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FLAT-Based Intervention: Effects on the Literacy Competence of Grade 6 Learners

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Abstract

This study investigated the effects of a FLAT-based multimedia intervention on the literacy competence of Grade 6 learners at Malansad Nuevo Elementary School, Libmanan, Camarines Sur during the School Year 2023–2024. Anchored on Schema Theory, Cognitive Theory of Multimedia Learning, and Vygotsky's Zone of Proximal Development, the study aimed to (1) determine learners' literacy competence across six levels: letter, word, paragraph, story, story with comprehension, and local material with comprehension; (2) develop a FLAT-based literacy intervention using the ADDIE model; (3) assess literacy competence after intervention; (4) determine significant differences between pretest and posttest results; and (5) evaluate the effectiveness of the intervention. Using a descriptive-comparative design and total enumeration of 48 learners, data were gathered through pretest–posttest assessments using the Functional Literacy Assessment Tool (FLAT). Results revealed low baseline performance in comprehension-based literacy skills. Posttest results showed marked improvement, particularly in foundational and intermediate skills. Statistical analysis confirmed significant differences ($p < .001$) and a large overall effect size ($d = 1.13$). The study concludes that FLAT-based multimedia intervention significantly enhances literacy competence, though comprehension skills require sustained support.

Keywords: FLAT-based intervention; literacy competence; multimedia learning; Grade 6; assessment-based intervention

1. Introduction

Literacy competence is a fundamental determinant of learners' academic readiness, particularly at the Grade 6 level where learners transition from learning to read toward reading to learn. At this stage, students are expected to demonstrate proficiency not only in decoding but also in comprehension, interpretation, and application of texts. However, global and national assessments consistently reveal persistent gaps in reading comprehension and higher-order literacy skills.

In the Philippine context, results from national assessments and international benchmarks such as PISA highlight significant challenges in literacy development among elementary learners. These challenges are often attributed to disparities in instructional resources, limited access to engaging learning materials, and insufficient integration of innovative teaching strategies.

One promising approach to addressing these challenges is the use of assessment-based interventions such as the Functional Literacy Assessment Tool (FLAT). FLAT provides a structured framework for

identifying learners' literacy levels and guiding targeted remediation. When combined with multimedia-supported instruction, FLAT-based interventions offer opportunities for engaging, differentiated, and learner-centered literacy instruction.

Aligned with Republic Act No. 10533 and the United Nations Sustainable Development Goal 4 (Quality Education), this study responds to the need for effective, inclusive, and evidence-based literacy interventions. By integrating multimedia tools such as television, projectors, speakers, and mobile devices, the study seeks to enhance literacy competence through meaningful and contextualized learning experiences.

FLAT-Based Intervention and Literacy Competence

The literature consistently emphasizes the importance of targeted literacy interventions and multimedia integration in improving reading outcomes. International studies (e.g., Snowling & Hulme, 2021; Kim & Quinn, 2019) highlight the role of structured interventions and technology in improving reading fluency, vocabulary, and comprehension.

In Asian and Philippine contexts, studies reveal that multimedia-supported instruction and assessment-driven interventions significantly improve learner engagement and literacy performance. National initiatives and policies further support these approaches through the implementation of diagnostic tools, remedial programs, and learning recovery strategies.

FLAT-based interventions align with these frameworks by combining diagnostic assessment, targeted instruction, and multimedia integration. This approach not only addresses learners' specific literacy needs but also promotes learner motivation and active participation.

2. Methodology

The study employed a descriptive-comparative research design to examine changes in literacy competence before and after the intervention. The respondents consisted of 48 Grade 6 learners from Malansad Nuevo Elementary School, who were selected through total enumeration to ensure complete representation. To measure literacy competence, the Functional Literacy Assessment Tool (FLAT) was utilized, covering six levels: letter, word, paragraph, story, story with comprehension, and local material with comprehension. The procedure involved the administration of a pretest using FLAT, followed by the implementation of a FLAT-based multimedia intervention guided by the ADDIE model, and concluded with a posttest using the same assessment tool. For data analysis, statistical measures such as mean, standard deviation, proficiency level, paired t-test, and Cohen's d were employed to determine differences and the effectiveness of the intervention.

Results and Discussion

Table 2 presents the literacy status of the Grade 6 learners across six aspects. The letter level obtained a mean of 4.84 with a standard deviation of 0.37 and a performance level of 96.80 interpreted as Outstanding and ranked first. The word level posted a mean of 7.37, standard deviation of 3.66, and performance level of 73.70 interpreted as Satisfactory and ranked second. The paragraph level recorded a mean of 6.00 with a standard deviation of 4.11 and a performance level of 60.00 interpreted as Fairly Satisfactory and ranked third. The story level yielded a mean of 4.37, standard deviation of 4.39, and a

performance level of 43.70 interpreted as Did Not Meet Expectations and ranked fourth. The story with comprehension level showed a mean of 1.00 with zero variability and a performance level of zero interpreted as Did Not Meet Expectations and ranked fifth. The local material with comprehension level registered a mean of zero with no variability and a performance level of zero interpreted as Did Not Meet Expectations and ranked sixth. Overall, the total literacy score reflected a mean of 23.58, standard deviation of 12.37, and a performance level of 47.16 interpreted as Did Not Meet Expectations.

The results show a clear decline in literacy performance as the reading tasks progress from basic to higher-order skills. The learners performed very well in letter recognition, suggesting strong foundational decoding skills developed during the early grades. Performance gradually decreased at the word and paragraph levels, indicating emerging difficulty in processing connected text. A more pronounced decline was observed at the story and comprehension-based levels, which require deeper understanding, inference, and integration of ideas. The increasing spread of scores in higher-level tasks suggests varied learner abilities and uneven mastery of comprehension skills, possibly influenced by limited exposure to complex texts and insufficient instructional support focused on meaning-making rather than decoding.

Table 2

Grade 6 Learners' Literacy Status

Aspects/Skills	No of Items	Mean	SD	PL	Int
Letter Level	5	4.84	0.37	96.80	O
Word Level	10	7.37	3.66	73.70	S
Paragraph Level	10	6	4.11	60.00	FS
Story Level	10	4.37	4.39	43.70	DNME
Story with Comprehension Level	10	1.00	0.00	0.00	DNME
Local Material w Comprehension Level	5	0.00	0.00	0.00	DNME
TOTAL	50	23.58	12.37	47.16	Did Not M Expectation

Note: Proficiency Level:(Based from D.O. 8 s. 2015) 84-100, Outstanding; 76-83.99, Very Satisfactory, 68-75.99, Satisfactory; 60-67.99, Fairly Satisfactory; 0-59.99, Did Not Meet Expectations

The outcome of this study is consistent with the findings of Sung, Chang, and Liu (2016), who reported that elementary learners often demonstrate strong basic reading abilities but struggle with comprehension without enriched instructional support. Similarly, Dalton and Proctor (2018) found that learners' difficulties increase as reading tasks demand deeper understanding and interpretation. The study of Hwang, Lai, and Wang (2020) likewise revealed that comprehension levels remain low when learners

are not provided with engaging and supportive learning resources. Moreover, Bernardo (2019) emphasized that Filipino learners tend to perform better in basic literacy tasks than in comprehension-based assessments, reinforcing the pattern observed in the present study.

FLAT-based Intervention Developed

The FLAT-based intervention was developed using the ADDIE model, a systematic and learner-centered instructional design framework consisting of Analysis, Design, Development, Implementation, and Evaluation, to enhance the literacy competence of Grade 6 learners. In the analysis phase, the FLAT pretest results were examined to identify learners' strengths and difficulties across literacy levels. While learners demonstrated competence in basic reading skills, significant challenges were observed in story comprehension and understanding local materials, which guided the development of targeted intervention activities focusing on comprehension, vocabulary, fluency, sequencing, and critical thinking. During the design phase, multimedia tools were strategically aligned with specific literacy skills, wherein television activities supported story understanding and vocabulary development, speaker-based activities enhanced fluency and pronunciation, projector-based tasks promoted shared reading and comprehension skills, and cellphone-assisted activities extended independent learning. In the development phase, instructional materials such as videos, audio recordings, projected texts, and mobile-based resources were prepared and adapted to learners' levels, accompanied by worksheets, comprehension questions, and scaffolding aids like subtitles and visual supports. The implementation phase involved conducting multimedia-based literacy activities through guided, paired, and independent learning tasks, where learners actively engaged in reading, listening, predicting, summarizing, and reflecting, with additional home-based activities to reinforce learning. Finally, the evaluation phase assessed the effectiveness of the intervention through FLAT posttest results, which were compared with pretest data and analyzed using Cohen's d to determine significant improvements and effect size, confirming that the structured integration of multimedia through the ADDIE model effectively enhanced the literacy skills of Grade 6 learners, particularly in decoding, fluency, and comprehension.

Literacy Competence of the Learners after the utilization of the Intervention

The conducted posttest assessment was patterned how it was done in the pretest. Table 4 presents the literacy level of Grade 6 learners after the intervention program. The letter level posted a mean of 5.00 with no variability, resulting in a performance level of 100.00 interpreted as Outstanding and ranked first. The word level registered a mean of 9.74 with a standard deviation of 0.65 and a performance level of 97.40 interpreted as Outstanding and ranked second. The paragraph level obtained a mean of 9.05 with a standard deviation of 2.07 and a performance level of 90.50 interpreted as Outstanding and ranked third. The story level yielded a mean of 8.26 with a standard deviation of 3.28 and a performance level of 82.60 interpreted as Very Satisfactory and ranked fourth. The story comprehension level recorded a mean of 5.63 with a standard deviation of 3.35 and a performance level of 56.30 interpreted as Did Not Meet Expectations and ranked fifth. The local material comprehension level posted a mean of 1.58 with a standard deviation of 1.61 and a performance level of 31.60 interpreted as Did Not Meet Expectations and ranked sixth. Overall, the total posttest literacy score showed a mean of 39.31 with a standard deviation of 9.99 and a performance level of 78.62 interpreted as Very Satisfactory.

Table 3

Literacy Level After the Intervention Program

Aspects/Skills	NI	Mean	SD	PL	Int
Letter Level	5	5.00	0.00	100.0	O
Word Level	10	9.74	0.65	97.40	O
Paragraph Level	10	9.05	2.07	90.50	O
Story Level	10	8.26	3.28	82.60	VS
Story Comprehension Level	10	5.63	3.35	56.30	DNME
Local Material Comprehension Level	5	1.58	1.61	31.60	DNME
Total	50	39.31	9.99	78.62	Very Satisfactory

Note: Proficiency Level:(Based from D.O. 8 s. 2015) 84-100, Outstanding; 76-83.99, Very Satisfactory, 68-75.99, Satisfactory; 60-67.99, Fairly Satisfactory; 0-59.99, Did Not Meet Expectations

The posttest results indicate a substantial improvement in learners' literacy performance following the intervention program, particularly in foundational and intermediate reading skills. Learners showed mastery in letter, word, and paragraph levels, reflecting strengthened decoding, word recognition, and text processing abilities. The strong performance at the story level suggests that learners benefitted from structured and supported reading activities that enhanced overall understanding of narratives. However, comprehension-based skills, especially in story comprehension and local material comprehension, remained challenging. This may be attributed to the higher cognitive demands of comprehension tasks, which require critical thinking, inference, and the integration of prior knowledge, skills that take longer to develop and require consistent exposure and guided practice.

It can be inferred that the intervention program was effective in improving the general literacy skills of Grade 6 learners, particularly in basic reading and text-level understanding. The improvement may have been the result of increased exposure to structured reading activities and supportive instructional strategies introduced during the intervention. Despite these gains, the persistence of difficulties in comprehension suggests that higher-order literacy skills need sustained and focused instructional support. In conclusion, while the intervention successfully enhanced overall literacy performance, further emphasis on comprehension development remains necessary.

The findings of this study align with the results of Sung, Chang, and Liu (2016), who reported improvements in learners' reading accuracy and fluency after multimedia-supported interventions, while noting that comprehension develops more gradually. Similarly, Dalton and Proctor (2018) found that interventions often lead to stronger gains in basic reading skills than in comprehension. The study of

Hwang, Lai, and Wang (2020) also showed that learners demonstrated significant post-intervention improvement in text-level reading but continued to struggle with deeper comprehension tasks. Likewise, Bernardo (2019) observed that Filipino learners tend to show marked progress in foundational literacy after instructional support, yet comprehension skills often lag behind, mirroring the outcomes of the present study.

Difference Between the Literacy Competence Level before and after the Utilization of the Intervention

Table 5 presents the difference between the pretest and posttest literacy levels of Grade 6 learners. The letter level recorded a t-value of 2.83 with a p-value of .007 and was interpreted as highly significant. The word level posted a t-value of 4.21 and a p-value of .000 with a very highly significant interpretation. The paragraph level yielded a t-value of 3.95 and a p-value of .000 and was interpreted as very highly significant. The story level showed a t-value of 4.38 with a p-value of .000, interpreted as very highly significant. The story comprehension level obtained the highest t-value of 9.91 with a p-value of .000 and was also interpreted as very highly significant. The local material comprehension level registered a t-value of 6.56 and a p-value of .000 with a very highly significant interpretation. Overall, the total literacy score reflected a t-value of 4.01 and a p-value of .000, interpreted as very highly significant.

The results indicate that the multimedia-based intervention produced statistically meaningful improvements across all literacy skills. The strong differences observed in word, paragraph, and story levels suggest that learners benefited from repeated exposure to structured and engaging reading activities supported by multimedia tools. The significance in comprehension-based skills implies that the intervention effectively addressed learners' previous difficulties in understanding and interpreting texts.

Table 4

Difference Between Pretest and Posttest on the Literacy Level of Grade 6 Learners

Test	t-value	p-value	Int
Letter Level	2.83	<.007	Sig
Word Level	4.21	<.001	Sig
Paragraph Level	3.95	<.001	Sig
Story Level	4.38	<.001	Sig
Story Comprehension Level	9.91	<.001	Sig
Local Material Comprehension Level	6.56	<.001	Sig
Overall	4.01	<.001	Significant

FLAT-Based presentations likely enhanced attention, motivation, and clarity of meaning through visual and auditory reinforcement, which helped learners process information more deeply. The consistency of

significance across all skills reflects the effectiveness of targeted and level-appropriate instructional strategies.

It can be inferred that the improvements in literacy levels occurred as a direct result of the systematic use of multimedia during the intervention period. The integration of television, speakers, projectors, and cellphones provided multiple opportunities for learners to engage with texts in varied and meaningful ways, supporting both guided and independent learning. These experiences likely strengthened comprehension, fluency, and vocabulary development, particularly in higher-order literacy tasks. In conclusion, the significant differences between pretest and posttest results confirm the effectiveness of the multimedia-based intervention in improving the literacy level of Grade 6 learners.

The findings of this study are supported by Sung, Chang, and Liu (2016), who observed significant improvements in learners' reading performance after multimedia-supported instruction. Dalton and Proctor (2018) similarly reported that literacy interventions using audio-visual materials resulted in notable gains in reading comprehension and fluency. The study by Hwang, Lai, and Wang (2020) also showed that learners exposed to structured multimedia activities demonstrated significant improvement in both basic and higher-level reading skills. Moreover, Bernardo (2019) emphasized that Filipino learners exhibit better literacy outcomes when innovative and engaging instructional strategies are implemented, supporting the outcomes of the present study.

Effectiveness of FLAT-Based Intervention

Table 6 presents the effectiveness of FLAT-based intervention on the literacy competence of Grade 6 learners using effect size. The letter level obtained an effect size of 0.60, interpreted as a medium effect. Word level showed an effect size of 0.90, interpreted as a large effect. Paragraph level registered an effect size of 0.94 with a large effect. Story level posted an effect size of 1.00 and was interpreted as large effect. Story comprehension level recorded the highest effect size of 1.96, interpreted as large effect. Local material comprehension level followed with an effect size of 1.39, also interpreted as large effect. The overall effect size was 1.13, interpreted as large effect.

Table 5

Effectiveness of FLAT-Based Intervention on the Literacy Competence of Grade 6 Learners

Assessments	Mean Difference	SD	p-value	d-value	Int
Pre Test and Post Test	2.60	2.973	<.001	.874	Large

Note. Cohen's d effect value is interpreted as follows: 0.20 indicates small effect, 0.50 indicates a medium effect, and 0.80 and above indicate a large effect.

The findings indicate that FLAT-Based Intervention had a meaningful and substantial impact on learners' literacy development, particularly in comprehension-based skills. The medium to large effects observed in letter, paragraph, and story levels suggest that multimedia reinforced learners' existing reading abilities by improving fluency, recognition, and general understanding of texts. The large effects evident in word recognition and comprehension skills indicate that multimedia tools were especially effective in helping

learners understand meanings, process information, and make sense of texts. Audio-visual presentations likely enhanced attention, motivation, and clarity, which are critical in improving deeper literacy skills that traditional instruction alone may not sufficiently address.

It can be inferred that the integration of FLAT-Based multimedia significantly strengthened learners' literacy performance by providing varied and engaging reading experiences. The combined use of visual, auditory, and interactive elements supported learners' understanding and retention of reading content, particularly in comprehension tasks. These results suggest that multimedia helped bridge learning gaps by making complex texts more accessible and meaningful to learners. In conclusion, the effect size results confirm that multimedia usage was an effective instructional strategy in improving the literacy level of Grade 6 learners.

The results are consistent with the study of Takacs, Swart, and Bus (2017), which found that multimedia presentations notably improved learners' reading comprehension and vocabulary development. Similarly, Chen and Wu (2016) reported that multimedia tools produced stronger learning outcomes in language instruction compared to text-only methods. Hussein (2017) also observed that multimedia-based reading instruction resulted in substantial gains in learners' comprehension skills.

Conclusions

1. Grade 6 learners demonstrated strong foundational literacy but significant gaps in comprehension-based skills.
2. The FLAT-based multimedia intervention effectively improved literacy competence across most domains.
3. Significant differences between pretest and posttest results confirm the effectiveness of the intervention.
4. Multimedia integration contributed to increased engagement, fluency, and reading performance.
5. Despite improvements, comprehension skills require sustained instructional support.

Recommendations

- Implement early diagnostic assessments and targeted reading interventions focusing on comprehension skills.
- Integrate multimedia tools systematically into literacy instruction.
- Sustain guided and independent reading practices to reinforce literacy gains.
- Promote the adoption of FLAT-based interventions across schools and divisions.
- Conduct further research on long-term effects and scalability of multimedia-based literacy interventions.

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