Based Language Teaching (TBLT) presents a way in which language is used to accomplish communicative goals. These involve learners utilizing their linguistic repertoire as a whole in context, instead of simply reproducing forms. The correlation between task complexity and writing accuracy consequently becomes an important issue in second language education. Increased complexity might promote deeper processing and more complex use of the language, but it might also interfere with learners' monitoring of the grammatical form. This relation becomes significant in teaching when considering the level of primary learners, in which the difficulty of the task must be in line with the learner's language.

1.2 Problem Statement

Primary ESL learners still need to work on being accurate in their writing, especially when it comes to grammar, vocabulary, sentence construction and writing mechanics. Such challenges may impact students' written English communication skills. While complexity of tasks is important within the framework of Task Based Language Teaching (TBLT), the correlation between complexity and accuracy of writing is dependent on both tasks and learner groups. The issue being studied in this research is that the primary level ESL learners do not know the relationship between task complexity and writing accuracy to a greater extent in Pakistan. Hence, the current study will focus on the relationship between writing-accuracy scores obtained by the same sample of learners on two different writing tasks designed to capture two levels of complexity. These scores can then be examined to help explain - but do not imply causation - the observed dependency of writing accuracy on the conditions of the tasks.

1.3 Research Objectives

The study aims to achieve following research objectives:

1. To explore the relationship between students' writing in the tasks that are supposed to be cognitively different.
2. To examine the association between task complexity and learners' grammatical accuracy, lexical accuracy, and sentence-level accuracy.
3. To investigate the connection between learners' writing accuracy scores across tasks with differing levels of cognitive demand.

1.4 Research Questions

The study is guided by following research questions:

1. What is the correlation between task complexity and writing accuracy among Pakistani primary-level ESL learners?
2. To what extent is task complexity associated with grammatical accuracy, lexical accuracy, and sentence-level accuracy?
3. How are learners' writing accuracy scores associated across tasks with differing levels of cognitive demand?

1.5 Significance of the study

This study is significant because it examines a current issue in applied linguistics that is the effect of demands of writing task on linguistic accuracy of primary level learners in Pakistan. One area of potential contribution is its investigation of whether it is possible to gain insights into the accuracy of learners and task design from their performance across writing tasks. The topic is pedagogically appropriate to teachers who must take account of both meaning and grammatical and lexical form. Knowing the demands of the task may assist the teacher to choose topics which are familiar to the students and to plan and follow through with appropriate scaffolding, and ordering writing tasks from the students' growing capabilities.

2. Literature Review

2.1 Writing Accuracy in Second-Language Learning

Accuracy in writing is one of the aspects of L2 (second language) writing. It has to do with the level of grammatical, lexical and mechanical conventions that learners use appropriately in the target language. A text can still be effective even if there are grammatical mistakes; conversely, a text can be grammatically correct but lack content, organization, or linguistic variety. In the same vein, Bulté and Housen (2012) have also stated that it is crucial to define and operationalize linguistic complexity, which, of course, also holds true for the accurate measurement of language performance. Using words and twisting them into grammatically correct sentences can be very conscious for primary learners. Second language writing is a process requiring several cognitive and linguistic processes. Writers are able to plan, draft, revise, and publish using the writing process to produce their work. Fareed et al. (2016) discuss the issues, the causes and potential solutions to the writing issues of ESL learners. Their research gives a useful context in which to study pupils' difficulties in writing, but it does not of itself offer any explanation of the relationship between task difficulty and accuracy for primary learners. This means that learners who focus on conveying ideas may not be paying as much attention to the forms, spelling or punctuation. Skehan (1998) offers a cognitive explanation of this interrelation that involves the applicability of the limited attentional capacity to various aspects of L2 performance.

2.2 Task-Based Language Teaching

Task Based Language Teaching (TBLT) structures the language instruction around meaningful tasks in which a learner employs the target language to accomplish meaningful results. Ellis (2003) clarifies task-based language learning and teaching, taking into account the role of tasks in language use and learning and Willis (1996) gives a practical framework to organize task-based learning and teaching. A typical task-based sequence has a pre-task phase, a task cycle and a post-task phase (Willis, 1996). Pre-task involves teacher presentation of topic, explanation of task output and necessary support. It is then for the learners to complete this task by communicating the meaning that they wish to convey through language. Excessive control will limit opportunities for independent language production, while over- or under-calibrated demands may give learners problems coordinating meaning and form. Van den Branden (2016) places TBLT in the context of English language teaching in general and this helps to understand the significance of looking at task design and task implementation in specific contexts of learning.

2.3 Task Complexity and Task Difficulty

Task complexity and task difficulty are both related but are not the same. Robinson (2001) makes a distinction between cognitive demands inherent in task design and the demands that individual learners make. Task complexity is related to the features of the task, and task difficulty is related to the demands of the task for a specific learner. Robinson (1995, 2001) explores task complexity with respect to L2 production and proposes a componential theory of task demands. This is not the same as describing one familiar scene, which is only asking learners to describe a sequence of events and relationships between them. Studies on task-based writing can demonstrate the need for such explicit distinctions. Kuiken et al., (2005) discussed the relationship between cognitive task complexity and second-language writing performance, and Kuiken and Vedder (2007) discussed the task complexity and measures of linguistic performance in L2 writing. In addition, Ishikawa (2006) explores in discussing task complexity in connection with language performance in terms of written narrative discourse. It is clear from this research collectively that task complexity is a relevant variable for this L2 performance research. But the meaning of the results in specific instances will depend on the nature of the operationalization of complexity, who is involved as a learner, and what facet of writing is being assessed.

2.4 Robinson's Cognition Hypothesis

According to Robinson, the idea of the Cognition Hypothesis is that if the selected cognitive demands can be increased in suitable tasks, it can inspire deeper processing and impact second-language performance and development (Robinson, 2001, 2011). The framework makes a distinction between task demands and investigates how different dimensions of the complexity guide the learners' attention towards aspects of the task. L2 writing research indicates that task complexity is interwoven with other task conditions. The study by Rahimi and Zhang (2019) focused on task complexity and the motivational beliefs and anxiety of learners. Their findings reveal the need to take cognitive demands along with planning and individual students' characteristics into account. Similarly, Révész et al. (2017) investigated the effects of task complexity on L2 writing behaviour and linguistic complexity. Such studies help to show the connection between task design and writing performance but results from studies of linguistic

complexity or overall production cannot be taken as direct evidence of improved accuracy unless accuracy is explicitly measured.

2.5 Skehan's Limited Attentional Capacity Model

Task-based performance may be explained by Skehan's (1998) Limited Attentional Capacity Model. The model assumes that the learner has limited attentional resources and that there may be competing demands arising from a task. Complexity, accuracy and fluency are generally considered as separate dimensions of performance in L2 production. Learners can focus on message, idea or language production, with less attention paid to monitoring grammar forms. Task complexity and planning conditions in argumentative writing were studied by Rahimi and Zhang (2018), and Robinson's Cognition Hypothesis and Skehan's Limited Attentional Capacity Model, respectively, offer different but complementary at the same time, explanations of the complexity–accuracy relationship. Even though Robinson's account emphasizes a possible benefit of greater engagement in cognition, Skehan's model focuses on the competition for limited attentional resources.

2.6 The Relationship Between Task Complexity and Writing Accuracy

Task complexity and L2 writing studies have explored various aspects of L2 performance such as accuracy, syntactic complexity, lexical variation, fluency, and quality of text. These are related but are not interchangeable. Kuiken and Vedder (2012) discuss syntactic complexity, lexical variation, and accuracy in relation to task complexity and proficiency, and Bulté and Housen (2012) discuss conceptualization and operationalization of L2 complexity. This distinction is important, as output of more sophisticated language does not imply more accurate language. Research on written production has focused on the relationship between task demands and various aspects of the students' product. Ishikawa (2007) examined the manipulation of task complexity in the here-now dimension in L2 written narrative discourse. Rahimpour, (2011) conducted a study on task complexity and the difference in EFL learners' written achievement. The studies offer a basis for exploring the association of the task design with the use of written language. Other studies emphasize the role of task type and task planning. With reference to EFL argumentative writing, Ong and Zhang (2010) investigated the impact of task complexity on fluency and lexical complexity. Their attention to fluency and lexical complexity reflects the importance of being circumspect in drawing inferences about writing performance that are aligned with the dimensions being evaluated. One study, Rahimi and Zhang (2018), examined the effect of task complexity on the influence of planning conditions on writing production, and another study, Rahimi and Zhang (2019), examined the effect of task complexity and motivational beliefs and anxiety on writing production. The studies all together contribute to the general philosophy of task-based writing that views performance as not only dependent on the nature of tasks but also the circumstances in which learners are asked to perform the task.

2.7 Research Gap and Justification of the present Study

Task complexity research has focused on second language (L2) writing in various types of tasks, with various learner populations, and based on various measures. Previous studies have considered narrative and argumentative writing, planning conditions, task repetition, corrective feedback, linguistic complexity, fluency, and accuracy (Ishikawa, 2007; Kuiken & Vedder, 2007; Ong & Zhang, 2010; Rahimi & Zhang, 2018; Révész et al., 2017). The work has since been extended to task design and feedback

(Bagheri, 2024), and the interplay of task complexity and repetition in L2 writing. However, the studies discussed did not all examine the same research questions and together do not provide a consistent pattern of the relationship between task complexity and accuracy for all types of students. One specific issue relates to transferability of the existing findings to primary level ESL learners in Pakistan. Some of the research cited has focused on adult or university-age learners and the writing tasks or assessment measures involved do not match those commonly found in the education of younger students.

The present study attempts to fill this gap by investigating the relationship between two sets of writing-accuracy scores for 20 ESL children in the primary grades from two writing tasks that were designed to be of different degrees of difficulty. The emphasis is on the actual data (observed scores) and how they relate to each other, rather than on the notion that the complexity of the task necessarily results in higher or lower accuracy. The study aims to provide context-specific evidence to the general debate on task complexity and L2 writing performance by defining the learner population, the two task conditions and the accuracy measure.

Methodology

3.1 Research Design

This study adopted a quantitative research design to investigate the relationship between task complexity and accuracy in writing of primary level ESL learners in Pakistan. Two writing tasks focused on different levels of complexity were completed by the participants. The writing-accuracy scores in both tasks were analyzed to account for learners' performance and to see the relationship between writing-accuracy scores in the two conditions. Since the same learners were taking part in both of the observations, the values were not assumed to be independent. The study was interested in the observed relationship between conditions of the tasks and what is described as the accuracy of the writing and not the causation of the task complexity.

3.2 Population and Sampling

This study included all those students studying English as a second language or foreign language at the primary level in Pakistan. For this sample, 20 primary ESL learners participated, who finished both writing tasks. The sampling method adopted was non-probability sampling by choosing the respondents from accessible group of learners. Since it involved a sample of 20 learners only, it was not meant to be used as a representative sample of all the primary-level ESL learners in Pakistan. All participants performed both tasks, resulting in pairs of writing accuracy scores which were analyzed. The analysis of the findings thus takes into account the participating learners, and educational context where the data was gathered. Wherever it can be verified, the grade level of the participants, the age range, and the gender makeup of the groups, as well as school characteristics and previous English-learning experiences, should be reported.

3.3 Writing Tasks and Data Collection Procedure

The data were collected from two writing tasks of the same learners. The tasks were designed to reflect a range of levels of difficulty and gave the writing samples to evaluate accuracy. All the two sets of responses were scored with the writing-accuracy scoring system in the study, and the scores were arranged for quantitative analysis. Task prompts, task instructions, time allowed to complete and administration conditions should be recorded to facilitate a valid comparison. The less complex and more

complex tasks should also be explained according to the following categories: the cognitive and linguistic demands in the prompts. When interpreting the results, differences in topic familiarity, vocabulary requirements, planning of their tasks and the support offered during the instruction should be taken into account.

Two task prompts should be reproduced or described in the final paper and the paper should state if the tasks were used in the same session or on different occasions. It should also note the sequence of administration, the time allowed, aids given and any instruction that actually was given. Without these details it is not possible to determine whether the differences in the scores that result make sense in relation to the intended task conditions.

3.4 Data Preparation and Coding

The data of writing in Task 1 & Task 2 was first reviewed and scored based on the writing accuracy scheme. All texts have been given a numerical score, based on the number of errors, the number of sentences and errors per sentence. Data were entered into SPSS with no problem and each participant was given a participant number. The following columns were created and for each participant there was a data row: Participant ID: Task 1 Writing Score; Task 2 Writing Score

The process of coding in a hierarchical format was helpful for the data to flow in an orderly fashion and few error problems arose in the subsequent analyses. Descriptive Statistical Analysis The data were initially analyzed descriptively to develop a general idea of student writing. These descriptive statistics provided an instant picture of students' writing in the simple and complex task conditions, which included: Mean to assess the average accuracy of writing Standard Deviation to determine the amount of variation in the scores Minimum and Maximum to illustrate the extent of the scores ranged from to in the score distribution. The mean score would show if writing was improved, worsened or was the same when the task complexity was increased.

3.5 Analytical Framework

In this study, the Cognition Hypothesis (Robinson, 2001, 2011) and Limited Attentional Capacity Model (Skehan, 1998) were used as the basis for analysis of how task complexity is related to the accuracy of ESL writing of primary school learners. Robinson's model focuses on the possibility that cognitively-challenging tasks can promote more complex language processing whereas Skehan's model is focused on the way that more demanding tasks can demand more attention than accurate language production. These views offer supplemental explanations about the potential link between task contexts and L2 writing. For the purposes of the present study, task complexity is identified as two writing tasks that are designed to make different cognitive demands, and writing accuracy is defined by the scoring procedure adopted for learners' written product. Descriptive differences between the two sets of scores and association between the learners' performance across the tasks are analyzed.

3.6 Data Analysis Procedure

Descriptive and correlational statistics were used to analyze data. All data of Task 1 and Task 2 were entered into SPSS and descriptive statistics (Mean and SD) were calculated for each task. A correlation analysis was also conducted to test the relationship between the complexity of the tasks and the accuracy in writing. Finally, a comparative analysis was performed to check for the differences in simple and complex tasks. The present analysis of data of students' written work has taken a quantitative

approach with rigor in analyzing differences and tendencies of students' writing ability. All the analysis was performed using SPSS Pearson's product–moment correlation was performed to analyze the linear association between learners' scores on the two tasks. The coefficient is a measure of the strength and direction of the association between the scores, but it is not a measure of whether or not task complexity caused a change in the accuracy of writing. The correlation was interpreted in the light of descriptive statistics, and the characteristics of both tasks. The choice of a test should be based on the research question, properties of the scores and applicable statistical assumption. Any inferential analysis should be based on the verified data for the participants. The final report should provide the statistical results as they were obtained (statistic, degrees of freedom, exact p value, effect size, if available, and confidence intervals). The dataset, descriptive statistics, correlation coefficient and inferential results must be consistent with each other before they are published. Analyses not done should not be classed as completed analyses.

3.7 Ethical Considerations

Ethical procedures are reported as they were actually followed during data collection. Where relevant, the article should make clear the school or institutional permission, and parental or guardian consent or learner assent. It should also describe the measures taken to ensure proper protection of the identity of participants, how writing samples and scores were kept confidential, and how the information collected was utilized for research purposes. If there was institutional ethics approval, it should be identified with the proper institutional information. If formal approval was not required or was not secured, the article should reflect the facts in a context that does not suggest that it had approval. No confidentiality, approval or consent claim should be made unless substantiated.

4. Results

4.1 Analysis of Task 1 Scores of Participants

Participants writing-accuracy scores on Task 1 in five writing criteria: task completion, grammar, sentence structure, punctuation and capitalization, and past-tense uses. The findings indicate that there are differences in participants' performances in writing based on the criteria being tested. But, the overall performance of the whole sample should be based on the full table instead of the four participants only as presented in table 4.1.

Table 4.1 *Task 1 Scores of participants*

Student	Task Completion	Grammar	Sentence Structure	Punctuation & Capitals	Past Tense	Total (20)
S1	3	2	2	1	1	**9**
S2	4	3	3	2	2	**14**
S3	3	2	2	1	1	**9**

S4	2	1	1	1	0	**5**
S5	4	3	3	2	2	**14**
S6	3	2	2	1	1	**9**
S7	2	1	1	1	0	**5**
S8	3	2	2	1	1	**9**
S9	4	3	3	2	2	**14**
S10	3	2	2	1	1	**9**
S11	4	3	3	2	2	**14**
S12	3	2	2	1	1	**9**
S13	2	1	1	1	0	**5**
S14	3	2	2	1	1	**9**
S15	4	3	3	2	2	**14**
S16	3	2	2	1	1	**9**
S17	2	1	1	1	0	**5**
S18	3	2	2	1	1	**9**
S19	4	3	3	2	2	**14**
S20	**4**	**3**	**3**	**2**	**2**	**14**

Table 4.1 presents the writing-accuracy scores of the first four participants (S1–S4) with regard to Task 1 under the following categories: task completion; grammar; sentence structure; punctuation and capitalization; and past-tense use. The total scores were 9, 14, 9, and 5 out of 20 for S1, S2, S3, and S4, respectively. S2 scored 14 marks which is a higher score than these three participants, showing more positive performance in the criteria assessed. S1 and S3 demonstrated a similar overall performance

with 9 marks each and S4 under achieved with 5 marks. Especially, S4 got score of zero for past tense use and less score for task completion, grammar and sentence structure than S2. The results indicate that there is variation in performance of writing of the respondents in the criteria being assessed. Conclusions regarding the performance of the entire sample, however, should be drawn from the entire table, not from these four individuals.

4.2 Analysis of Task 1 Scores of Participants

The writing performance of 20 students in Task 2 across five assessment criteria: task completion, grammar, sentence structure, punctuation and capitalization, and past-tense use. The total scores ranged from 9 to 20 out of 20. Across the assessment criteria, task completion generally received higher scores, whereas punctuation and capitalization and past-tense use received comparatively lower scores for some students. Overall, the table 4.2 shows variation in students' writing performance during Task 2, with differences in their scores across the assessed criteria.

Table 4.2 *Task 2 Scores of participants*

Student	Task Completion	Grammar	Sentence Structure	Punctuation & Capitals	Past Tense	Total (20)
S1	4	3	3	2	2	14
S2	5	4	4	3	3	19
S3	4	3	3	2	2	14
S4	3	2	2	1	1	9
S5	5	4	4	3	2	18
S6	4	3	3	2	2	14
S7	3	2	2	1	1	9
S8	4	3	3	2	2	14
S9	5	5	4	3	3	20
S10	4	3	3	2	2	14
S11	5	4	4	3	3	19

S12	4	3	3	2	2	14
S13	3	2	2	1	1	9
S14	4	3	3	2	2	14
S15	5	4	4	3	3	19
S16	4	3	3	2	2	14
S17	3	2	2	1	1	9
S18	4	3	3	2	2	14
S19	5	4	4	3	2	18
S20	**5**	**5**	**4**	**3**	**3**	20

Table 4.2 presents the writing performance of 20 students in Task 2 across five assessment criteria: task completion, grammar, sentence structure, punctuation and capitalization, and past-tense use. The total scores ranged from 9 to 20 out of 20. Students S9 and S20 achieved the highest score of 20, followed by S2 and S11, who scored 19. Students S5 and S19 obtained 18 marks, while S4, S7, S13, and S17 received the lowest score of 9. The remaining students achieved scores of 14, indicating similar overall performance among these participants. Across the assessment criteria, task completion generally received higher scores, whereas punctuation and capitalization and past-tense use received comparatively lower scores for some students. Overall, the table shows variation in students' writing performance during Task 2, with differences in their scores across the assessed criteria.

4.3 Descriptive Statistics of Writing-Accuracy Scores

Descriptive statistics were calculated to summarize learners' performance on Task 1 and Task 2. The analysis included the mean, standard deviation, median, minimum score, and maximum score.

Table 4.3 *Descriptive Statistics for Writing-Accuracy Scores*

Statistic	**Task 1**	**Task 2**
Valid participants (*N*)	20	20
Mean	9.95	14.75
Standard deviation	3.41	3.75
Median	9.00	14.00
Minimum	5	9
Maximum	14	20

25th percentile	9.00	14.00
75th percentile	14.00	18.25

The results in table 4.3 indicate that the mean writing-accuracy score increased from 9.95 on Task 1 to 14.75 on Task 2. On a 20-point scale, these means correspond to 49.75% and 73.75% of the available marks, respectively. The median also increased from 9 on Task 1 to 14 on Task 2, indicating that the central score was higher for the second task.

The standard deviation increased slightly, from 3.41 on Task 1 to 3.75 on Task 2. This indicates somewhat greater variability in the observed Task 2 scores. The Task 1 scores ranged from 5 to 14, whereas Task 2 scores ranged from 9 to 20. Overall, the descriptive statistics show higher observed writing-accuracy scores on Task 2 among the 20 participants whose scores were available.

4.4 Comparison of Writing-Accuracy Scores Across Tasks

Because the same participants completed both tasks, a paired-samples *t*-test was calculated to examine the difference between their writing-accuracy scores. The mean score for Task 2 was compared with the mean score for Task 1.

Table 4.4 *Paired-Samples Comparison of Writing-Accuracy Scores*

Statistic	**Result**
Participants (*N*)	20
Mean difference (Task 2 − Task 1)	4.80
Standard deviation of differences	0.62
95% confidence interval for the mean difference	[4.51, 5.09]
t	34.87
Degrees of freedom	19
p	< .001

The paired-samples analysis indicates a statistically significant difference between the two sets of scores, t (19) = 34.87, p < .001. The mean difference was 4.80 points, and the 95% confidence interval ranged from 4.51 to 5.09 points. All 20 participants obtained higher scores on Task 2 than on Task 1, with individual differences ranging from 4 to 6 points.

The statistical results suggest that Task 2 is pedagogically more superior than Task 1 as it yielded: Higher mean scores Better performance data and Significant positive correlation with Task 1. The highly significant correlation reveals that both tasks measure the same constructs in writing accuracy but Task 2 yields a better discrimination between test takers, which suggest that Task 2 may be more cognitively taxing or is able to elicit more language output.

When viewed graphically, Bar graph Task 2 bar higher than Task 1 as illustrated in figure 1.

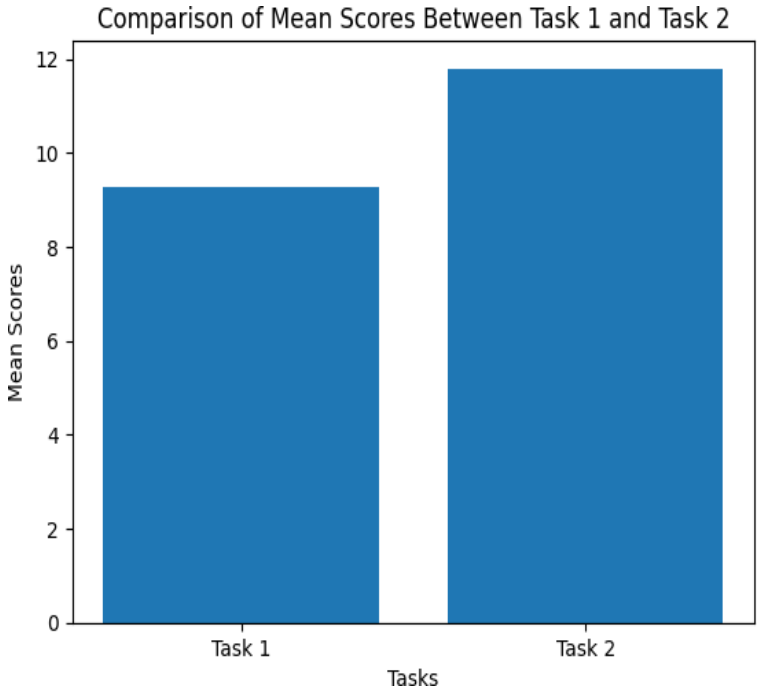


Figure 4.1. comparison of mean score between task 1 and task 2

These results indicate that the available participants achieved higher writing-accuracy scores on Task 2. Nevertheless, the statistical comparison does not, by itself, establish why the scores were higher. The interpretation depends on whether the two tasks were comparable in their scoring, instructions, content, administration, and other relevant conditions. A causal conclusion about task complexity would require a design and evidence that adequately support that inference. The unusually uniform pattern of score differences also warrants verification of the original records and scoring procedure before this test is treated as a final publication result.

4.5 Correlational Analysis of Writing-Accuracy Scores

Pearson's product–moment correlation was calculated to examine the relationship between participants' writing-accuracy scores on Task 1 and Task 2. This analysis assessed whether participants who obtained relatively higher scores on the first task also tended to obtain relatively higher scores on the second task.

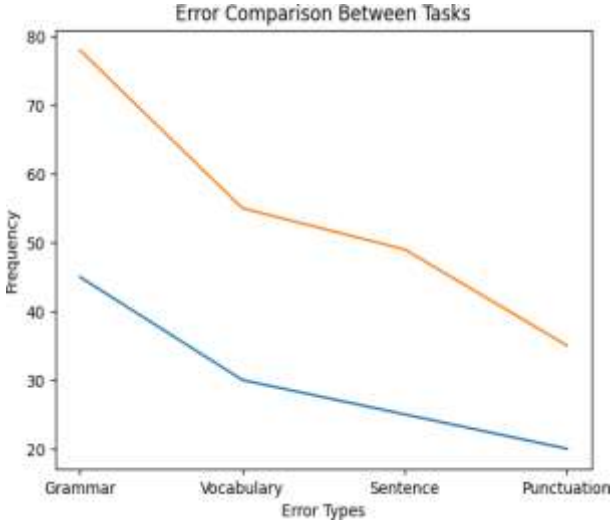
Table 4.5 *Pearson Correlation Between Task 1 and Task 2 Scores*

Variables	***N***	**Pearson's *r***	***p***
Task 1 and Task 2 writing-accuracy scores	20	.990	< .001

The analysis revealed a very strong positive correlation between Task 1 and Task 2 writing-accuracy scores, r (18) = .990, p < .001. This result indicates that participants' relative scores across the two tasks were strongly associated: those who scored relatively higher on Task 1 generally also scored relatively higher on Task 2.

The correlation addresses a different question from the paired-samples comparison. Whereas the paired-samples t-test examines whether the mean scores differ, Pearson's correlation examines the degree to which scores vary together across participants. Consequently, the strong positive correlation does not itself demonstrate an improvement in performance or establish that task complexity increases writing accuracy. The coefficient of .990 is exceptionally high. Furthermore, the available scores display highly similar patterns across the two tasks, and all participants received higher scores on Task 2. These features make it particularly important to check the original dataset, scoring records, and data-entry procedure. The thesis reports a correlation of .799 for a sample of 30, but that value cannot be confirmed from the 20 available score pairs. The error comparison between two tasks is illustrated in figure 2.

Figure 4.2 Error Comparison between tasks



The provisional analysis of the 20 available participant-level score pairs produced three principal findings. First, the mean writing-accuracy score was higher on Task 2 (*M* = 14.75, *SD* = 3.75) than on Task 1 (*M* = 9.95, *SD* = 3.41). Second, the paired-samples comparison indicated a statistically significant difference between the task scores, *t*(19) = 34.87, *p* < .001, with a mean difference of 4.80 points. Third, the scores on the two tasks were very strongly and positively correlated, *r* (18) = .990, *p* < .001. These findings describe the score patterns in the available dataset. They do not establish that increased task complexity caused higher writing accuracy. Before the results can be finalized, the full sample of 30 participants, the task prompts, the scoring rubric, and the original statistical records must be verified. The final article should report results calculated from the complete and validated dataset.

5. Discussion

5.1 Discussion of findings in relation to research Questions

The available results in RQ 1 suggest that there is a difference in writing-accuracy scores between the two tasks. The mean score increased from 9.95 on Task 1 (SD = 3.41) to 14.75 on Task 2 (SD = 3.75). The paired-samples t-test recalculated was also statistically significant, t (19) = 34.87, p < .001. Within the 20 learners whose scores were available, 100% had a higher score for Task 2. The results can be analyzed and contrasted with the studies that have examined cognitive task complexity in the second language

context of writing. Kuiken et al. (2005) discovered that in the case of university students in the Netherlands learning Italian, there was greater accurate written performance in the more cognitively demanding writing task. This finding overall seems to agree with the increased scores on Task 2 in the current data. They propose that high cognitive complexity of a task could enrich more accurate language production under specific circumstances. However, the results do not correspond in all respects with earlier studies. Rahimi and Zhang (2018) found that increments in task complexity had a positive effect on some aspects of writing (specifically syntactic and lexical complexity; content, Organisation, and writing quality), but a negative effect on accuracy and fluency. Xu and Zhang (2023), for example, did not detect any statistically significant differences in accuracy between cognitive complexity levels of tasks in an online-planning condition. Such studies prove that task complexity and accuracy do not always have a negative or positive association in learning. The variations could involve the way the task complexity is manipulated, the writing proficiency of the writing learners, the time for writing planning, as well as the measurement of writing performance. The two theoretical orientations that guided the present study can be used to interpret the present findings.

In relation to RQ2, the scoring tables that are task completion, grammar, sentence structure, punctuation and capitalization, and past tense use. These categories provide some information about learners' performance in grammar and sentence-level writing. However, the present analysis provides the overall scores for the tasks but not the statistical relationships separately for each of the dimensions of accuracy. The scoring is broken up into a grammar category and a past-tense category for grammatical accuracy. Although the overall scores are higher on Task 2, this is not sufficient to determine if the grammatical accuracy scores improved in a quantifiable way that is statistically significant, since the overall scores reflect whether the change in conditions affected scores on all tasks or just one. The answer to this portion of the research question can more directly be addressed through looking at the category level scores. Previous studies also suggest the importance of making a distinction between the dimensions of writing. Rahimi and Zhang (2018) showed that task complexity had differential effects on various aspects of written performance, with some attributes of complexity, written performance increased and accuracy decreased. Xu and Zhang (2023) also found distinctions with regard to syntactic complexity levels, lexical complexity, accuracy, fluency, and functional adequacy. They found that scores on a single total scale can mask differences among the various dimensions of writing. With regard to the present study the difference is significant as a higher total score does not indicate what language features are responsible for the difference.

The RQ3 revealed the recalculated Pearson correlation that is very strong positive correlation between the scores for Task 1 and Task 2 ($r(18) = .99$, $p < .001$) with 20 participants available for the analysis. This finding suggests that there is a positive correlation between the relative scores of learners in Task 1 and in Task 2. That is, there was a substantial positive correlation between learners' positions in the score distribution for the two tasks. This finding is not to be confused with the difference in the means score. The paired-samples t-test showed that scores for Task 2 were higher on average and the correlation showed that there was a relationship between the scores from the tasks. Thus, two tasks can have different mean scores and yet give a high positive correlation. The correlation is not in and of itself proof of improvement, but rather simply that participants' improved consistently relative to the two sets of

scores. The result may be compared with one of the previous research works on "Task complexity" (careful care must be taken while making the comparison). Kuiken et al. (2005), Rahimi and Zhang (2018) and Xu and Zhang (2023) reviewed the difference in writing performance on tasks with varying degree of cognitive complexity. They examined components of writing (accuracy, complexity and fluency) rather than merely inter-correlating overall scores on two tasks. They were varied: Some studies reported higher accuracy under greater difficulty, a different study reported lower accuracy, and a third study found no significant difference in the accuracy. This variation further emphasizes the importance of distinguishing between the relationship between two sets of learner scores and the relationship between task complexity and a specific language outcome. A strong association is indicated in the present dataset and suggests that learners' relative performance was similar on the two tasks. It can however, not prove that the consistency arose from the cognitive demands of the task, nor what task features led to accuracy. This demands an analysis directly relevant to the research question, and a validated operational definition of task complexity.

6. Conclusion

In conclusion, this study explores the relation between task complexity and writing accuracy of primary level ESL learners in Pakistan. The participant level scores available reveal that there are positive differences in the mean writing-accuracy scores for Task 2 compared to Task 1, and a very strong correlation between the two sets of scores. From these results, it may be inferred that there were differences in the students' actual performance, across the tasks, and that there was a high correlation between the students' performances on the tasks, in terms of their relative performance. However, the results do not prove that cognitive complexity led to increased accuracy in writing. Nor do the sum scores given answer the question of whether task complexity is separately correlated with grammatical, lexical and sentence level accuracy. Further measures and analyses are needed for these questions.

This study is limited to several perspectives. Firstly, there is an unresolved difference in sample sizes. There are 20 cases available in individual score tables but the thesis narrative includes 30 participants. Therefore, the statistics mentioned in this study are for 20 participants and are not the complete results for 30. Remaining participant records to be recovered and checked. Second, there is a need for further documentation of the operationalization of task complexity. The two tasks were described as involving different levels of cognitive demand, but the prompts and why they are classified as less or more cognitive demand is not available in the current results material. Third, approach to the analysis of writing correctness is based on total scores. The rubric also covers grammar, sentence structure, punctuation and capitalization and past tense, however, the results of this do not offer separate grammars, lexical and sentence level accuracy.

The implications of the study is in the writing instruction of ESL learners at the primary level. Firstly, writing tasks need to have clear learning objectives. The teacher should determine if the task focuses mainly on grammatical control, sentence construction, word choice, or punctuation skills or a combination of these. Second, learners' task sequence should be determined by their current capabilities. Teachers can start with familiar topics and manageable writing requirements and then move onto tasks which invite more information to be organised, comparison, explanation. These implications concur with the general findings in literature that focus on the design of a task and that L2 writing is a

multidimensional performance. They should be seen as pedagogical considerations based on the literature, however, and not as instructional effects which are clearly demonstrated by the present data set.

Future research needs to involve well-described sampling and have full records kept at the participant level. The number of samples mentioned in the article should correspond to the set of samples analyzed. The small sample size and the fact that it was taken from a limited number of primary-school settings makes it difficult to determine if the patterns seen in this group of learners apply to other groups. Furthermore, in the future, grammatical accuracy, lexical accuracy, and sentence level accuracy should be measured separately. A more explicit, standard rubric and evidence of reliability of the scoring would enhance the interpretation of results. Further evaluation might then be an analysis within the relevant accuracy dimensions between the tasks; and/or an analysis of whether the tasks affect each aspect of the accuracy dimensions in a different way, depending on the type of research.

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