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Effect of Sheltered Instruction Observation Protocol [SIOP] Model on Eighth-Grade Students' Academic Achievement in English

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ARTICLE DETAILS	ABSTRACT
History: Accepted 15 December 2021 Available Online December 2021	<p><i>School education in Pakistan has allocated resources to upsurge English language learners (ELLs) academic achievement. But in spite of concerted efforts, students of English language specifically at elementary level continue to lag behind in their academic achievement. Additionally, English language teachers feel themselves unequipped to fulfill the linguistics and academic needs of these learners without relevant professional development training. The main objective of this quasi experimental pre-test post-test design study, therefore, was to analyze the effect of SIOP model on students' achievement in English in comparison with students who were not taught using this model. All the students enrolled in grade 8th in elementary schools of district Lodhran served as study population. Two intact/pre-existing sections of grade 8th in two elementary schools were taken as study sample. One section with 32 students (experimental group) was taught using SIOP model while the other section with 40 students (control group) received instruction with conventional methods. The inferential analysis of pre-test post-test data exhibited statistically significant differences in experimental group students' English achievement level who received instruction with SIOP. Findings of this study suggest that the use of SIOP model has positive effect on English language learners (ELLs) academic achievement as well as closing the English achievement gap. Finally, this study provides valuable implications for teachers, school administrators and policy makers to improve academic performance of English language learners.</i></p>
Keywords: Sheltered Instruction Observation Protocol, Elementary Level, English Language Learners, English Achievement	
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1. Introduction

Teaching is a process of facilitating learning. In this process learners interact with their teachers, acquire new knowledge, learn new skills and develop original ideas (Koura & Zahran, 2017). Teachers, worldwide, are considered as one of the key elements to ensure success of any educational reform program and provision of quality education. Performance of teachers at all the stages of education and in all content areas affects the development of their teaching methodology especially in case of English as foreign language (EFL) teachers because they have to deal with an international language maintaining its standards (Kumaravadivelu, 2003).

It is generally agreed that teacher's quality, specifically, that of EFL teacher is one of the most influential factors affecting students' overall academic performance (Coulter, 2007). Hassan (2014) supported this notion and emphasized that a quality teacher should be equipped with up-to-date content knowledge, ensure a safe classroom environment, allow students freedom to express their needs, offer students proper feedback concerning their accomplishments and the most important, have specific and clear structure of instruction and assessment. ELLs at all levels of education, in view of Koura and Zahran (2017), complete the requisite educational tasks when their teachers provide them clear and direct instruction.

The Sheltered Instruction (SI) is an approach that offers a clear structure of direct instruction; makes educational material comprehensible for learners and increases their English language proficiency (Koura & Zahran, 2017). Various traits of operational teaching (i.e., differentiated instruction, amalgamation of four language skills, reading strategies and particularly cooperative learning) are integrated in this instructional model. Additionally, this model encompasses traits especially intended to enhance students' academic attainments i.e., introducing course language goals, examining students' prior knowledge and employing teaching methods for developing learners' intellectual capability (Echevarria & Short, 2004). The Sheltered Instruction, according to Friend et al. (2009), develops students' language skills through interaction and collaboration in all subject areas.

Moreover, this instructional approach enables teachers to provide clear and direct instruction and students learn how to build meaning from texts (Koura & Zahran, 2017) and follow content material (Friend et al., 2009). It is a standard model that guides teachers at all the instructional phases from lesson planning to educational assessment. This is one of the well-recommended strategies and sometimes referred to as simply as Sheltered Instruction [SI]. This model, though, provides same instruction to the ELLs as their English-speaking peers receive but this model also introduces some additional learning material and instructional strategies for non-native learners (Cervetti et al., 2015) as well as teachers for teaching content to English learners (Echevarria & Vogt, 2010; Elfers & Stritikus, 2014). Likewise, this model solves the problem of language proficiency among ELLs (Boughoulid, 2020).

This approach mainly focuses on students' content proficiency, language learning as well as their academic progress. It is a language training process with emphasis on content teaching and includes all the basic steps required to improve overall academic performance of ELLs as well as English language acquisition (Koura & Zahran, 2017). This beneficial model of teaching was primarily developed to help teachers who cope with students of diverse backgrounds and proficiency levels (Echevarria et al., 2011; Friend et al., 2009 & O'Neal et al., 2009) and recommended for students to learn content in a non-native/foreign language (Batt, 2010).

There are six key versions/types (i.e., SDAIE, GLAD, CALLA, CLIL, CBI and SIOP) of sheltered instruction being used worldwide particularly in U. S. A. and Europe to teach minority language learners with English as target language (Moore, 2009). These versions are mostly based on analogous research with slight variations. Specially Designed Academic Instruction in English (SDAIE) originally developed in California was specifically designed for non-native English speakers. The main focus of this teaching approach is on improving the comprehensibility of various subject matters such as social studies, literature and/or science typically taken by native speakers (Moore, 2009). As regards Cognitive Academic Language Learning Approach (CALLA), it is a systematic five step instructional model used to teach ELLs. It facilitates the learners in using learning strategies for language and content learning.

Similarly, Guided Language Acquisition Design (GLAD) instructional model is used to improve literacy and comprehensibility for language learners and particularly focuses the information, concepts, and vocabulary regarding their lessons. Content and Language Integrated Learning (CLIL) and Content-Based Instruction (CBI) models were also designed to facilitate language learners. Finally, Sheltered Instruction Observation Protocol (SIOP) is one of the most well-known, tested and validated model for sheltered instruction (Moore, 2009) and improves student achievement for language learning systematically. This model, according to (Moore, 2009) is offered as an 8:30 model for the reason that it included eight comprehensive components and thirty smaller features.

SIOP model was initially introduced in 1996 for measuring and documenting the efficacy of teachers' instructional practices with a main focus on content and English language proficiency for ELLs (Song, 2015). This model guides teachers about how to support ELLs and how to efficiently respond to learners' strengths and needs (Daniel & Conlin, 2015). Each of the eight components of SIOP Model is essentially useful for ELLs. These eight components (Figure 1) comprising thirty integrated features are combined in SIOP model for ELLs (Echevarria et al., 2011; McIntyre et al., 2010). These features of this model facilitate teachers to focus on students' problems which they are facing in their classroom settings.

Figure 1: *Components of SIOP Model*

“Lesson preparation” is the first component of this model and emphasizes that effective lesson planning must include content objectives (overall learning outcomes) in addition to language objectives (specific to students' language development) linked with standards (Shearer et al., 2019). This component of SIOP model also emphasizes the uses of add-on resources i.e., study guides, diagrams, visual aids, multimedia, images, computer-based resources and outlines to increase clarity. This component further emphasized that four basic language skills (i.e., reading comprehension, writing, listening, speaking) may be focused in some language objectives.

The second essential component of SIOP is “building background” which is crucial not only to understand the language that students come across but also to bridge the content gaps from preceding lessons to the present classes (Echevarria et al., 2018). In this feature of SIOP model, according to Shearer et al. (2019), teachers clearly put emphasis on vocabulary teaching and offer students' opportunities for using the vocabulary in meaningful ways (Alsalihi, 2020). Likewise, in third component i.e., “comprehensible input” teachers use varied techniques and visual aids fitting to students' proficiency level to make academic content comprehensible (Echevarría et al., 2018; Shearer et al., 2019). These techniques include word choice and suitable teacher speech along with complexity of sentence structure consistent with students' proficiency level (Echevarría et al., 2018).

Similarly, the fourth component of SIOP model i.e., “strategies” focuses on developing problem-solving skills and strategic thinking in ELLs using a range of social, intellectual and meta-cognitive approaches along with varied language learning strategies (Shearer et al., 2019). The fifth component “interaction” puts emphasis on learners' participation in learning process to make it more effective and suitable for students. Supporting this feature of SIOP, Koura and Zahran, (2017) proclaimed that meaningful interactions provide opportunities to students for speaking, questioning, answering and clarifying their ideas.

The sixth “practice/application” component is related to the integration of language, content and language skills. This component integrates all the four language skills (Hayden et al., 2019) and focuses on activities that involve learners in practical activities and connect them to theoretical knowledge with practical and actual use of this knowledge (Koura & Zahran, 2017). In “lesson delivery” component, the focus is on clearly supporting both the content and language objectives, engaging students for maximum possible period and delivering the lesson fitting to students' capability (Echevarría et al., 2018). Finally, the eighth component of SIOP model “review and assessment” concentrates on key vocabulary review, assessing students' learning and providing feedback to learners.

Previous review of literature puts forward that sheltered instruction involves instructive approaches crucial for effective teaching and instructional techniques required for successful teaching of the ELLs (Wright, 2010). Several previous scholars (i.e., Al-Ansari, 2000; Faltis, 2010) confirmed that the SIOP components in combination with sheltered instruction strategy were reliable to use for ELLs. Likewise, findings of numerous other scholars (e.g., Batt, 2010; Echevarria et al., 2011; O'Neal et al., 2009) established that SIOP model applies its eight components together with sheltered instruction and ascertains effectiveness in teaching new vocabulary (Whittier & Robinson, 2007).

Review of literature further suggests that none of the literatures have analyzed effectiveness of SIOP model in Pakistan specifically in the context of 8th grade ELLs. This study, therefore,

primarily attempted to ascertain the extent of effectiveness of SIOP model in improving English language learners' academic achievement at elementary level. It was hypothesized that SIOP model would affect positively and significantly on students' English achievement score. The findings of this study may provide EFL teachers with a framework that might be helpful for them in monitoring and evaluating their own teaching and developing students' academic achievement. The findings may also be valuable for English curriculum developers to focus on the use of sheltered instruction at elementary level.

2. Research Hypotheses

Following three research hypotheses were formulated to test the main objective of this study.

1. H_{01} : There is no significant difference in mean English achievement score of Control group and Experimental group in pre-test at elementary level.
2. H_{02} : There is no significant effect of SIOP model on students' English achievement score in terms of Experimental group at elementary level.
3. H_{03} : There is no significant difference in mean English achievement score of Control group and Experimental group in post-test at elementary level.

3. Method and Procedure

3.1 Study Design, Population and Sample

This study employed Quasi Experimental pre-test post-test design (Figure 2). This design establishes cause and effect relationship between independent and dependent variables (Creswell, 2012). This design uses two intact/pre-existing groups based on non-random criteria. One group is declared as control group and the second group as experimental and both the groups are constructed before the treatment non-randomly (Creswell, 2012).

Figure 2: Quasi Experimental study design (Groups without randomization)

All the (74) government girls elementary schools in district Lodhran with all the students enrolled in 8th class served as the population for this study. A centralized national curriculum is implemented in Pakistan, meaning that all the government elementary schools in study site were using the similar English curriculum. Researchers conveniently selected two government elementary schools. One of the selected schools was randomly assigned to experimental group and the other to

control group. The school selected in experimental group had an intact/pre-existing section of 8th class with 32 students and the school selected in control group had an intact/pre-existing section of 8th class with 40 students. Consequently, total 72 students from class 8th constituted the sample for this study. The experimental group was taught through SIOP model, while the control group received instruction through conventional method.

3.2 Tool Development and Validation

The data collection tool used in this study was 8th grade English Achievement Test (EAT). Researchers personally developed pre-test and post-test in line with the prerequisites of 8th class English syllabus to measure students' English achievement level. These English achievement tests were constructed consistent with prescribed paper pattern of Punjab Education Commission (PEC). The test containing 50 marks was divided into two parts i.e., 30 marks for multiple-choice question and 20 marks for two detailed answer questions. Researchers used similar pre-test and post-test to make sure test reliability with regard to test content, format as well as its cognitive level. A panel of experts comprising three qualified subject matter experts reviewed and validated the initial draft of pre-test and post-test. Furthermore, a pilot test was done involving 21 students of 8th class in a school different from the schools selected as a sample in this study. Participants of the pilot test were directed to provide feedback about the relevance and format of test items, test readability, time required for test completion and other concerns regarding the test. Both the tests were finalized in line with changes suggested by the panel of experts and participants of pilot-testing.

3.3 Tool Administration and Data Collection

This Quasi Experimental pre-test post-test design study was completed in two girls public elementary schools of district Lodhran after completing requisite permission procedure from school administration. Prior to begin the experiment, a pre-test was conducted with sample students of both the groups in already-taught lessons of 8th class English textbook and the obtained scores were interpreted. Pre-test scores were used to find out academic level of the sample students included in experimental and control groups. The mean scores of both the groups before the treatment were almost the same. The results of inferential statistics revealed the matching of both the groups before the treatment (Table 2). It was inferred that both the groups comprised mixed ability students.

The control group was taught through traditional method by the already allotted school teacher and the experimental group was taught by one of the research team members. This team member was trained in using SIOP model and already working as an English teacher in the experimental school. The same content was taught to both the groups at the same time in school time table. A lesson plan was developed for each session of SIOP model. Lesson plans were developed by the research team because one of the research team members was trained and had substantial knowledge about execution of SIOP model.

Furthermore, all the lesson plans were discussed with and approved by subject specialists before classroom teaching. In total, forty lesson plans were developed for the intervention period of eight weeks i.e., five plans per week with instructional time 40 minutes per day for both the groups. After the completion of instructional treatment of eight weeks, post-test was administered to students of both the groups to measure the effectiveness of SIOP model.

3.4 Data Analysis and Results

Collected data were analyzed by calculating frequency count and percentage along with performing Independent samples t-test and Paired samples t-test. Frequency count and percentage was used to analyze demographic information of sample students in both the groups. Independent samples t-test was used to find out the homogeneity and/or heterogeneity between the mean scores of both the groups. Paired samples t-test was carried out to compare the pretest and post-test scores of experimental group only. The alpha was set at 0.05 for Independent samples t-test and Paired samples t-test. The results are displayed in Table 1 to Table 4 followed by interpretation of results.

Table 1: Demographic information of sample students

Grade	Subject	Gender	Age	Group	N	%age
8th	English	Female	11-13 year	Control	32	44.4
				Experimental	40	55.6
				Total	72	100

Table 1 depicts analysis of sample respondents' demographic information. Table further shows that all the 72 sample students were female. Out of 72 total sample students, 32 (44.4%) were in experimental group and 40 (55.6%) were in control group. The average age of these 72 students was 12 years. The age range of sample students was between 11 and 13 years. The independent samples t-test revealed insignificant differences between the ages of sample students in both the groups. The two groups, therefore, were assumed to be comparable as regards their demographic composition.

Hypothesis 1 (Ho₁). There is no significant difference in mean English achievement score of Control group and Experimental group in pre-test.

Table 2 : Comparison between mean scores of pre-test in terms of control and experimental groups

Category	Group	N	Mean	S.D	df	t-value	p-value
Pre-test	Control	40	18.61	7.72	70	0.608	0.545
	Experimental	32	19.66	6.59			

Table 2 demonstrates the analysis of mean English achievement score of control group and experimental group in pre-test. Table further shows the mean value and standard deviation value (18.61, 7.72 respectively) for control group and for experimental group (19.66, 6.59 respectively). The mean values indicated that both the groups were normally distributed and seemed almost equal. The p-value i.e., 0.545 more than table value supports the null hypothesis. This evidence suggests that there is no significant difference in pre-test mean English achievement score of control group and experimental group. It can, thus, be inferred that academic level of students in both the groups was comparable before the treatment.

Hypothesis 2 (Ho₂). There is no significant effect of SIOP model on students' English achievement score in terms of Experimental group at elementary level.

Table 3: Paired samples t-test for pretest and post-test scores of experimental group

Group	Category	N	Mean	S.D	df	t-value	p-value
Experimental	Pre-test	32	19.66	6.59	31	8.85	0.000
	Post-test	32	31.27	7.24			

Table 3 shows the analysis of mean English achievement score for pre-test and post-test in terms of experimental group. Table 3 further shows the mean value and standard deviation value (19.66, 6.59 respectively) for pre-test score and post-test score of experimental group (31.27, 7.24 respectively). These values indicated that both the scores were not normally distributed and difference between two mean scores was clear. The p-value i.e., 0.000 less than table value rejects the null hypothesis. This evidence suggests that there is significant difference in pre-test and post-test mean English achievement scores of experimental group. It can, thus, be inferred from this result that there is significant effect of SIOP model on students' English achievement at elementary level. It can further be concluded that teaching through SIOP model contributes significantly to improve academic level of students.

Hypothesis 3 (Ho₃). There is no significant difference in mean English achievement score of Control group and Experimental group in post-test at elementary level.

Table 4: Independent samples t-test for post-test scores of experimental and control group

Category	Group	N	Mean	S.D	df	t-value	p-value
Post-test	Control	40	21.63	7.14	70	16.41	0.000
	Experimental	32	31.27	7.24			

Table 4 shows the analysis of mean English achievement score for the post-test in terms of control and experimental groups. Table 4 further shows the mean value and standard deviation value (21.63, 7.14 respectively) for control group and for experimental group (31.27, 7.24 respectively). These values indicated that both the scores were not normally distributed and difference between two mean scores was clear. The p-value i.e., 0.000 less than table value rejects the null hypothesis. This evidence suggests that there is significant difference in post-test mean English achievement scores of both the groups. It can, thus, be inferred from this result that there is significant effect of SIOP model on students' English achievement at elementary level. It can further be concluded that teaching through SIOP model contributes significantly to improve academic level of students.

4. Discussion

The main objective of this quasi experimental pre-test post-test design study was to analyze the effect of SIOP model on students' achievement in English in comparison with students who were not taught using this model. Three research hypotheses were formulated to test the main objective of this study. The analysis of pre-test mean scores of both the groups answered Research Hypothesis 1. Pre-test scores were used to find out academic level of the sample students included in experimental and control groups. The mean scores of both the groups before the treatment were almost the same. The results of inferential statistics revealed that academic level of students in both the groups was

comparable before the treatment. After conducting the pre-test, the control group was taught through conventional lecture demonstration method by the already allotted school teacher and the experimental group was taught by one of the research team members through SIOP model. At the completion of instructional treatment of eight weeks, post-test was administered to both the groups to measure the effectiveness of SIOP model.

The analysis of experimental group post-test English achievement score answered Research Hypothesis 2, which aimed to analyze “there is no significant effect of SIOP model on students’ English achievement score in terms of experimental group at elementary level”. The p-value less than table value rejects this null hypothesis. Results portrayed a significant effect of SIOP model on students’ English achievement. The students in experimental group performed better in post-test as compared to pre-test after receiving instruction from SIOP model. This result is in agreement with the findings of a number of previous studies (i.e., Parenti et al., 2018; Shearer et al., 2019; Villegas et al., 2018). Findings of these earlier studies revealed that teachers need to deliver high-quality instruction to successfully teach English language learners and make their teaching understandable for the students.

Furthermore, the comparison of post-test mean scores of both the groups answered the Research Hypothesis 3, which aimed to analyze “there is no significant difference in mean English achievement score of control group and experimental group in post-test at elementary level. This null hypothesis was also rejected. The experimental group performed better in post-test as compared to control group. These findings are consistent with an earlier study conducted by McIntyre et al. (2010). They also found significant differences in students’ achievement after receiving instruction with the SIOP model. McIntyre et al. (2010) used SIOP model to examine association amongst students’ reading achievement. They concluded that students’ scores in experimental group (i.e., teaching through SIOP strategies) were considerably higher in comparison with the students’ scores in control group who were taught using conventional methods. McIntyre et al. (2010) further established that SIOP model was more useful when executed with commitment in classroom. The findings of this study also support the argument of Banse et al. (2017) who emphasized that providing student opportunities for classroom discussions, engaging in peer collaboration and using scaffolding techniques, which are common strategies in SIOP model, can build up ELLs foundational skills. A number of other scholars (i.e., Batt, 2010; Echevarria et al., 2011; O’Neal et al., 2009) also supported these findings and pointed out that students efficiently communicate and collaborate with each other as well as their teachers in an operative sheltered instruction class. These findings are also in accordance with the results of Pascopella (2008) who concluded that percentage of high achievers in the subject of mathematics increased after the teachers’ training in the SIOP model. Writing in the same vein, Zhao and Lapuk (2019) proclaimed that SIOP model offers structure for teachers to fulfill both the linguistics and academic requirements of ELLs and most important, this model develops their English language and math with interaction, strategies and logical contribution.

5. Conclusion and Recommendations

The findings of this study led to the conclusion that teaching English through SIOP model contributes significantly in elevating academic level of students at elementary level. Specifically, following three key conclusions were drawn to answer the research hypotheses. First, there was no significant difference in pre-test mean English achievement score of control group and experimental group. This result implies that academic level of students in both the groups was comparable before the treatment. Second, evidence from this study suggested that there was significant difference in

pre-test and post-test mean English achievement scores of experimental group. It was inferred from this result that there was a significant effect of SIOP model on students' English achievement at elementary level. Third, significant difference was found in post-test mean English achievement scores of both the groups. It was concluded from this result that SIOP model has significant positive effect on students' English achievement. Finally, this study recommends that teacher education programs as well as teacher training institutes should include SIOP model in their curriculum. This integration might be helpful in making teachers more proficient, knowledgeable and competent in their teaching areas. This study also provides valuable implications for teachers, school administrators and policy makers to improve academic performance of English language learners.

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