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Improvement of Writing Skills Among Students With Hearing Impairment Using the Cognitive Model: An Experimental Study

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ABSTRACT

Being a vital aspect of literacy, writing skills have great importance in the academics of students with hearing impairment. Improvement in writing skills is one of the prominent purposes of school education. Limitations in hearing impact the writing skills of students with hearing impairment (SWHI) in addition to reading skills. The present study was designed to highlight the writing problems of SWHI and to improve their creative writing skills using a cognitive model of teaching writing skills proposed by Flower and Hayes. The true experimental research design was used to see the impact of cognitive-based teaching strategies on the writing skills of SWHI. Pretest, treatment, posttest design were used to conduct this study. The targeted population for this research was SWHI studying in the grade 7th in the schools of Lahore city. A total number of 10 SWHI of Grade 7th was selected from one school in Lahore city. An equal number of students were assigned to control (N=5) and experimental group(N=5). Four different types of instruments were used to conduct the study. The experiment was conducted in one school in Lahore city for two months. The treatment comprised of instructional strategies developed in the light of Flower and Hayes's model of cognitive development. The study explored a statistically significant difference between the writing skills of the students of the experimental group (EG) than the writing skills of the control group's students. The writing skills of students who belong to EG have upgraded after receiving treatment. The study recommended the use of cognitive-based strategies for the improvement of writing skills of students with hearing impairment.

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1. Introduction

Writing is considered one of the basic tools of literacy. Writing skills facilitate involvement both in society and academic institutions. It is an important skill requires to express feelings, thoughts, and sentiments (Rodríguez-Málaga, Cueli, & Rodríguez, 2021). To be a competent writer requires not only competency of transcription skills (e.g., handwriting and spelling) (Hayes, 2012) but also the positioning, higher-level control, and self-regulation of high-level cognitive processes such as planning, drafting, and revising ideas according to their accurate linguistic form, revising and editing (Kellogg, 2018).

Achieving excellence in writing is a challenging task for young students being new writers whose challenge is twofold (Rijlaarsdam & Couzijn, 2000). According to them, students must be able to write and learning how to write. Being writers, the purpose is to produce text observing three main features including structure, coherence, and quality. As learners, the purpose of the students is to learn to write and subsequently acquire writing skills (Rodríguez-Málaga, Cueli, & Rodríguez, 2021). In this regard, if students lack automaticity of transcription, they bestow the greatest time of their cognitive assets to text construction and a smaller amount of concentration to higher-level cognitive procedures (Limpo & Alves, 2018).

A research study conducted by Olive and Kellogg (2002) showed that in students of Grade 3, if handwriting is not still automatic or involuntary, the process of transcription requires working memory resources, leaving few resources available for other high-level cognitive processes. Even in students from upper-primary and high school levels, the literature has shown, students spend little time in planning or revising and the use of these high levels of cognitive processes is ineffective resulting in low-quality writing (López, Torrance & Fidalgo, 2019). Thus, receiving effective teaching in writing skills development would prevent future difficulties in higher grades. Different teaching approaches and strategies have been designed for refining the written skills of students with hearing impairment. The present study was designed to improve the writing skills of the students with hearing impairment by guiding them on the use of their cognitive abilities.

Information related to the content and motivation is also required to be a good writer. Skilled writers are motivated to write (Andheska, Suparno, Dawud, & Suyitno, 2020). Their motivation has a strong impact on their writing ability (McGranahan, 2020). For example, writers who are more confident about the goals of their writing manuscript, plan systematically to achieve their goals (Young & Ferguson, 2020).

2. Developing Language Skills among SWHI through Flower & Hayes' model (F&HMCW)

Hearing impairment has two main types concerning its onset and language. While referring to language, it is pre-lingual and/ or post-lingual (Lieu, Kenna, Anne & Davidson, 2020). The hard of hearing students requires proper use of hearing aids to listen and have quality written expression. Listening is required for speaking and reading that ultimately facilitates writing (Easterbrooks, 2020). Such students have to do a great struggle with prewriting skills too, where they ought to explain and organize their thoughts before writing. This is the most innovative effort to prepare the written work. The majority of our hearing-impaired students have great thoughts and are distinctly inspired to write but are unable due to lack of training to translate their thoughts into written expression.

The scenario put them in great difficulty while most of the time they need the assistance of their teachers to write sentences or paragraphs. They lag behind their normal peers due to a lack of skills when they ought to generate and consolidate their ideas before and during writing (Nasir, Naqvi & Bhamanz, 2013).

Normally, SWHI is considered inferior cognitively but research studies have proven normal cognitive development of hearing-impaired students and mark them equal to normal people. According to Mayberry (2002), young SWHI performs similarly to hearing persons on non-verbal IQ tests. This research study underlined the writing skills of SWHI who are at the age of 13 to 15 years old.

3. Using Flower & Hayes Model for teaching writing to SWHI:

According to Flower & Hayes (1980), skillful writers exercise three cognitive procedures during writing i.e., planning, translating, and reviewing. The model claimed that writing comprises of unique and multiple thought procedures through which a writer can manage her writing, these thinking procedures are designed in a tiered, embeddable way, writing is driven by internally framed objectives of the writer (d) writing objectives are established through the writer's aim for writing, as well as insights that occur during the act of writing. Hayes and Flower (1986, 1987) later mentioned that all of these three processes are greatly entwined. As writers pass from each stage, they observe their progress and decide when they should transfer their abilities to the next stage/process. This description of the writing procedure has proven established it as a cognitive procedure. Using this approach for persons with hearing impairment and other disabilities can develop the writing skills of students with disabilities.

Keeping in view the discussion mentioned above, the study was aimed to bring improvements in the writing skills of students with hearing impairment using the F&HM model of cognitive writing (F&HMCW) as it alert and utilize the cognitive skills of SWHI by motivating them to use their thoughts (Souza, & Barbosa, 2019). Due to restricted hearing ability SWHI are deficient in their writing abilities and comprehension (van de Weijer, Åkerlund, Johansson, & Sahlén, 2019). The lacking of the skills influences the social skills of these students (Teklemariam, 2019). Thus, the study aimed to polish the writing competency of hearing-impaired students for enabling them to be more expressive about their ideas, emotions, and issues related to their academic and personal, or general life.

4. Research objectives

The study was carried out to attain the following objectives.

1. Seek improvements in the writing skills of the students with hearing impairment by using strategies based on a model of cognitive writing.
2. Built-up a new horizon for the teachers on the development of the writing skills of SWHI.
3. Improve the writing skills of hearing-impaired students after implementing the cognition-based strategies.

5. Hypothesis

H₁. There is a significant difference in the writing skills of SWHI who are taught through cognitive-based strategies and who receive regular instruction only.

H₀. There is no significant difference in the writing skills of SWHI who are taught through cognitive-

based strategies who receive regular instruction only.

6. Research controls

Due to financial and time constraints, the experiment's duration was only two months. The researchers used self-developed instruments to assess the writing skills of the students.

7. Delimitations

1. Owing to the limited time and resources, the study included only the students with hearing impairment studying in the grade 7. As at this stage, students require to write creatively.
2. The writing skills are developed only in the subject of Urdu
3. Self-developed instruments were used to measure the writing skills of SWHI.
4. The cognitive strategies (treatment) was implemented only for the improvement of the creative writing.

8. Study Impact

After successful completion of the study, it will have an impact in the following ways.

1. The study will help the teachers in teaching writing to students with hearing impairment by bringing to the forefront the importance of using cognitive strategies for the development of creative writing skills among SWHI.
2. This study will be beneficial for the SWHI by suggesting them, new ways of acquiring competency in writing based upon cognitive strategies proposed on the basis of Flower and Hayes' model. Students having weak writing skills cannot excel in their academics. Learning is not based solely upon natural abilities, rather acquiring new skills can build new capabilities (Schenker et al. 2010). It will impact the overall literacy skills of SWHI as the lack of reading and writing skills is attached to overall poor literacy performance.
3. The study will be equally good and useful for the students with other disabilities as they too lack writing skills.
4. The study will impact the metacognition abilities of the students, hence it will improve the reading and writing comprehension of the hearing impaired students.

9. Methodology and procedure of the study

The Quasi-experimental design was used to conduct this study. The population of the study consisted of SWHI studying in the school of Lahore, belongs to the 13 to 15 years age group. 10 students with moderate to severe levels of hearing loss and 13 to 15 years old were taken as a sample of the study. An equal number of the students were assigned to both the control and experimental group. Before this, the pretest was administered five times, and the mean value was calculated. Finally, based on performance 5 students were assigned to the EG and 5 students to the CG. The performance of both groups in the pre-test was the same.

Four different types of instruments including a test developed to check the Urdu narrative writing skills for pre-test, test for post-test, treatment worksheets based on F&HMCW, and a checklist to assess students' writing. The test reliability was estimated by applying the Cronbach alpha reliability formula which was .85.

Treatment plan: After assigning samples into two groups, the treatment plan has started. The control group was taught traditionally, however, the intervention/ treatment was provided to the experimental group comprised of cognitive strategies based upon F&HMCW. The intervention was

provided for two months. The treatment was provided in the three fundamental stages; planning, translating, and reviewing. In each stage, the students were guided on how to plan with the help of their sub-stages. In the stage of planning the students were taught how to plan for writing which is called *Organizing*; *students were modeled how to group the ideas and form new main ideas and secondary ideas*. Whereas, the second stage under the planning stage was *Goal setting*. Goals were created by the writers after taking guidance from the experimenters /teachers. The second stage was translating (writing). In translating stage the SWHI had modeled to translate the information in written form that was produced (into various types e.g., pictures, gestures, symbolic and words, etc.) in the planning segment. *Reviewing* is the 3rd stage, comprising of two strategies. *Evaluating and revising*. In this stage, students were guided by the teachers on how to *evaluate* their writing manuscripts with the help of their peers, highlight their mistakes whether they interpreted their ideas in an orderly manner. In revising stage the students were taught to revise their manuscripts. The time duration for intervention was one hour a day. A total of 60 hours of treatment was provided to the SWHI in two months. A total of 12 manuscripts were produced by the students of EG during experimentation.

Data after treatment /intervention was collected by using a checklist formulated by the researchers keeping in view a landmark study conducted by Berieter & Scardamalia (1987) to develop writing skills among low achievers' of grades 5,6 & 7. Both the pre-tests and post-tests were assessed and assigned scores. Data were analyzed by using SPSS to see the difference in the performance of both groups after the treatment.

10. Data Analysis and findings of the study

The independent and paired sample t-test was run to test the research hypothesis and to reject the null hypothesis. The results of the tests are tabulated and presented in the following tables.

Table No.1: Template of experiment plan: day 1.

Days /time	Topic /Type	“Planning”		“Translating “	“Reviewing ’		
First	Paragraph	Organizing	Goal Setting	Writing	Evaluating	Revising	
1 (60m)	Mera Ustad	5minutes	10minutes	20minutes	Personal 5minutes	Peers 5minutes	15minutes

Table No.2: Pre and post-test scores of students of both CG* and EG**

Students ID	Planning		Translating		Reviewing		Total score	
Control group	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Stu1	12.0	13.0	5.0	5.0	2.0	2.0	19.0	20.0
Stu 2	12.0	14.0	6.0	5.0	2.0	2.0	20.0	21.0
Stu 3	14.0	16.0	5.0	6.0	3.0	2.0	22.0	24.0
Stu4	11.0	17.0	5.0	5.0	4.0	2.0	20.0	24.0
Stu 5	12.0	13.0	6.0	6.0	2.0	2.0	20.0	21.0
Experimental group	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Stu 1	10.0	24.0	9.0	9.0	3.0	6.0	22.0	39.0
Stu2	12.0	24.0	3.0	9.0	2.0	6.0	19.0	39.0
Stu 3	15.0	21.0	6.0	9.0	2.0	6.0	23.0	36.0
Stu 4	12.0	22.0	6.0	8.0	2.0	6.0	20.0	36.0
Stu5	14.0	23.0	4.0	9.0	4.0	6.0	22.0	38.0

*Control group

**Experimental group

The table No.2 shows that an improved score of the students of EG in post –test as compared to the students of CG. It depicts that the F&HMCW is an effective model for the development of the writing skills of students with hearing-impaired.

Table. No. 3: Independent sample t-test was applied to see the comparescores of the CG and EG before treatment.

Pretest	Mean	No	SD	P
Control group	21.40	5	2.793	.740
Experimental group	22.00	5	2.793	

The above table illustrates a similar set of scores of students belongs to control and experimental when tested before receiving treatment.

Table.No.4: T-teston the pre and post-test of the CG

Pretest	Mean	No	SD	P
Control group	20.20	5	1.095	0.495
Control group	22.00	5	1.871	

The above table shows no significant difference in the performance of students of the control group on pretest and posttest ($P=0.495$) after receiving the treatment.

Table No. 4: Independent sample t-test was applied to compare the scores of the CG and EGAfter receiving treatment.

Pretest	Mean	No	SD	P
Control group	21.00	5	1.581	.000
Experimental group	37.20	5	1.643	

The above table shows a significant difference in the performance of the control (CG) and experimental group (EG) after receiving treatment. The mean of EG(37.20) is higher than the mean of CG (21.00), whereas p is .000 which is $\leq .05$.

Table No. 5: Paired sample t-tests were applied to compare the performance of the Experimental group on treatmentvariables i.e., planning, translating, and reviewing.

Variables	Mean	SD	P
Planning Pretest	12.60	1.949	.000
Post-test	22.80	1.304	
Translating Pretest	5.60	2.302	.000
Post-test	8.60	.548	
Reviewing Pretest	2.40	.548	.000
Post test	5.80	.447	
Planning Pretest	14.60	1.817	.61
Post-test	12.20	1.095	
Translating Pretest	4.30	.428	1.000
Post test	5.40	.548	
Reviewing Pretest	2.00	.000	.208
Post test	2.60	.894	

The above table shows a significant difference in the performance of students of EG on pre and post-test in all variables of treatment/intervention plan. Mean of all three variables of treatment plan including planning (pretest =12.60, posttest =22.80), translating (pretest=5.60, posttest= 8.60) and reviewing (pretest=2.40, posttest =5.80) are higher after receiving treatment. Whereas, there is no statistically significant difference between the score on pretest and posttest on the planning, translating, and reviewing as the SWHI of CG did not receive treatment based on the strategies F&HMGW

11. Findings

Hypothesis testing: The results of independent sample t-test has shown a statistically significant difference between the performances of the student of EG. Thus our research hypothesis is accepted calming a significant difference in the writing skills of SWHI who are taught through cognitive-based strategies and who receive regular instruction only. It shows that our experiment

was successful and treatment (cognitive strategies) remained effective to develop the writing skills of SWHI. Therefore, the null hypothesis claiming no significant difference in the writing skills of SWHI who are taught through cognitive-based strategies and who receive regular instruction only is rejected.

12. Discussion

This experimental study was designed to pave a new way in the research field related to the improvement of the writing skills of SWHI. The study intended to give some solution to develop the writing competency of SWHI studying at the secondary level. The experiment shows that students of EG performed better in the posttest after receiving treatment on their writing skills. The students were instructed through the strategies developed under the guidance of F&HMCW. The students received guidance in verbal, sign language, pictorial and visual cues before starting a new stage of writing. Dumenčić (2021) has highlighted the role of sign language in developing the writing skills of SWHI. It facilitates the participants of EG to develop text to signs relationships while thinking for vocabulary to write. According to Nelson & Bruce (2019), the use of visual materials either motion pictures or still pictures facilitates the hearing impaired students to become skilled writers. The experimenter talks about every aspect of the concepts given for the writing before asking them to write a piece of narrative writing. Doing so motivates students to think and plan about their manuscripts before writing. It helps them in jotting down their ideas at a conceptual level. According to Baisov (2021), talking is an effective strategy for the development of writing skills among students at the elementary level. All this improves their writing skills by thinking, brainstorming, and collecting the ideas on the topics given them by the experimenter. Involving thinking at every stage of writing trained the participants of EG to use cognition while writing thus enhance their writing skills. The study conducted by Teng (2021) on writing skills has supported the use of cognitive strategies to improve the writing skills of the students. In short, the importance of teaching writing through cognitive-based strategies has proven successful for developing the writing skills of SWHI. Improving the writing skills will influence the overall academics of SWHI. According to Sugaya, et.al.(2019) writing has a vital role in the academic achievement of students with hearing impairment.

13. Conclusion

The study sees the impact of the Flower & Hayes model of cognitive writing on the improvement in the writing skills of the students with hearing impairment studying at grade 7. The study revealed an improvement in the writing skills of the subjects of EG, (who were receiving the treatment) as compared to the writing skills of the subjects of the CG. The study concluded that SWHI, particularly hard of hearing, can be taught creative writing skills, like students, without hearing impairment through alerting their cognitive abilities. Writing is an important tool for the mainstream and inclusion of SWHI in mainstream society. On the other way, the complete dependence on sign language in the case of hard-of-hearing students can add to their exclusion from mainstream society and would enhance their social and personal problems. Finally, teaching writing to deaf and hard-of-hearing students (D&HH) is a dire need to be a successful and inclusive society.

14. Recommendations

Following recommendations have been made to improve the writing skills of (D&HH) students.

1. The D&HH students of primary and at kindergarten level may be taught by using cognitive strategies' based upon F&HMCW.

2. The study may be conducted again on a different group of D& HH students in the different schools of the city /province.
3. Teachers of D&HH students should be trained and facilitated by the school management to explore new ways of teaching reading and writing to their students in routine

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