



Promoting Cognitive Strategies in Second Language Writing

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ABSTRACT

Purpose: Polytechnic students lack basic skills, especially the writing skill essential for their employment. They find it difficult to write emails, reports, and other technical documents required at their workplace. Although there are studies to investigate this skill-gap, there is little research to explore the possibilities for enhancing their writing skill. Hence, this study focuses on enhancing the writing skill of the polytechnic students. This study aims to employ cognitive strategies to guide the mental operations entailed in performing a writing task. The paper delineates the experimental study employing cognitive strategies to foster the writing proficiency of the students.

Research Methods: 51 pre-final year diploma students belonging to the Department of Instrumentation and Control Engineering of the autonomous polytechnic institute in Tamil Nadu was chosen as the samples for this study. The teacher-researcher imparted cognitive strategies to the students and has invigorated them to employ it in their writing tasks administered in a graded structure during the course.

Findings: The findings of the study established a strong correlation between students' cognitive strategy use and their writing. The results corroborated improvement in the students' writing skill expedited by the employment of cognitive strategies in their writing tasks.

Implications for Research and Practice: The findings obtained in this study suggest the necessity of integrating cognitive strategies in the writing skill of the ESL learners in accordance with the workplace demands of adequate proficiency in writing skills of the employees creating a desideratum for the polytechnic students to enhance proficiency in their writing.

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Introduction

Writing is a productive skill encompassing various copious processes. Many researchers assert that “attention to process is potentially very important for the teaching of writing” (Hayes & Flower, 1980). This process-oriented approach enumerates, retrieval of information relevant to the task from memory, transfer of the background knowledge into writing, generation of new ideas, formulation of goals for the successful completion of the task, the grouping of ideas in a sequential methodology. The writing process is divided into three stages: Pre-writing, writing and Re-writing comprising subcategories, including planning, goal-setting, generating, organising, translating, reviewing and editing. Zamel (1983) opines writing as a “non-linear, exploratory, and generative process whereby writers discover and reformulate their ideas as they attempt to approximate meaning” (as cited in Hyland, 2003, p.11). Hayes and Flower (1980) describe, “as a dynamic process, writing is the act of dealing with an excessive number of simultaneous demands or constraints” (p. 33). Flower and Hayes (1981) proffer, “the process of writing is best understood as a set of distinctive thinking processes which writers orchestrate or organize during the act of composing” (p. 366). Davis and McKay (1999) expound, “writing is a process which fuses language and thought” (p. 5). These elucidate the role of cognition in writing, as Hyland (2003) has insisted, “cognition is a central element of the (writing) process” (p. 13) and “writing is a sociocognitive activity which involves skills in planning and drafting as well as knowledge of language, contexts and audiences” (p. 23). As cited in Shower, Gilmore, and Banks-Joseph (2008), “cognitive strategies are the ‘steps or mental operations used in learning or problem-solving that require direct analysis, transformation, or synthesis of learning materials in order to store, retrieve, and use knowledge’ (Wenden, 1986). ‘cognitive strategies involve asking questions, checking, revising, self-testing’ (Riding & Rayner, 1998); ‘analogy, memorization, repetition, writing things down, and inference’ (Hedge, 2000)” (p. 5). Accordingly, the paper proposes cognitive strategies to be employed in the ESL classroom to hone the Polytechnic students’ writing skills considering the skill gap prevailing in the polytechnic students’ writing skill as proffered by (Sarfo-Adu, 2015). Chaudron (2009) explains cognitive strategies as the operations that are involved in analysis, transformation or synthesis (p.113). Weinstein and Hume (1998) define cognitive strategies as “the behaviors, thoughts, or actions used by the learner in the process of learning to organize and store knowledge and skills, and to apply them easily in the future” (as cited in Pitenoe, Modaberi & Ardestani, 2017, p. 595). In congruence with this, selected cognitive strategies say, Remembering, Connecting and Generating are propounded in this paper to enhance the polytechnic students’ thinking ability in recalling and transferring their background knowledge, generating ideas, connecting the ideas relevant to the topic and organising them in a coherent manner. This strategy instruction employed in the study has been identified to promote the students’ thought process and equip them in achieving coherence and unity in their writing.

Literature Review

Learning Strategies. Chaudron (2009) defines learning strategies as the cognitive operations that learners apply in the classroom and learning situations (p. 109). Oxford (1989) defines language learning strategies as “the often-conscious steps of behaviors used by language learners to enhance the acquisition, language, storage, retention, recall, and use of new information” (as cited in Shi, 2017). However, some researchers, such as Rubin, Stern, Carver, Ellis, O’Malley et al. and Oxford, have classified learning strategies based on various components say, the process involved in learning and performance, hypothesis formation, cognition, metacognition, social and affective factors. Moreover, Cognitive Strategies have been proposed by O’Malley et al., Oxford and Wenden. While cognitive strategies have been furcated by O’Malley et al. into rehearsal, organization, inferencing, summarizing, reducing, imagery, transfer, and elaboration components, Oxford has categorized it into, enabling learners to understand and producing new language, such as reasoning, practicing, receiving and sending messages, analysing, and summarizing, and Wenden has categorized it into selecting information, comprehending, storing and retrieving information (as cited in Shi, 2017).

Table 1

Studies of Learner Strategies (Chaudron, 2009)

<i>Study</i>	<i>Class Level</i>	<i>Data Collection</i>
Naiman et al. (1978)	Grades 8,10,12	Classroom Observation, interviews
Bialystok & Frohlich (1978)	High School	Questionnaire
Politzer (1983)	University	Questionnaire
Politzer & McGroarty (1985)	University graduate preparation	Questionnaire
Chesterfield & Chesterfield (1985)	Preschool & grade 1	Classroom observation
Willing (1985)	Adult immigrants	Questionnaire
O’Malley et al. (1985)	High school	Interviews, classroom observation

Table 1 indicates the precursory studies that have been conducted effectuating Learning strategies in the classroom. Griffiths (2019), after analysing all the methods and learning strategies, has posited,

Language learning strategy theory eclectically combines all the theoretical traditions, viewing learners as cognitively active individuals, operating within a social environment according to their own individual human characteristics. In addition, strategy theory retains traces of other theories, such as behaviourism (e.g. repetition), structuralism (e.g., finding grammar rules), post-structuralism (e.g. emphasizing meaning), and self-regulation (the need for learners to manage their own strategy choices) (p. 3).

Second Language Writing. Matsuda (2003) promulgates that writing has been given attention during the 1960s and has become a significant issue at the annual meetings of the Conference on College Composition and Communication (CCCC) in 1949. Only

in the late 1950s, the shift from composition studies to second language studies has been identified; TESOL (Teachers of English to Speakers of Other Languages) has been found; and L1 and L2 writing composition have been demarcated. Besides, the limitation in writing as a controlled composition has led to the development of Guided composition. In the 1980s, discourse analysis was developed and a shift from textual features to process writing has been discovered. Later, second language writing has been recognized as a legitimate field and since then, the number of studies in the field has increased. As cited in Polio (2003), the prefatory research on the writing process is conducted by several researchers (see Boshier, 1998; Zamel, 1983; Pennington & So, 1993; Whalen & Menard, 1995) focusing mainly on General process, Hall (1990) Phinney and Khouri (1993), Porte (1997) and Roca de Larios et al. (1999) have investigated the revision process of writing, Henry (1996), Intaraprawat and Steffensen (1995) have concentrated on the fluency of writing, Polio and Glew (1996) have perused the prewriting process, Cohen and Cavalcanti (1990) and Hyland (1998) have examined the benefit of written feedback. Villamil and deGuerrero (1996) and McGroarty and Zhu (1997) have assessed the peer review in writing. Besides these studies, there are studies in L2 writing that has been conducted focusing the attention towards the participants say, teachers, students/writers, raters, and professors/NES (National Evaluation Systems) teachers. Students and writers have been the pivots in some studies (see McGroarty & Zhu, 1997; Liebman, 1992; Kubota, 1997; Spack, 1997; Leki & Carson, 1997; Deckert, 1993; Harklau, 1999; Leki, 1995).

Cognition and Writing. Van Dijk and Kintsch (1983) delineate cognitive strategies as,

Thinking and problem solving are well-known examples: We have an explicit goal to be reached, the solution of a problem, and there may be specific operations, mental steps, to be performed to reach that goal. These steps are under our conscious control and we may be at least partly able to verbalize them so that we can analyze the strategies followed in solving the problem (p. 68).

Ramli and Ardiana (2018) have conducted a study on tenth-grade students using cognitive strategy instruction in writing (CSIW) and have found improvement in the students' writing skills. Cognitive strategies have been investigated in contexts of writing by many researchers (see Graham & Harris, 1994; Harris & Graham, 1996; Scardamalia & Bereiter, 1986) (as cited in Shabitha, 2014). Bereiter (1980) has opined, "a complete processing model (Cognitive) would have to deal with all three of these aspects - with the cognitive moves that make up writing and their organization; with levels of processing, from the highly conscious and intentional to the unconscious and automatic; and with how processing capacity is deployed to these various functions in such a way as to enable writing to go on" (p. 103). Scardamalia and Bereiter (1986) have observed, "even relatively advantages students with years of schooling tend to exhibit strategies that are more novice- than expert like, but instruction designed on the basis of cognitive strategy models is demonstrating considerable promise" (p. 60). Besides, they explain cognitive strategies as the way, the cognitive behaviour (e.g., planning, rethinking or reproducing) is organised in writing. García and Fidalgo (2008) enunciates the predominance of cognition in the writing process as,

The demanding nature of writing requires student engagement to develop both writing competence and skills. Writing demands a level of behavioral engagement, which incites students to exert more effort and persist longer at tasks and seek instrumental help if necessary. Moreover, writing tasks require extensive attention control and self-regulation, because skilled writing as a self-planned, self-initiated and self-sustained activity entails high levels of self-regulation (Graham & Harris, 1997; Zimmerman & Risemberg, 1997); that is to say, writing also requires students' cognitive engagement (p. 415).

The eminence and influence of cognitive strategies in the process of writing is reflected through these revelations by great experts. While these studies have focused more on the process of cognition in writing, the present study explores the effectiveness of cognitive strategies in achieving coherence and unity in the polytechnic students' writing.

Research Rationale

Writing is not used to reinforce grammar and vocabulary in modern L2 classrooms as writing is an enterprise in and of itself (Manousou, 2015). Olson (as cited in Linse, 2005, p. 98) represents that writing is gathering and working on the ideas until they are presented in a polished and comprehensible manner to the reader. In addition, he attests that the concept of writing as a process is very useful. These reports reveal the importance of writing skill to be taught as a process rather as a product. Pushpanathan (2019) asserts, "all the four skills of a language (listening, speaking, reading, and writing) are included in the curricula in order to develop the communication skills of the Polytechnic Students" (p. 6093). Although these skills are included in the curriculum, the students lack the basic skills required for employment according to Goel (2017), Deputy Director General, Department of Higher Education Ministry of Human Resource Development, Government of India, "over the years, the diploma programmes have deteriorated losing the skill components, which has resulted in their being just a diluted version of degree education. The organizations employing them have to train them all over again in basic skills" (p. 8). Madhavan (2018) explicates that the students graduating from Polytechnic colleges lack the modern talents and skills required in corporate companies. This evidences explain the lacunae of polytechnic students in basic skills. Isnin (2017) has propagated the significance of writing skills at the workplace in spite of any profession, including engineers, scientists, architects, physicians and lab technicians. A study conducted by Yasin et al. (2010) on English skill deficiencies of polytechnic students found that they lack the comprehension of technical documents, appropriate use of grammar, vocabulary and sentence structure, writing test/investigation report and questioning for clarification (as cited in Isnin, 2017). These studies emphasize the need for improvement in the writing skills of polytechnic students. Frans (2014) indicates that the effective language learning necessitates the right knowledge to cope with the complexity and demanding nature of the language, especially in writing. Sturm and Rankin-Erickson (2002) have stated that "strategy instruction is a teaching approach that help students to develop strategies for all the process of writing by dividing the writing tasks and making the

sub processes and skills much more explicit" (as cited in Pitenoe, Modaberi, & Ardestani, 2017, p. 595). In concord with this, the present study has engrossed the polytechnic students with cognitive strategies to enhance their writing skill. To identify the predominance of cognitive strategies on the polytechnic students' writing skills, the following research questions have been examined in this study.

1. How often the students have used cognitive strategies in their writing?
2. Do cognitive strategies influence the students' writing skill?
3. Is there a difference in the writing performance of control and experimental group?

Method

Research Sample and Design

The present quasi-experimental study was conducted at Seshasayee Institute of Technology (SIT), a polytechnic institution located in Tiruchirappalli, Tamil Nadu, India. Simple random sampling technique was used to select the participants (N = 73) of this study. A diagnostic test was administered to identify the proficiency level of the students and the low proficiency students were allocated to the experimental group ICE (N = 51) and the remaining students were assigned to the control group ECE (N = 22). These students were chosen for this study considering their need of project report submission in the final year and their workplace requirements of report writing, letter writing and instructions.

Research Instruments and Procedures

The pre-study questionnaire was administered in the beginning of this study to examine their social background and to analyse their awareness of cognitive strategies pertaining to the writing skill. The pre-study questionnaire exhibited that most of the students hailed from rural background, regional medium of instruction and were not aware of cognitive strategies. Pre-Proficiency test was conducted to diagnose the proficiency level of the students, which indicated their low-level of writing proficiency. A schedule of 30 classes with 60 minutes duration was conducted to the experimental group facilitating the students to employ cognitive strategies in their writing process. 20 writing tasks were administered to the students in a graded structure. At the end of the course, post-study questionnaire was administered to analyse the students' strategy use in their writing after the employment of cognitive strategies and post proficiency test was conducted to assess the improvement in the students' performance. Besides these tests, a delayed-proficiency test was conducted after three months of the course to analyse if the students have sustained their improvement.

Validity and Reliability

The reliability of the research instruments, such as Questionnaire and writing tasks, has been inspected using the reliability analysis. The Cronbach's Alpha values in Table 2 being greater than 0.8 indicate that the data are highly reliable.

Table 2

Reliability Statistics

S.No.	Group	Variable	Cronbach's Alpha	N of Items
1.	Experimental	Cognitive Strategies	0.798	9
2.	Experimental	Pre-Study Questionnaire	0.902	53
3.	Experimental	Post-Study Questionnaire	0.896	37
4.	Control	Pre-Study Questionnaire	0.804	53
5.	Experimental	Writing Tasks	0.965	20

Data Analysis

The data collected were coded and analysed using SPSS software. Significant values of Shapiro-Wilk test in Table 3, being greater than 0.05 explicate the normal distribution of the data set. Descriptive statistics were used to analyse the first research problem concerning the strategy use of the students. Further, correlation analysis was computed to examine the relation between cognitive strategy and writing skill concerning the second research problem. Moreover, paired-samples t-tests have been computed to evaluate the outcome of implementing cognitive strategies in the writing process discussing the third research problem.

Table 3

Normality Statistics of Proficiency Test

S.No.	Group	Test	Shapiro-Wilk (Sig.)
1.	Experimental	Pre	0.541
2.	Experimental	Post	0.116
3.	Experimental	Delayed	0.532
4.	Control	Pre	0.608
5.	Control	Post	0.206

Results

Descriptive Analysis of Students' Cognitive Strategy Use

The frequency of Students' Cognitive Strategy use was analysed and is tabulated in Table 4. Cognitive strategies have been classified into three major categories say, Remembering, Connecting and Generating. Flower and Hayes (1981) have classified writing stages as, "Pre-Writing is the stage before words emerge on paper; Writing is the stage in which a product is being produced; and Re-Writing is a final reworking of that product" (p. 367). Remembering strategy is used in Pre-writing stage; generating strategy is used at all the stages and connecting strategy is used in Writing and Re-writing stage. The frequency percentage in Table 4 exhibits that the students from the experimental group 'sometimes' recollected ideas from their memory, 'always' transferred their background knowledge in their writing, 'always' related their thoughts and ideas in their writing, 'sometimes' sequentially classified and grouped their ideas for clarity, 'always' consciously followed the instructions, 'sometimes' generated new words concerning contextualization, 'sometimes' were able to think in English, 'always' were able to ponder and generate new content on their own, and

were 'always' were able to be transparent and lucid in expressing their thoughts in their writing task.

Table 4

Descriptive Statistics of the Cognitive Strategies

S.No.	Cognitive Strategies	N	Always (%)	Sometimes (%)	Rarely (%)	Never (%)	Mean	S.D.
<i>Remembering</i>								
1	Recollection of topics	51	26.2	47.5	6.6	3.3	3.16	0.73
2	Usage of background knowledge	51	42.6	31.1	6.6	3.3	3.35	0.79
<i>Connecting</i>								
3	Relating thoughts and ideas continuously	51	41.0	34.4	6.6	1.6	3.37	0.72
4	Clarity in the statement of opinion	51	31.1	44.3	4.9	3.3	3.24	0.74
5	Careful follow-up of the task instructions	51	45.9	29.5	4.9	3.3	3.41	0.78
<i>Generating</i>								
6	Compensation of new words	51	16.4	37.7	18.0	11.5	2.71	0.94
7	Ability to think in English	51	29.5	41.0	8.2	4.9	3.14	0.83
8	Ability to think and generate content	51	39.3	36.1	3.3	4.9	3.31	0.81
9	Ability to express thoughts clearly	51	41.0	34.4	4.9	3.3	3.35	0.77

Relationship between Cognitive Strategies and Second Language Writing

Correlation analysis was computed to analyse the relationship between the students' Cognitive strategy use and their writing. Table 5 explicates the students' writing that has been evaluated based on the scoring profile of Jacob et al. (1981) comprising Content, organisation, Vocabulary, Language Use and Mechanics as shown in Table 6. The p-values less than 0.05 in Table 5 indicated that there was a significant relationship between second language writing (Content, Organisation, Vocabulary, Language use, Mechanics) and Cognitive strategies (Remembering, Connecting and Generating). While there was a significant correlation between Remembering strategy and Content, Organisation, Vocabulary and Mechanics at 0.05 level, Remembering strategy and Language Use were correlated at 0.01 level. Besides, there was a significant correlation between the Connecting strategy and second language writing at 0.05 level. Further, Generating strategy and Second Language

Writing had a significant correlation at the 0.01 level. According to Chien (2012) "Students need to utilize the suitable strategies to be a professional writer because a positive correlation can be observed between writing competence and strategy use" (Pitenoe, Modaberi & Ardestani, 2017, p. 594). In concord with this, the results in Table 5 explicates that the employment of cognitive strategies has a positive influence on students' writing skill with reference to recalling the ideas stored in their memory that are relevant to the topic assigned to them, generating new ideas relevant to the topic, and connecting those ideas in sequential order for clarity and coherence in their writing.

Table 5

Correlation Analysis of Cognitive Strategies and Second Language Writing

	Cont.	Org.	Voc.	Lang. Use	Mech.	Remem.	Conn.	Gen.
Cont.								
Org.	0.972** 0.000							
Voc.	0.966** 0.000	0.990** 0.000						
Lang. Use	0.969** 0.000	0.987** 0.000	0.989** 0.000					
Mech.	0.945** 0.000	0.957** 0.000	0.968** 0.000	0.973** 0.000				
Remem.	0.346* 0.013	0.334* 0.017	0.324* 0.020	0.363** 0.009	0.312* 0.026			
Conn.	0.309* 0.027	0.291* 0.038	0.305* 0.030	0.336* 0.016	0.298* 0.033	0.601** 0.000		
Gen.	0.536** 0.000	0.524** 0.000	0.516** 0.000	0.551** 0.000	0.526** 0.000	0.622** 0.000	0.597** 0.000	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Note. The abbreviations in the table is expanded as the following: Cont. - Content, Org. - Organisation, Voc. - Vocabulary, Lang. Use - Language Use, Mech. - Mechanics, Remem. - Remembering, Conn. - Connecting, Gen. - Generating.

Table 6*Jacob et al.'s (1981) Scoring Profile*

<i>ESL Composition Profile</i>				
<i>Student:</i>	<i>Date:</i>	<i>Topic:</i>		
<i>Score</i>	<i>Level</i>	<i>Criteria</i>	<i>Comments</i>	
Content	30-27	EXCELLENT TO VERY GOOD:		
		<ul style="list-style-type: none"> • Knowledgeable • Substantive • thorough development of the thesis • relevant to assigned topic 		
	26-22	GOOD TO AVERAGE:		
		<ul style="list-style-type: none"> • some knowledge of the subject • adequate range • limited development of the thesis • mostly relevant to topic, but lacks detail 		
21-17	FAIR TO POOR:			
	<ul style="list-style-type: none"> • limited knowledge of the subject • little substance • inadequate development of the topic 			
16-13	VERY POOR:			
	<ul style="list-style-type: none"> • does not show knowledge of subject • non-substantive • not pertinent • OR not enough to evaluate 			
Organisation	20-18	EXCELLENT TO VERY GOOD:		
		<ul style="list-style-type: none"> • Fluent expression • Ideas clearly stated/supported • Succinct • Well-organized • Logical sequencing • cohesive 		
	17-14	GOOD TO AVERAGE:		
		<ul style="list-style-type: none"> • somewhat choppy • loosely organized but main ideas stand out • limited support • logical but incomplete sequencing 		
	13-10	FAIR TO POOR:		
<ul style="list-style-type: none"> • non-fluent • ideas confused or disconnected • lacks logical sequencing and development 				
9-7	VERY POOR:			
	<ul style="list-style-type: none"> • does not communicate • no organization • OR not enough to evaluate 			

Table 6 Continue

ESL Composition Profile				
Student:	Date:	Topic:		
Score	Level	Criteria	Comments	
Vocabulary	20-18	EXCELLENT TO VERY GOOD:		
		<ul style="list-style-type: none"> • Sophisticated range • Effective word /idiom choice and usage • Word form mastery • Appropriate register 		
	17-14	GOOD TO AVERAGE:		
		<ul style="list-style-type: none"> • Adequate range • Occasional errors of word/idiom form, choice, usage but meaning not obscured 		
13-10	FAIR TO POOR:			
	<ul style="list-style-type: none"> • Limited range • Frequent errors of word/idiom form, choice, usage • Meaning confused or obscured 			
9-7	VERY POOR:			
		<ul style="list-style-type: none"> • Essentially translation • Little knowledge of English Vocabulary, idioms, word form • OR not enough to evaluate 		
Language Use	25-22	EXCELLENT TO VERY GOOD:		
		<ul style="list-style-type: none"> • Effective complex constructions • Few errors of agreement, tense, number, word order/function, articles, pronouns, prepositions 		
	21-18	GOOD TO AVERAGE:		
		<ul style="list-style-type: none"> • Effective but simple constructions • Minor problems in complex constructions • Several errors of agreement, tense, number, word order/function, articles, pronouns, prepositions but meaning seldom obscured 		
17-11	FAIR TO POOR:			
	<ul style="list-style-type: none"> • Major problems in simple complex constructions • Frequent errors of negation, agreement, tense, number, word order/function, articles, pronouns, prepositions and/or fragments, run-ons, deletions • Meaning confused or obscured 			
10-5	VERY POOR:			
		<ul style="list-style-type: none"> • Virtually no mastery of sentence construction rules • Dominated by errors • Does not communicate • OR not enough to evaluate 		

Table 6 Continue

ESL Composition Profile				
Student:	Date:	Topic:		
Score	Level	Criteria	Comments	
Mechanics	5	EXCELLENT TO VERY GOOD:		
		<ul style="list-style-type: none"> • Demonstrates mastery of conventions • Few errors of spelling, punctuation, capitalization, paragraphing 		
	4	GOOD TO AVERAGE:		
		<ul style="list-style-type: none"> • Occasional errors of spelling, punctuation, capitalization, paragraphing but meaning not obscured 		
	3	FAIR TO POOR:		
<ul style="list-style-type: none"> • Frequent errors of spelling, punctuation, capitalization, paragraphing • Poor handwriting • Meaning confused or obscured 				
2	VERY POOR:			
		<ul style="list-style-type: none"> • No mastery of conventions • Dominated by errors of spelling, punctuation, capitalization, paragraphing • Handwriting illegible • OR not enough to evaluate 		
Total score	Reader	Comments		

Students' Writing Performance

The Paired-samples t-test was computed among the pre-, post-, and delayed proficiency tests to analyse the difference and improvement in the students' writing skill. In Table 7, p-value greater than 0.81 indicated that there was no significant difference between the performance of control and experimental group in their pre-proficiency test though the mean value 3.36 exhibits the proficiency level of the control group, slightly higher than the experimental group. Moreover, p-values less than 0.05 indicated that there was a significant difference between the experimental and control group in the post proficiency test. This finding suggests that the control group students who have been able to do fairly well in the pre-proficiency test could not excel in the post-proficiency test, as they have not been subjected to the pedagogical intervention. Besides, the results indicate that there is a significant difference between pre and post proficiency; post and delayed proficiency test performance of the experimental group.

Cohen classified effect sizes as small ($d = 0.2$), medium ($d = 0.5$), and large ($d \geq 0.8$) (Sullivan & Feinn, 2012). The effect size values greater than 0.8 for Post-Proficiency test of Control and Experimental group, and for pre and post-proficiency test of Experimental group in Table 7 implies a 'large' difference between the variables. The mean values and Effect size values of pre, post and delayed proficiency test performance of the experimental group denote that there is an adequate improvement in Pre-, Post- and delayed proficiency test performance of students belonging to the experimental group.

Table 7

Paired-samples t-test

		Mean	SD	T	P	Effect Size
Pre-Proficiency	Experimental	3.05	3.89	0.25	0.81	0.1
Pre-Proficiency	Control	3.36	4.20			
Pre-Proficiency	Experimental	2.52	3.09	-9.14	0.00	1.6
Post-Proficiency	Experimental	14.19	9.58			
Post-Proficiency	Control	6.70	4.61	2.81	0.01	0.8
Post-Proficiency	Experimental	14.19	9.58			
Delayed-Proficiency	Experimental	17.28	12.61	-2.36	0.02	0.3

Table 8 presents the results of the Paired-samples t-test of Experimental group comprising the components the students have been tested, such as Reading Comprehension, Note-Making, Report Writing, Letter Writing, Transcoding, Writing Instructions, Visual Inference/Process Description and Paragraph writing. The p-value of less than 0.05 indicates a significant difference between pre and post proficiency test performance of the Experimental group students. The Mean Values and the large effect size values in Table 8 indicate the improvement level of the experimental group in each component.

Table 8

Paired-samples t-test of Experimental Group

Components		Mean	SD	T	P	Mean Difference	Effect Size
Reading Comprehension	Pre	0.86	0.79	-6.913	0.000	1.06	1.1 Large
	Post	1.92	1.14				
Note Making	Pre	0.14	0.43	-8.772	0.000	1.36	1.6 Large
	Post	1.50	1.14				
Report Writing	Pre	0.17	0.52	-6.236	0.000	1.86	1.2 Large
	Post	2.03	2.09				
Letter Writing	Pre	0.37	1.18	-3.422	0.001	0.86	0.6 Large
	Post	1.24	1.82				
Transcoding	Pre	0.21	0.65	-7.893	0.000	2.38	1.6 Large
	Post	2.59	2.06				
Instructions	Pre	0.46	0.80	-5.135	0.000	0.88	0.9 Large
	Post	1.34	1.10				
Visual Inference/ Process Description	Pre	0.13	0.42	-5.214	0.000	0.89	1.1 Large
	Post	1.02	1.11				
Paragraph Writing	Pre	0.15	0.36	-7.929	0.000	2.40	1.5 Large
	Post	2.55	2.23				

The results in Table 7 and 8 explain that the writing skill of the experimental group students has exhibited a remarkable improvement in comparison with the control group, which suggest that prescribing cognitive strategies to the experimental group students have improved their thinking ability to recall and generate ideas, and sequentially write on their own, whereas the control group without the awareness of cognitive strategies are not able to exhibit improvement in their writing.

Discussion, Conclusion and Recommendations

The analysis of results suggests that cognitive strategies may have an impact on students' writing skill. The cognitive strategy use has guided the students to achieve consistency in their writing. It is deduced from Table 4 that the students belonging to the experimental group have started using cognitive strategies. These strategies have equipped the students in their memory retrieval process and have enhanced their cognitive use in the process of writing. In addition, strategy use has promulgated their cognition to achieve proficiency in written communication. The students' cognitive strategy use has augmented their attentiveness towards writing, interpretation of background knowledge, creation of new ideas, planning, grouping and compilation of ideas into a coherent paragraph. These cognitive strategies have been effective in guiding and assisting the students in Pre-writing, writing and Re-writing stages.

According to Hadley (1993) "Writing requires composing, which implies the ability either to tell or retell pieces of information in the form of narratives or description, or to transform information into new texts, as in expository or argumentative writing" (as cited in Pitenoe, Modaberi, & Ardestani, 2017, p. 594). Celce-Murcia (1996) has asserted, "Cognitive strategies enable the learners to manipulate the language material in direct ways, i.e., through reasoning, analysis, note-taking, summarizing, synthesizing, outlining, recognizing information to develop stronger schemas, knowledge structure, practicing in naturalistic settings, and practicing structures and formulas" (as cited in Khoshnevis & Parvinnejad, 2015). These statements indicate the interrelatedness of cognitive strategies and writing.

In congruence with this, results in Table 5 suggest that the cognitive strategies have a positive correlation with students' writing skills. This implies that cognitive strategy use influences the students' writing skill with reference to planning, goal-setting, retrieving and transferring information, eliciting new ideas, comparing and relating the ideas in relevance to the topic provided, and systematizing and compiling the ideas. The employment of cognitive strategies in the classroom has instigated the students' cognition and has capacitated them to be proficient in their writing.

The Pre-Proficiency test has been conducted to estimate the students' proficiency level in writing and the Post-Proficiency test has been conducted to analyse the improvement level of experimental group students after the employment of cognitive strategies in the writing process. The Delayed Proficiency test has been conducted to examine the sustenance level of students' proficiency in their writing. These test results have emphasised the improvement of experimental group students after their exposure to the cognitive strategies, as exhibited in Tables 7 and 8.

The control group students without the knowledge of cognitive strategies have sustained a low level of proficiency in their Post-Proficiency test. The large difference in the Pre-Proficiency and Post-Proficiency performance of experimental group students indicates the major impact of cognitive strategies in the enhancement of their writing skills. Cognitive strategies are effective in strategizing the knowledge retrieval and improving the thinking ability of the students.

Writing is a predominant skill used widely for academic and professional purposes. It is a cyclic and a composite process necessitating logical and cogent thinking. The changing global workplace environment necessitates the students to communicate clearly and concisely in their writing. Thus, to capacitate the students with effective writing skills and achieve proficiency in their writing, this study has proposed cognitive strategies to be imparted to the polytechnic students in their English classroom. Cognitive strategies say, 'Remembering', 'Connecting' and 'Generating' have been facilitated to the students in the classroom under the guidance and observation of the teacher-researcher. The results of the study have evinced the positive effect and influence of these strategies in achieving coherence and unity in the students' writing besides capacitating and regulating the students' thought process.

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