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Improving Grade 12 SHS Students' Reading Skills through Technological Pedagogical and Content Knowledge (TPACK) and Teacher - Directed Instructions

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Abstract

Reading, a fundamental skill for both academic and personal development, can be hindered when students overly concentrate on decoding tasks such as identifying thesis statements, summarizing, and elucidating text-specific ideas. Addressing this, the study evaluated the effectiveness of Technological, Pedagogical, and Content Knowledge (TPACK) Instruction versus Teacher-Directed Instruction (TDI) in improving reading skills among Grade 12 students in one of the senior high schools in Kinoguitan, Misamis Oriental, Philippines. A quasi-experimental design was employed, involving 70 participants who were equally divided into two groups of 35. Thirty-five (35) students were exposed to TPACK (experimental group) and the other thirty-five students in teacher-directed instruction (control group). For data analysis, descriptive statistics and t-tests were utilized to ensure a thorough assessment of the outcomes. The findings revealed that TPACK emerged as more effective in enhancing overall reading skills for Grade 12 students. Interestingly, this trend was not consistent across all aspects of reading; in the specific skill of summarizing, the TDI group exhibited a slight improvement over the TPACK group. This suggests that while TPACK is generally more beneficial, TDI has its strengths in certain areas of reading. In conclusion, the study indicates that both TPACK Instruction and Teacher-Directed Instruction have their respective merits in the context of Senior High School (SHS) reading skill development. TPACK is more effective in increasing reading skills except for summarizing where both approaches are comparably effective. It advocates for a blended approach in educational strategies, integrating technological tools with effective teacher facilitation, to enhance student learning outcomes comprehensively. This approach underscores the importance of a multifaceted educational methodology in cultivating vital reading competencies among students

Keywords: TPACK, teacher-directed instruction, reading skills, SHS students

Introduction

Reading is essential for academic, professional, and personal development. Its significance in our evolving world is emphasized by Lee (2021), highlighting the critical role of robust reading skills. The link between proficient reading and academic success, along with improved cognitive functions, is well-documented, notably by Cunningham and Stanovich (2018). Erten (2018) underscores that excessive time spent on decoding activities like stating the thesis, summarizing, and explaining text-specific ideas often compromises reading comprehension, highlighting fluency's importance.

The growing disparity between proficient and less proficient readers as students progress through the educational system (Totto & Ramos, 2021) underscores the importance of basic literacy skills. This trend is particularly critical, as Hedgcock & Ferris (2018) point out, because reading is essential for academic success and daily life, especially for students. Furthermore, Duke et al. (2021) and Greenleaf et al. (2023) emphasize the necessity of strong reading skills for understanding complex materials and facilitating intellectual growth. On a related note, Ropero (2019), as cited by Idulog (2023), suggests that developing practical reading skills depends on access to diverse texts and instructional strategies. Comprehension of complex texts becomes increasingly crucial as students advance to higher grades (Basuki, 2018; Sulikhah et al., 2020). Additionally, Idulog et al. (2023) emphasize the importance of reading across all subjects, not just English classes (Ying et al., 2021).

Moreover, the Philippines faces significant educational challenges, as highlighted by its low performance in global assessments like the Programme for International Student Assessment (PISA), the Southeast Asia Primary Learning Metrics (SEA-PLM), and the Trends in International Mathematics and Science Study (TIMSS). PISA 2022 reading results show Filipino students improved despite their continued global lag. With an average score of 347, only 24% of responders met the required competency, ranking them 75th. Only a small percentage achieved advanced levels, suggesting challenges with complex texts. Despite progress, closing the reading gap is still crucial. In response, the Department of Education in the Philippines has developed initiatives like the "Every Child a Reader Program" (ECARP) and "Drop Everything and Read" (DEAR), which are yet to be assessed thoroughly.

Despite extensive literature, a distinct gap still needs to be in research targeting the integration of the Technological Pedagogical and Content Knowledge (TPACK) framework with Teacher-Directed Instruction to enhance reading proficiency in the Philippines. This study aims to explore this integration, as suggested by Joseph (2020) and Saunders (2020), and examine its effectiveness in improving Filipino learners' reading proficiency. The role of technology in education, highlighted by Irum, Bhatti, Mohammad, and Dilshad (2019), Winthrop et al. (2016), Joseph, Khan (2020), and others, will be considered. The TPACK model's applicability in language classrooms will be examined, referencing Lin et al. (2013), Ariani (2015), Ali (2018), Chai et al. (2013), and Oyanagi and Satake (2019).

Prompted by the findings of Decena (2021), this study, set in a public school in Misamis Oriental for the academic year 2023-24, sought to address reading challenges faced by grade twelve students. It will explore transformative solutions, assessing whether diverse reading strategies, including teacher-directed instruction and technology-enhanced personalized teaching such as TPACK, can significantly improve reading skills among Grade 12 Senior High School students.

Thus, this study examined the effect of teacher-directed instruction on reading comprehension drawing on insights from Smith (2021), Johnson et al. (2022), and Ab Rashid et al. (2021). Additionally, it will explore the integration of technology in language learning, an aspect underscored by the works of Nurdianingsih (2021), Sari and Ivada (2013), Slamecka and Boekaerts (2022), and Lam and Lawrence (2020), which is a crucial component of this research. Luu et al. (2021) pointed out how technology seamlessly enhanced language learning inside and outside the classroom. Chouthaiwale and Alkamel (2018) observed significant improvements in student performance using Information and Communication Technology (ICT). Studies such as those by Latief, Sriyanto, and Daryanto (2018) on cooperative learning and Gozukucuk and Gunbas (2020) on technology-based reading texts emphasized TPACK's benefits.

Research Objectives

This study examines the effectiveness of TPACK and teacher-directed instruction in improving the reading of grade 12 students. The research aims to answer several questions, including assessing participants' reading skills before and after the intervention, such as their ability to state the thesis statement, summarize, and explain specific ideas. Additionally, the study seeks to compare participants' reading skills in each group before and after the intervention and to determine if there is a significant difference in the reading skill increments between the two groups.

Methodology

This research employed a quasi-experimental research design method. It analyzed data collected from pre-test and post-test in both TPACK approach and teacher-directed instruction groups. These groups were identified prior to the implementation of the treatment before the course of the experimentation. Based on findings from a pre-test provided before the study and a post-test given after the experiment, these two reading approaches were used to improve the reading skills. A minimum of six weeks of instructional implementation was allotted for the experimentation and treatment of the study. These students are part of a heterogeneous group, with equal enrollees from both the ABM and HUMSS strands. TPACK was the intervention employed by the 35 students in the experimental group, with 12 males and 24 females. By contrast, the control group also used Teacher-Directed Instruction with 35 students, 20 males and 15 females. The researcher employed a set of forty-five comprehension questionnaires, adapted and modified from the SAT (Scholastic Assessment Test), to evaluate the reading skills of the study's participants. Both the TPACK and TDI groups underwent a pre-test and post-test assessment. Each questionnaire consisted of fifteen (15) questions, categorized into three distinct reading skills: identifying thesis statements, summarizing, and explaining specific ideas. The main goal was to evaluate the extent to which the targeted treatments that were applied had enhanced the reading abilities of each group. The researcher initially obtained the Lourdes College Ethics Committee's consent before beginning the study. The research began with a pretest to gauge both groups' beginning reading abilities after the Lourdes College Research Committee issued its certification, with the endorsement of the school's division superintendent from the division office. After putting the appropriate treatments into practice, a posttest followed this to gauge how well each group

performed on the reading skills. Descriptive statistics, a T-test for independent samples, and a T-test for paired samples were used in the study to assess how sound interventions improved reading skills among the Grade 12 students.

Results and Discussion

Problem 1. What is the participants' reading skills before and after the intervention in terms of stating thesis statement; summarizing; and explaining specific ideas?

A comprehensive overview of participants' reading skills, focusing on their abilities in identifying thesis statements, summarizing content, and explaining specific ideas. The mean score for TPACK Instruction participants rose from 4.85 (Below Average) to 8.80 (Average), signaling an enhancement in reading proficiency. Similarly, the Teacher-Directed Instruction group improved, with the mean score increasing from 4.89 (Below Average) to 8.25 (Average). This general trend of advancement from below-average to average performance indicates the success of both instructional methods in enhancing overall reading skills.

Table 1

Participants' Reading Skills

	TPACK INSTRUCTION						Teacher-Directed INSTRUCTION					
	Pretest			**Post-test**			**Pretest**			**Post-test**		
	M	Int	SD	M	Int	SD	M	Int	SD	M	Int	SD
Stating Thesis Statement	4.17	BA	1.12	**8.20**	A	1.26	4.09	BA	1.38	**7.34**	A	1.61
Summarizing	5.74	BA	1.20	**9.34**	A	1.35	5.40	BA	1.46	**8.91**	A	1.12
Explaining Specific Ideas	4.63	BA	1.31	**8.86**	A	1.40	5.17	BA	1.56	**7.34**	A	1.61
OVERALL	**4.85**	**BA**	**1.01**	**8.80**	**A**	**0.98**	**4.89**	**BA**	**1.23**	**8.25**	**A**	**1.27**

Legend:
O = Outstanding; AA = Above Average; A = Average BA = Below Average;
P = Poor

The study findings reveal that both TPACK and Teacher-Directed Instruction demonstrate improvements from the pretest to the post-test. The mean score for TPACK Instruction participants rose from 4.85 (*Below Average*) to 8.80 (*Average*), signaling an enhancement in reading proficiency. Similarly, the Teacher-Directed Instruction group improved, with the mean score increasing from 4.89 (*Below Average*) to 8.25 (*Average*). This general trend of advancement from *below-average* to *average* performance indicates the success of both instructional methods in enhancing overall reading skills.

Furthermore, the data reveals consistent improvements across all three evaluated aspects: Stating Thesis Statement, Summarizing, and Explaining Specific Ideas. For the Stating Thesis Statement, TPACK Instruction participants improved their mean score from 4.17 (*Below Average*) to 8.20 (*Average*). At the same time, the Teacher-Directed group saw a rise from 4.09 to 7.34 in their mean scores, both moving

from below-average to average proficiency. In the area of Summarizing, both groups demonstrated significant gains. TPACK Instruction's mean score increased from 5.74 to 9.34, and Teacher-Directed Instruction's score rose from 5.40 to 8.91, moving from *below average* to *average*.

Moreover, in Explaining Specific Ideas, both instructional methods again showed improvements. TPACK Instruction's mean score escalated from 4.63 (*Below Average*) to 8.86 (*Average*), and the Teacher-Directed Instruction's score increased from 5.17 to 7.34. These results underscore the usefulness of both instructional methods in enhancing specific reading skills.

This transition from *below average* to *average* in all areas for both TPACK Instruction and Teacher-Directed Instruction underscores an enhancement in reading skills, validating the success of these instructional strategies in improving reading proficiency among participants.

Problem 2. How do the participants in each group compare their reading skills before and after the interventions?

Ho1. There is no significant difference in the participants' reading skills before and after the interventions.

Table 2 presents the Result of the Test of Difference in the Participants' Reading Skills Levels before and after the Interventions.

For both groups, the overall scores demonstrate statistically significant improvements from the pre-test to the post-test. Specifically, the TPACK Instruction Group showed a rise in mean scores from 4.85 to 8.80, while the Teacher-Directed Instruction Group saw an increase from 4.89 to 8.25. These improvements were confirmed by very low p-values (<.000) and high effect sizes (Cohen's d), 3.59 for TPACK and 2.35 for Teacher-Directed Instruction. These values indicate not only statistical significance but also practical significance. Thus, the null hypothesis can be rejected.

Table 2

Result of the Test of Difference in the Participants' Reading Skills Levels before and after the Interventions

	TPACK INSTRUCTION GROUP					TEACHER-DIRECTED INSTRUCTION GROUP				
Reading Skills	**Pre-test**	**Post test**	**t**	**p**	**Cohen's d**	**Pretest**	**Posttest**	**t**	**p**	**Cohen's d**
Stating Thesis Statement	4.17	8.20	**15.26****	**.000**	*2.58*	4.09	7.34	**11.67****	**.000**	*1.97*
Summarizing	5.74	9.34	**15.72****	**.000**	*2.66*	5.40	8.91	**14.21****	**.000**	*2.40*
Explaining Specific Ideas	4.63	8.86	**15.54****	**.000**	*2.63*	5.17	7.34	**9.68****	**.000**	*1.64*
OVERALL	**4.85**	**8.80**	**21.26****	**.000**	***3.59***	**4.89**	**8.25**	**13.90****	**.000**	***2.35***

**significant at 0.01 level

Focusing on the TPACK Instruction Group, the results across individual categories, such as Stating Thesis statements, Summarizing, and Explaining Specific Ideas, further substantiate this trend. The pre-test to post-test improvements were statistically significant in each of these categories, as evidenced by low p-values. As measured by Cohen's d, the effect sizes were particularly notable. The effect sizes for Stating Thesis Statement, Summarizing, and Explaining Specific Ideas were 2.58, 2.66, and 2.63, respectively. These high effect sizes suggest that the intervention had a strong and meaningful effect on the participants' reading skills.

The recent research on TPACK (Technological Pedagogical Content Knowledge) instruction presents a coherent picture of its effectiveness in boosting educational competencies, particularly reading skills. Critical studies, such as those by Abu-Hardan et al. (2019), have specifically underscored the positive effects of TPACK on English as a Foreign Language (EFL) learners' reading abilities. Complementing these findings, research by Kim and Lee (2018), Miguel-Revilla et al. (2020), and Buss et al. (2018) extend the scope of TPACK's impact, indicating enhancements not just in reading skills but also in teachers' technological and pedagogical capabilities. This broader improvement is crucial, as it points to TPACK's role in a holistic educational strategy, benefiting various aspects of teaching and learning. The collective evidence from these studies confirms the substantial influence of TPACK Instruction in academic settings, emphasizing its potential in converting educational approaches and underscoring the need for further exploration into its application across diverse learning environments.

Similarly, the Teacher-Directed Instruction (TDI) Group significantly improved their reading skills across the same categories. The p-values were again well below the 0.01 threshold, reaffirming the statistical significance of the improvements. The effect sizes for the TDI Group were also substantial, though slightly lower than those for the TPACK Group. The effect sizes for Stating Thesis Statement, Summarizing, and Explaining Specific Ideas were 1.97, 2.40, and 1.64, respectively. These figures point to a significant and practical improvement in reading skills post-intervention, though the impact seems slightly less pronounced than that of the TPACK Group.

The Teacher-Directed Instruction (TDI) Group's significant improvements in reading skills underscore its effectiveness as an educational approach. This aligns with the findings of Hammond and Moore (2018), who investigated the impact of explicit instruction on teachers' professional development. Their study revealed that explicit instruction, which shares characteristics with TDI, positively affects educational outcomes, particularly in reading skill enhancement.

Overall, the TPACK Instruction and Teacher-Directed Instruction methodologies improved the reading abilities of participants. The compelling statistical evidence firmly confirms that the null hypothesis can be rejected, revealing advancements in reading proficiency following the intervention in both cohorts.

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Problem 3. Do the reading skill increments of the two groups significantly differ?
Ho2. The reading skills increments of the two groups do not significantly differ.

Table 3 presents the results of the increments in reading skills for participants in the TPACK Instruction Group and the Teacher-Directed Instruction Group. Notably, the TPACK group achieved an overall mean increment of 3.95, compared to 2.46 for the Teacher-Directed group. This notable mean-score disparity is statistically supported by an overall t-value of 2.71, surpassing the commonly accepted threshold for statistical significance in social science research. The p-value associated with the overall score is .010, which is considerably lower than the standard alpha level of 0.05 typically used in research. Such a p-value robustly indicates that the difference in reading skill increments between the two groups is statistically unlikely to result from random chance. Therefore, based on this data, the null hypothesis, which asserts that there are no significant differences in the reading skills increments between the two groups, can be rejected.

Additionally, the effect size, as indicated by Cohen's d, stands at 1.30. This magnitude of effect size is categorized as large, given that effect sizes are generally considered small around 0.2, medium around 0.5, and large at 0.8 or above. A large effect size like this emphasizes the statistical significance of the findings and highlights their educational importance. It underscores that the impact of the two instructional methods on reading skills is not just a statistical artifact but also bears substantial educational relevance, with the TPACK method demonstrating a more pronounced effect on reading skill enhancement.

Table 3
Result of the Test of Difference in the Reading Skills Increments

Reading Skills	TPACK INSTRUCTION GROUP		TEACHER-DIRECTED INSTRUCTION GROUP		t	p	Cohen's d
	M	**SD**	**M**	**SD**			
Stating Thesis Statement	4.03	1.56	3.26	1.65	**2.01***	**.049**	*0.48*
Summarizing	3.60	1.36	3.51	1.46	**.254**	**.800**	*0.61*
Explaining Specific Ideas	4.23	1.61	3.31	2.03	**2.09***	**.049**	*0.50*
OVERALL	3.95	1.10	2.46	1.48	**2.71***	**.010**	*1.30*

*significant at 0.05 level

The data reveals a distinct advantage for the TPACK group in the specific skill of Stating Thesis Statements. They exhibited a mean increment of 4.03, significantly higher than the 3.26 achieved by the Teacher-Directed group. This notable difference in performance is statistically validated by a t-value of 2.01 and a p-value of .049. Such findings suggest that the TPACK instructional method is particularly effective in enhancing students' ability to articulate thesis statements. This effectiveness

likely stems from TPACK's holistic approach, which synergizes technology, pedagogy, and content knowledge. This integrative strategy fosters an enriched learning environment that is especially conducive to developing complex cognitive skills, such as formulating thesis statements (Vasodavan, 2020; Walker, 2020; Yeh et al., 2021). In this environment, learners are better equipped to engage with and comprehend intricate concepts, thereby enhancing their capacity for critical thinking and coherent expression, as evidenced by their improved ability to state thesis statements (Wang, 2020; Katechaiyo, 2019).

In contrast, the skill of Summarizing displayed a different trend. The TPACK and Teacher-Directed groups demonstrated similar levels of improvement, contrasting the trends observed in other skills. The TPACK group registered a mean increment of 3.60, closely paralleled by the Teacher-Directed group with 3.51. The slight difference in these increments is further emphasized by a t-value of .254 and a p-value of .800, which collectively indicate no statistically significant difference in their effectiveness in teaching summarization. This equivalence in performance suggests that both the TPACK and Teacher-Directed instructional methods are comparably effective when it comes to teaching summarization skills. This observation leads to the inference that specific reading skills, like summarization, may be independent of the specificities of the instructional approach employed. Instead, these skills might be more universally developed across various teaching methods, hinting at their reliance on core teaching principles shared among different educational strategies.

Complementing this, recent research sheds light on the broader implications of the Technological Pedagogical Content Knowledge (TPACK) and Teacher-Directed Instruction (TDI) frameworks in education. Studies focusing on TPACK (Miguel-Revilla et al., 2020; Fathi & Yousefifard, 2019) highlight its success in enhancing aspects of teacher education, including integrating technology with pedagogical and content knowledge. This suggests that TPACK is particularly effective in merging technology with traditional teaching practices. Conversely, research on TDI (Ibrahim et al., 2020; Gess-Newsome et al., 2019) emphasizes its strengths in refining teaching strategies, course planning, and boosting student achievement. Characterized by structured, teacher-led activities, TDI also emerges as a robust method for imparting summarization skills. Thus, both TPACK and TDI, despite their distinct approaches, effectively teach critical educational skills like summarization, each contributing uniquely to the educational process.

In the skill of Explaining Specific Ideas, the performance of the TPACK group notably surpassed that of the Teacher-Directed group. The TPACK participants achieved a mean increment of 4.23, while the Teacher-Directed group reached 3.31. This distinction in performance is statistically significant, with a t-value of 2.09 and a p-value of .049, underscoring a meaningful difference in efficacy between the two instructional methods in this particular skill. The superior performance of the TPACK group in fostering the skill of explaining and elaborating on ideas may be attributed to the comprehensive nature of the TPACK framework. This framework effectively integrates technology with pedagogical strategies, enhancing the learners' capacity to comprehend and express complex concepts.

Supporting this observation, recent studies have emphasized the strengths of the TPACK approach in developing such cognitive and expressive abilities. For instance, a study by Koh (2019) demonstrated how TPACK's integration of technological tools and pedagogical techniques improves students' conceptual understanding and articulation skills. Similarly, research by Goradia (2018) highlighted the role of TPACK in promoting higher-order thinking skills, which are crucial for explaining complex ideas. These findings align with the observed success of the TPACK group in our analysis, suggesting that the TPACK methodology is particularly effective in nurturing advanced cognitive skills like explaining specific ideas.

Recommendations

The study recommends that reading teachers should integrate technology with traditional teaching methods, pursue continuous learning in tech-pedagogy-content integration, and employ diverse strategies like TPACK and Teacher-Directed Instruction to cater to different student needs. School administrators are advised to provide necessary technological resources, invest in teacher training programs for tech-pedagogy-content integration, regularly evaluate teaching methods, and update reading curriculums to promote interactive learning. Future researchers are encouraged to further investigate and refine TPACK and TDI methodologies, explore their impact on various reading skills components, and examine additional methods to enhance reading abilities.

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