

Topic, Inference, Proof, Sum-up (TIPS): A Strategy in Developing Reading Comprehension in Science Among Learners

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ABSTRACT

Today's scientific education relies on higher-level thinking skills rather than basic academic information. This study examined the effective use of the Topic, Inference, Proof, Sum-up (TIPS) strategy in developing reading comprehension in science among learners. The investigation was conducted using a quasi-experimental design in School A of Tagum City Division, Davao del Norte. The 70 Grade 7 students who participated were chosen through a purposive sampling technique. The data were collected using synchronous online timed pretest and posttest, and the results were then tabulated and textually presented, analyzed, and interpreted. The findings reveal that no significant difference between the experimental group's pretest and posttest has a p-value of 0.13, which is larger than the 0.05 level for significance ($p > 0.05$). The null hypothesis is therefore not refuted. This indicates that there is no significant difference between the experimental group's pretest and post-test scores when the TIPS strategy is used. Students have below-average reading comprehension, lack skills, abilities, struggle to utilize the TIPS strategy and have the same competency level before and after the intervention. The findings suggest improving research-based academic interventions in all fields to investigate other factors of poor reading comprehension, developing a parallel test that aligns with standardized test material, and evaluating each key stage area that needs improvement.

Keywords: reading comprehension, reading strategy, science, quasi-experiment, teaching-learning

INTRODUCTION

In the 21st century, developing students' scientific skills necessitates a high level of competence (Karnouskos, 2017). In the Programme for International Student Assessment (PISA), the Philippines did not meet the standards (Schleicher, 2019), and in the 2019 Trends in International Mathematics and Science Study (TIMSS), ranked in the bottom 70 of 58 countries, with a poor grasp of scientific ideas and essential science facts (Magsambol, 2020). Reyes (2019) presented the results of the 2018 National Achievement Test (NAT), which showed that problem-solving, information literacy and critical thinking scored 39.2%, 36.8%, and 33.5%, respectively. The TIPS strategy will enable teachers to better understand and develop students' knowledge, abilities, and attitudes through reading comprehension to address these gaps.

The study was conducted to determine the effectiveness of the TIPS strategy in developing reading comprehension in science among learners. Specifically, this study aimed to identify the levels of pretest and posttest mean percentage scores of the students, the significant difference between the test results, and the effectiveness of the intervention.

The following hypotheses were formulated from the research questions and tested at a 0.05 level of significance.
Ho 1: There is no significant difference between the pretest mean percentage scores of control and experimental groups.
Ho 2: There is no significant difference between the posttest mean percentage scores of control and experimental groups.
Ho 3: There is no significant difference between the pretest and posttest mean percentage scores of control and experimental groups.

METHODS

This chapter includes the research design, participants, data gathering methods, analysis, and ethical considerations.

Research Design

This study used a quantitative method utilizing the quasi-experimental design. This answered the research questions that investigated the effective use of the TIPS strategy in the development of reading comprehension in science among learners.

Research Participants

In this study, 70 (35 students for the experimental and 35 students for the control group) Grade 7 online class students under the K to 12 Basic Education Curriculum of School A in Tagum City Division in School Year 2021 – 2022 were composed of a group of classes that underwent a purposive or judgmental sampling technique.

Data Gathering Methods

The procedures were divided into three periods: the pre-experimentation period, the experimentation period, and the post-experimentation period. Table 2 shows the proficiency level descriptive equivalent:

Table 2
Proficiency Level Descriptive Equivalent

Mean Percentage Score (MPS)	Descriptive Equivalent	Interpretation
Above 75	Above average	The students have met more than the learning standards and skills required.
75	Passing average	The students have met the learning standards and skills required.
Below 75	Below average	The students did not meet the learning standards and skills required.

Note: Proficiency level is based on DepEd Order No. 55 s.2016 "Policy Guidelines of the National Assessment of Student Learning for the K to 12 Basic Education Program"

Data Analysis

Data gathered were statistically treated and analyzed using Mean and t-test for dependent and independent samples.

Ethical Considerations

For this study, a letter of approval was obtained from the Schools Division Superintendent and the school principal for the conduct of the study. A letter of permission for the parents/guardians was translated into Filipino and bilingual format for the respondents to understand easily. Their involvement is purely optional and will not influence their grades. Potential benefits from participation in this study include improvement in the use of the TIPS strategy in developing reading comprehension in science among learners and the development of an action plan for the school to improve science instruction.

RESULTS

This chapter presented the analysis and interpretation of data organized in tabular and textual forms.

Level of Pretest Mean Percentage Scores of Control and Experimental Groups

Presented in Table 3, Section B got the highest mean percentage score of 39.24 while Section A got the lowest mean percentage score of 37.62, which both have a descriptive level of below average. This indicates that both Sections have the same level of understanding in identifying the Topic, Inference, Proof, and Sum-up in the passage given in reading comprehension in science.

Table 3
Level of Pretest Mean Percentage Scores of Control and Experimental Groups

Group	N	Mean	SD	Descriptive Equivalent
Section A Experimental Group	35	37.62	16.26	Below Average
Section B Control Group	35	39.24	11.55	Below Average
Overall		38.43	13.91	Below Average

Level of Posttest Mean Percentage Scores of Control and Experimental Groups

As shown in Table 4, Section A and Section B of School A. It was observed that

Section A got the highest mean percentage of 42.19, while Section B got a mean percentage of 37.62, which both have a descriptive level of below average. This indicates that the students in Section A exposed to the TIPS strategy still have difficulties identifying the TIPS in the passage given in reading comprehension in science.

Table 4
Level of Posttest Mean Percentage Scores of Control and Experimental Groups

Group	N	Mean	SD	Descriptive Equivalent
Section A Experimental Group	35	42.19	13.26	Below Average
Section B Control Group	35	37.62	11.31	Below Average
Overall		39.91	12.29	Below Average

Significant Difference in the Pretest Mean Percentage Scores Between Control and Experimental Groups

Table 5 shows the mean percentage, standard deviation with the computed t-value of -0.48. Since the p-value of 0.63 was higher than 0.05 ($p > 0.05$), the null hypothesis is not rejected. This implies that there was no statistically significant difference on the pretest between Section A and Section B in identifying the TIPS in the passage given in reading comprehension in science.

Table 5
Significant Difference in the Pretest Mean Percentage Scores Between Control and Experimental Groups

Group	Mean	SD	t-value	p-value	Decision @ $\alpha = 0.05$
Section A Experimental Group	37.62	16.26	-0.48	0.63	Ho is NOT Rejected
Section B Control Group	39.24	11.55			

Significant Difference in the Posttest Mean Scores Between Control and Experimental Groups

Table 6 shows the mean percentage, standard deviation with a computed t-value of 1.55. The p-value of 0.13 was higher than the 0.05 level of significance ($p > 0.05$), in which the null hypothesis is not rejected. This implies that there is no statistically significant difference

between posttests of Section A and Section B in identifying the TIPS in the passage given in reading comprehension in science.

Table 6
Significant Difference in the Posttest Mean Scores Between Control and Experimental Groups

Groups	Mean	SD	t-value	p-value	Decision @ $\alpha = 0.05$
Section A Experimental Group	42.19	13.26	1.55	0.13	Ho is NOT Rejected
Section B Control Group	37.62	11.31			

Significant Difference Between the Pretest and Posttest Mean Scores of Control and Experimental Groups

As indicated in Table 7, the mean percentage, standard deviation, a p-value of 0.13, and a p-value of 0.63 of Section A and Section B, respectively, were greater than the significant level of 0.05 ($p > 0.05$). Thus, the null hypothesis is not rejected. This implies that there is no significant difference between the pretest and posttest in Section A and B in identifying the TIPS.

Table 7
Significant Difference Between the Pretest and Posttest Mean Percentage Scores of Control and Experimental Groups

Groups	Pretest		Posttest		t-value	p-value	Decision @ $\alpha = 0.05$
	Mean	SD	Mean	SD			
Section A Experimental Group	37.62	16.26	42.19	13.26	-1.55	0.13	Ho is NOT Rejected
Section B Control Group	39.24	11.55	37.62	11.31	0.480	0.63	Ho is NOT Rejected

DISCUSSION

This chapter presents the discussion, conclusion, and reflection drawn from the results of the study.

Level of Pretest Mean Percentage Scores of Control and Experimental Groups

Students manifest Below Average reading comprehension. This finding indicates that the foundation of the Grade 7 students in terms of identifying the TIPS strategy is rated as poor mastery (Imam et al., 2014) and needs help in core skill and knowledge domains (Clemens et al., 2017).

Level of Posttest Mean Percentage Scores of Control and Experimental Groups

Students lack the skills and abilities to use the TIPS strategy. This can be deduced that the students exposed to the reading strategy were poor readers and comprehensives of science (Torppa et al., 2020), unable to grasp scientific ideas, and had difficulty comprehending science texts (Johnson & Zabrocky, 2011).

Significant Difference in the Pretest Mean Percentage Scores Between Control and Experimental Groups

Students have the same proficiency level. Both groups showed that reading intervention scored below proficient and did not yet meet the norm (Cordon & Polong, 2020). There is a necessity for differentiated intervention to address the underlying issues causing readers to struggle (Oslund et al., 2018).

Significant Difference in the Posttest Mean Scores Between Control and Experimental Groups

Students struggle with the use of the TIPS strategy in reading comprehension. A possible explanation might be that students lack the requisite prior knowledge (Best et al., 2005), which requires a lot of attention (Pourhosein Gilakjani & Sabouri, 2016), which is expected to have a highly positive relationship with reading comprehension (Zare & Othman, 2013).

Significant Difference Between the Pretest and Posttest Mean Scores of Control and Experimental Groups

Students have poor scientific literacy. The result indicates that using the TIPS strategy is due to a lack of scientific & inquiry skills (Kite et al., 2021) and scientific text reading strategies to improve students' scientific literacy (Roberts, 2007). However, some factors that affect the implementation of the academic intervention (Vaughn, 2010) need to be looked into.

Conclusion

Based on the findings, the study came to the following conclusions.

Students have below-average reading comprehension, lack skills, abilities, struggle to utilize the TIPS strategy and have the same proficiency level before and after the intervention. The results of the study refute the hypothesis of Scientific literacy of Schools (2006) to master reading skills that will enable students to comprehend and apply the text to engage in the inquiry of learned science topics and become scientifically literate.

Reflection

The researcher provided the following suggestions based on the study's results and conclusions: There is a need to improve the research-based academic interventions in all fields to investigate other factors of poor reading comprehension, develop a parallel test that aligns with standardized test material to measure the proficiency level of the students, and evaluate each key stage area that needs improvement.

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