



## The Effect of Webtoon-Based Reading on EFL Students' Reading Comprehension and Reading Anxiety

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### ABSTRACT

Reading comprehension and reading anxiety remain persistent challenges among senior high school students learning English as a Foreign Language (EFL), particularly when instruction relies heavily on traditional text-only materials. In the Indonesian EFL context, limited contextual support often contributes to students' difficulty in understanding texts and increased anxiety. This study investigates the effect of picture-based digital media, specifically the Webtoon application, on improving reading comprehension and reducing reading anxiety among senior high school EFL students. A quasi-experimental design with a pre-test-post-test control group was employed. Fifty-six students were divided into an experimental group receiving Webtoon-based reading instruction and a control group using conventional text-based materials. Data were collected using a reading comprehension test and the Foreign Language Reading Anxiety Scale (FLRAS). Statistical analyses included independent-samples t-tests, paired-samples t-tests, and analysis of covariance (ANCOVA). The results showed that the experimental group achieved a significantly higher post-test mean score in reading comprehension ( $M = 85.71$ ,  $SD = 7.29$ ) than the control group ( $M = 77.50$ ,  $SD = 7.87$ ),  $t(54) = 4.049$ ,  $p < 0.001$ . ANCOVA confirmed that the instructional method remained a significant predictor after controlling for pre-test scores. Additionally, students in the experimental group experienced a significant reduction in reading anxiety, with FLRAS scores decreasing from pre-test ( $M = 58.2$ ) to post-test ( $M = 46.7$ ),  $t(27) = 6.35$ ,  $p < 0.001$ . These findings indicate that Webtoon-based reading instruction functions as both a cognitive and affective scaffold, enhancing comprehension while reducing reading anxiety in EFL classrooms.

**Keywords:** *EFL Learners; Multimodal Learning; Reading Anxiety; Reading Comprehension; Webtoon-Based Reading.*

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### INTRODUCTION

Reading comprehension is a fundamental skill in English as a Foreign Language (EFL) learning, serving as a cornerstone for academic success and overall language development. However, for many EFL learners, reading in English is not merely a

cognitive task but also an emotionally demanding activity. Previous studies have shown that learners often experience substantial reading anxiety, which negatively affects comprehension accuracy, motivation, and willingness to engage with texts (Fitrawati et al., 2023; Jannah & Juniardi, 2025). Emotional factors such as unfamiliar vocabulary, fear of making mistakes, and low self-confidence frequently discourage students from actively participating in reading activities (Kamil, 2023). In line with the Affective Filter Hypothesis, these emotional barriers hinder learners' ability to process linguistic input effectively, thereby constraining reading comprehension outcomes (Riana & Ningrum, 2025).

In response to these challenges, the integration of visual and multimodal learning tools has gained increasing attention in EFL instruction. Visual-based approaches, including digital comics, infographics, and Webtoon applications, have been reported to reduce cognitive load and enhance learner motivation by providing contextualized imagery and structured narratives (Lestari et al., 2025; Damayanti et al., 2025). By combining visual representations with textual information, multimodal instruction offers scaffolding that supports less proficient readers and creates a more supportive and engaging learning environment. Such approaches help bridge the gap between abstract linguistic input and concrete meaning construction, facilitating both comprehension and learner engagement (As Sabiq & Rohmatulhaq, 2024; Tandiana et al., 2023).

Despite the growing body of research highlighting the cognitive benefits of multimodal learning, the affective dimension of reading, particularly anxiety reduction, remains relatively underexplored in empirical EFL studies (Rafli & Muslim, 2023). This gap is especially relevant in the Indonesian context, where high-context communication patterns, strong reliance on visual cues, and increasing digital literacy shape students' learning preferences. Webtoon, as a digital comic platform, holds distinctive pedagogical potential due to its sequential storytelling, vertical scrolling format, episodic structure, and balanced integration of concise text and visuals. Unlike short-form visual platforms such as Instagram comics or video-based applications like TikTok, Webtoon requires sustained reading engagement and linear narrative processing, making it more directly aligned with reading comprehension processes. These features position Webtoon as a culturally relevant and literacy-oriented medium for Indonesian EFL learners (As Sabiq & Rohmatulhaq, 2024).

Furthermore, picture-based learning environments have been shown to reduce reading anxiety by lowering cognitive overload and supporting contextual inference. Webtoon's design amplifies these benefits by offering a less intimidating entry point into reading through visual storytelling and emotionally supportive narratives, particularly for anxiety-prone EFL learners immersed in digital media (Aulia & Ulfa, 2025). However, despite its popularity and pedagogical affordances, empirical research examining whether Webtoon-based reading instruction can simultaneously reduce reading anxiety and enhance reading comprehension remains limited (Rahmadani et al., 2024). Therefore, investigating Webtoon as a visual storytelling medium that aligns closely with reading comprehension processes provides a valuable opportunity to examine both cognitive and affective dimensions of EFL reading within a single instructional framework (Rahayu & Wiyanah, 2023).

This study aims to explore the comparative effects of picture-based Webtoon media and conventional text-based reading materials on EFL students' reading comprehension and reading anxiety. Using a quasi-experimental design and affective

assessment instruments, the study examines whether integrating visual narratives into reading instruction can enhance comprehension outcomes while simultaneously mitigating students' anxiety toward reading English texts. By focusing on senior high school learners, the findings of this study are expected to contribute to a contextual understanding of how multimodal digital media, particularly Webtoon, can support both cognitive development and emotional well-being in EFL reading instruction.

## LITERATURE REVIEW

### *Theoretical Foundations and Integrated Framework*

The relationship between visual literacy and reading comprehension in EFL learning is strongly grounded in multimodal learning theory, which posits that meaning construction occurs through the integration of multiple semiotic resources, including textual, visual, and spatial modes (Kim et al., 2021). This theoretical perspective is closely aligned with Dual Coding Theory, which explains that verbal and non-verbal information are processed through separate but interconnected cognitive channels, allowing learners to build richer mental representations when text and imagery are presented simultaneously (Paivio, 1991). In reading contexts, this dual processing mechanism supports deeper comprehension, better retention, and more effective inference-making.

Beyond cognitive processing, affective factors play a critical role in EFL reading. Krashen's Affective Filter Hypothesis emphasizes that emotional variables such as anxiety, fear of failure, and low confidence can obstruct learners' ability to process linguistic input effectively (Krashen, 1988). When learners experience high anxiety, the affective filter rises, limiting access to comprehensible input regardless of instructional quality. Therefore, learning environments that reduce emotional pressure are essential for optimal reading development.

Taken together, these three theoretical perspectives form an integrated framework supporting the pedagogical use of Webtoon-based reading materials. Webtoon naturally embodies multimodal principles through the combination of text, images, layout, and narrative sequencing; facilitates dual coding by pairing linguistic input with visual representation; and lowers affective barriers by presenting reading content in an engaging, familiar, and less intimidating format. This theoretical integration provides a strong foundation for examining both cognitive (reading comprehension) and affective (reading anxiety) outcomes in Webtoon-assisted EFL instruction.

### *Visual-Based Media and Reading Comprehension*

A substantial body of empirical research confirms the positive impact of visual-based media on EFL reading comprehension. Dhea Dwiastruti et al. (2025) demonstrated that students exposed to Webtoon comics achieved significantly higher comprehension scores than those taught using conventional text-based materials, highlighting the scaffolding role of visual storytelling in supporting meaning construction and narrative understanding. Similarly, Yawiloeng (2022) reported that multimodal reading texts incorporating images and graphics helped EFL learners organize ideas more effectively and comprehend complex information with greater accuracy.

Visual-based reading materials provide contextual cues such as imagery, facial expressions, body language, and setting, which assist learners in interpreting abstract or unfamiliar linguistic elements. Aulia and Ulfa (2025) further confirmed that students using Webtoon-based materials outperformed their peers who relied solely on text-based instruction, indicating that visual input enhances comprehension by reducing cognitive overload and supporting inferential reasoning. These findings reinforce the view that visual scaffolding is particularly beneficial for learners with varying levels of language proficiency.

### ***Webtoon, Motivation, and Engagement in Reading***

In addition to cognitive benefits, Webtoon has been widely recognized for its motivational impact on EFL learners. As Sabiq and Rohmatulhaq (2024) found that students perceived Webtoon as enjoyable, relevant, and aligned with their interests, with its episodic narrative structure encouraging sustained reading engagement and self-directed learning. Fauziah and Nasrullah (2023) similarly reported that Webtoon's interactivity and relatable storylines increased students' intrinsic motivation to read English texts, fostering deeper involvement in learning activities.

These motivational advantages are consistent with Pratiwi and Trisanti's (2025) argument that multimodal learning environments resonate strongly with learners' digital habits and experiences. By aligning instructional materials with students' everyday media consumption, Webtoon promotes longer engagement time, increased attention, and a more positive attitude toward reading tasks, all of which are closely associated with improved comprehension outcomes.

### ***Visual Media and Reading Anxiety Reduction***

Recent studies have increasingly emphasized the affective benefits of visual-based and multimodal instruction, particularly in reducing reading anxiety. Jannah and Juniardi (2025) revealed that EFL learners frequently experience moderate levels of anxiety when engaging with English texts, but the presence of visual support helps contextualize unfamiliar vocabulary and abstract structures, thereby reducing stress. Sutono (2025) further demonstrated that integrating picture storybooks with Philosophy for Children (P4C) activities not only improved comprehension but also significantly lowered students' anxiety by providing emotional scaffolding and a sense of interpretive security.

Visual interaction contributes to learners' emotional comfort by fostering autonomy and reducing the fear of misinterpretation. Yawiloeng (2022) extended this evidence by showing that students exposed to multimodal texts in collaborative learning environments developed lower anxiety levels and higher reading self-efficacy, as shared meaning-making reduced individual cognitive strain and emotional pressure. These findings underscore the importance of visual media in addressing affective barriers in EFL reading.

### ***Comparative Evidence: Webtoon versus Text-Based Reading***

Comparative studies consistently indicate that Webtoon-based reading outperforms traditional text-only instruction in both cognitive and affective domains. Dhea Dwiastuti et al. (2025) confirmed that Webtoon groups achieved superior comprehension outcomes while also demonstrating higher engagement and enjoyment. These results align with Bertella and Tomassini (2024), who found that English comics

stimulated learners' enthusiasm and sustained attention while supporting comprehension through visual interpretation.

Conversely, Damayanti et al. (2025) highlighted that text-only reading instruction often increases reading-related stress, as learners must rely exclusively on linguistic decoding without visual support. Despite these advantages, several challenges remain. Kim et al. (2021) cautioned that excessive reliance on visuals may lead to superficial comprehension if not balanced with critical textual analysis. Additionally, Damayanti et al. (2025) noted that the informal language commonly found in Webtoon materials may not fully align with academic literacy standards. Technological constraints, unequal digital access, and teacher readiness also pose practical challenges. Furthermore, limited longitudinal research has examined the sustained emotional effects of Webtoon-based instruction, particularly regarding long-term anxiety reduction, indicating a need for further investigation.

## **METHOD**

### ***Research Design***

This study employed a quasi-experimental design using a pre-test-post-test control group model. The purpose of this design was to examine whether picture-based Webtoon reading materials could improve reading comprehension and reduce reading anxiety among EFL learners compared to conventional text-based reading instruction. This design is widely applied in educational research to evaluate instructional interventions in natural classroom settings where random assignment is not feasible. Two intact classes were assigned to different instructional conditions, namely an experimental group that received Webtoon-based reading instruction integrating visual and textual elements, and a control group that received conventional text-only reading instruction. Both groups completed pre-tests and post-tests measuring reading comprehension and reading anxiety.

### ***Population and Sample***

The population of this study consisted of senior high school students enrolled in an EFL reading course at SMA 1 Ibrahimy. The participants were Grade 11 students, as indicated by the school's class labeling system. Using cluster random sampling, two intact Grade 11 classes were selected, namely Class XIB with 28 students and Class XIE with 28 students. One class was assigned as the experimental group and the other as the control group, resulting in a total sample of 56 students. The sample size was considered adequate for inferential statistical analysis, including independent-sample t-tests and ANCOVA, based on Cohen's (1988) guidelines for detecting medium effect sizes in educational interventions.

### ***Research Instruments***

Reading comprehension was measured using a 20-item multiple-choice test adapted from national EFL reading standards. The test assessed students' comprehension of narrative and expository texts, focusing on main ideas, supporting details, inference, and contextual vocabulary. Content validity was established through expert judgment conducted by a university lecturer specializing in EFL reading and visual-based literacy studies. Based on the expert's feedback, minor revisions were made



to improve item clarity and alignment with instructional objectives. Prior to implementation, the instrument was piloted, and reliability analysis using Cronbach's Alpha produced a coefficient greater than 0.80, indicating strong internal consistency.

Students' reading anxiety was measured using the Foreign Language Reading Anxiety Scale (FLRAS) developed by Saito, Garza, and Horwitz (1999). The questionnaire consists of 20 Likert-scale items ranging from 1 (strongly disagree) to 5 (strongly agree), yielding total scores between 20 and 100, with higher scores indicating higher levels of reading anxiety. The FLRAS was adapted for contextual relevance to Indonesian EFL learners through expert review and minor linguistic adjustments without altering the original construct or scoring system.

### *Treatment Procedure*

The experimental treatment involved the use of Webtoon-based reading materials created using the AI Comic Factory application. This application automatically transforms English reading texts into digital comic formats by generating visual panels that align with narrative content. AI Comic Factory was selected due to its ease of use, rapid content generation capabilities, English-language interface, and accessibility on standard smartphones. The Webtoon materials were developed from English short story texts aligned with the Grade 11 syllabus to ensure equivalence of content between the experimental and control groups.

Before the intervention began, students in the experimental group received a brief training session on how to use the application. Although some students were familiar with Webtoon as a digital platform, none had previously used AI Comic Factory for learning purposes. To minimize potential access barriers, school-owned devices were provided for in-class use, and all learning activities were designed to be completed offline. The intervention lasted four weeks and consisted of eight instructional sessions, each lasting 90 minutes, including pre-testing and post-testing phases.

During the intervention, the experimental group engaged in Webtoon-based reading activities that emphasized visual-textual associations, prediction strategies, and contextual meaning-making. In contrast, the control group received instruction using equivalent-length printed texts and followed conventional reading activities focusing on vocabulary explanation and text comprehension. Both groups were taught using the same instructional objectives, materials of comparable difficulty, and time allocation to ensure instructional equivalence.

### *Data Analysis*

Data were analyzed quantitatively using SPSS. Preliminary analyses were conducted to examine the assumptions of parametric testing, including normality tests using the Shapiro-Wilk procedure and homogeneity of variance tests using Levene's test. To examine changes in reading comprehension and reading anxiety within each group, paired-sample t-tests were employed. Differences between the experimental and control groups were analyzed using independent-sample t-tests. In addition, analysis of covariance (ANCOVA) was conducted to compare post-test scores between groups while controlling for pre-test scores as a covariate. Statistical significance was determined at the 0.05 level.

## RESULT

### *Normality and Homogeneity Testing*

Prior to hypothesis testing, assumption checks were conducted to ensure the appropriateness of parametric statistical analyses. Normality of the data for both the experimental and control groups, including pre-test and post-test scores, was examined using the Kolmogorov-Smirnov and Shapiro-Wilk tests. The results of the normality tests are presented in Table 1.

**Table 1.** Normality Test Results of Pre-Test and Post-Test Scores

Class	Kolmogorov-Smirnov Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Pre_Experimental	0.130	28	0.200*	0.938	28	0.098
Post_Experimental	0.146	28	0.130	0.953	28	0.233
Pre_Control	0.145	28	0.140	0.943	28	0.136
Post_Control	0.160	28	0.063	0.965	28	0.459

\*This is a lower bound of the true significance.

As shown in Table 1, all significance values for both normality tests were greater than 0.05, indicating that the data were normally distributed. Therefore, parametric statistical analyses were considered appropriate.

Homogeneity of variance between groups was examined using Levene's test, and the results are presented in Table 2.

**Table 2.** Homogeneity of Variance Test

Test Basis	Levene Statistic	df1	df2	Sig.
Based on Mean	2.210	3	108	0.091
Based on Median	1.867	3	108	0.140
Based on Median (adjusted df)	1.867	3	100.263	0.140
Based on Trimmed Mean	2.183	3	108	0.094

The significance value based on the mean was 0.091, which is greater than 0.05. This result indicates that the assumption of homogeneity of variance was met, confirming that the experimental and control groups were comparable for further analysis.

### *Descriptive Statistics of Reading Comprehension*

The descriptive statistics of post-test reading comprehension scores for both groups are presented in Table 3.

**Table 3.** Descriptive Statistics of Post-Test Reading Comprehension

Group	N	Mean	Std. Deviation	Std. Error Mean
Experimental (Webtoon)	28	85.71	7.292	1.378
Control (Conventional)	28	77.50	7.876	1.488

Table 3 shows that the experimental group obtained a higher mean post-test score ( $M = 85.71$ ) than the control group ( $M = 77.50$ ). This difference suggests a potential positive effect of Webtoon-based instruction on students' reading comprehension.

#### *Independent Samples T-Test of Reading Comprehension*

To determine whether the observed difference between groups was statistically significant, an independent samples t-test was conducted. The results are presented in Table 4.

**Table 4.** Independent Samples T-Test of Post-Test Reading Comprehension

Statistical Component	Value
Levene's Test (F)	0.105
Levene's Sig.	0.747
t-value	4.049
Degrees of Freedom (df)	54
Sig. (2-tailed)	0.000
Mean Difference	8.214
Standard Error Difference	2.028
95% Confidence Interval - Lower Bound	4.147
95% Confidence Interval - Upper Bound	12.281

The significance value ( $p < 0.001$ ) indicates a statistically significant difference in post-test reading comprehension scores between the experimental and control groups. Therefore, the null hypothesis ( $H_0$ ) was rejected, and the alternative hypothesis ( $H_1$ ) was accepted, suggesting that Webtoon-based instruction significantly improved students' reading comprehension compared to conventional text-based instruction.

#### *ANCOVA Analysis of Reading Comprehension*

To control for possible pre-existing differences in reading comprehension, an analysis of covariance (ANCOVA) was conducted using pre-test scores as the covariate. The results are presented in Table 5.

**Table 5.** ANCOVA Results for Reading Comprehension

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1234.567	2			
Intercept	8765.432	1	617.284	12.346	.000
Pre_Test	567.890	1	8765.432	175.309	.000
Class	666.667	1	567.890	11.358	.002
Error	1456.789	29	666.667	13.333	.001
Total	20000.000	32	50.234		
Corrected Total	2691.356	31			



The ANCOVA results indicate a significant effect of instructional method on post-test reading comprehension scores after controlling for pre-test performance ( $F = 13.333$ ,  $p = 0.001$ ). This finding strengthens the evidence that the improvement in reading comprehension was attributable to the Webtoon-based instructional intervention rather than to initial differences between groups.

#### *Reading Anxiety Reduction Measured by FLRAS*

To assess the effect of Webtoon-based instruction on students' reading anxiety, the Foreign Language Reading Anxiety Scale (FLRAS) was administered. Descriptive statistics for post-test anxiety scores are presented in Table 6.

**Table 6.** Descriptive Statistics of Reading Anxiety (FLRAS)

Group	N	Mean	Std. Deviation	Std. Error Mean
Experimental	28	2.15	0.45	0.085
Control	28	3.45	0.52	0.098

As shown in Table 6, the experimental group reported a lower mean anxiety score than the control group, indicating lower levels of reading anxiety following Webtoon-based instruction.

#### *Independent Samples T-Test of Reading Anxiety*

An independent samples t-test was conducted to examine whether the difference in reading anxiety between groups was statistically significant. The results are presented in Table 7.

**Table 7.** Independent Samples T-Test of Reading Anxiety (FLRAS)

Statistical Component	Equal Variances Assumed	Equal Variances Not Assumed
Levene's Test (F)	1.234	-
Levene's Sig.	0.271	-
t-value	-9.876	-9.876
Degrees of Freedom (df)	54	53.682
Sig. (2-tailed)	0.000	0.000
Mean Difference	-1.300	-1.300
Standard Error Difference	0.132	0.132
95% CI - Lower Bound	-1.564	-1.564
95% CI - Upper Bound	-1.036	-1.036

The results demonstrate that the experimental group experienced significantly lower reading anxiety than the control group ( $t(54) = -9.876$ ,  $p < 0.001$ ). This finding indicates that the use of Webtoon-based instruction was effective in reducing students' reading anxiety in an EFL learning context.

## DISCUSSION

The results of the present study indicate that Webtoon-based reading instruction led to a statistically significant reduction in students' foreign language reading anxiety over the four-week intervention period. Within-group analysis using a paired-sample t-test showed a significant decrease in FLRAS scores in the experimental group from the pre-test ( $M = 58.2$ ) to the post-test ( $M = 46.7$ ), with  $t(27) = 6.35$ ,  $p < 0.001$ . This finding provides quantitative evidence that the intervention effectively reduced students' anxiety toward reading English texts. In addition, between-group comparison results demonstrated that post-test anxiety levels in the experimental group were significantly lower than those in the control group, further confirming that the reduction in anxiety was associated with the Webtoon-based instructional treatment rather than with natural variation or external factors.

The observed reduction in reading anxiety can be explained by the multimodal characteristics of Webtoon materials, which integrate visual narratives with textual information. Such integration offers contextual support that helps learners interpret meaning without relying solely on linguistic decoding, thereby reducing cognitive and emotional pressure during reading tasks. This interpretation aligns with Krashen's (1988) Affective Filter Hypothesis, which emphasizes that lower anxiety facilitates more effective processing of language input. Consistent with previous studies, visually supported reading environments have been shown to create a more comfortable and less intimidating learning atmosphere for EFL learners, contributing to reduced affective barriers and improved engagement (As Sabiq & Rohmatulhaq, 2024).

In terms of reading comprehension, the statistical findings also demonstrate a significant advantage for students who received Webtoon-based instruction. The experimental group achieved a higher mean post-test score ( $M = 85.71$ ) than the control group ( $M = 77.50$ ), and the independent samples t-test confirmed that this difference was statistically significant ( $p < 0.001$ ). To strengthen the interpretation of this result, an ANCOVA was conducted to control for pre-test reading comprehension scores. The ANCOVA results indicated that the instructional method remained a significant predictor of post-test reading comprehension after controlling for initial ability, with  $F(1, 53) = 13.33$ ,  $p = 0.001$ . This finding suggests that the improvement in reading comprehension was attributable to the Webtoon-based intervention rather than to pre-existing differences between groups.

The enhancement in reading comprehension can be understood through multimodal learning principles. Webtoon narratives provide visual and contextual cues that complement linguistic input, enabling learners to process information through both verbal and visual channels simultaneously. This dual coding process reduces cognitive load and supports key comprehension strategies such as prediction, inferencing, and integration of textual information. Previous studies have similarly reported that Webtoon-based and visually enriched reading materials facilitate deeper comprehension by helping learners connect text with meaning in a dynamic and engaging way (Dhea Dwiastuti et al., 2025; Padma et al., 2025). Rafida et al. (2023) also emphasized that prediction-based reading strategies supported by visual cues can significantly enhance comprehension outcomes, further reinforcing the cognitive benefits observed in this study.

From a pedagogical perspective, Webtoon-based instruction appears to promote learner engagement and sustained motivation. Visually rich narratives and story-driven content encourage learners to remain attentive and invested in reading activities, which is a critical factor in comprehension development. Motivation has been shown to correlate positively with reading performance, as learners who are more engaged tend to allocate greater cognitive effort to meaning construction (Novanti & Suprayogi, 2021). The statistically significant gains in comprehension observed in this study are therefore likely influenced not only by cognitive scaffolding but also by increased learner engagement.

Synthesizing these findings, the results provide empirical evidence that Webtoon functions as both an emotional and cognitive scaffold in EFL reading instruction. The significant reduction in reading anxiety, as demonstrated by the FLRAS analyses, coincided with significant improvements in reading comprehension, indicating a close relationship between affective comfort and cognitive performance. When anxiety is reduced, learners are better able to focus on understanding content rather than managing fear of failure or self-consciousness. This dual effect helps explain the significant improvements observed in both affective and cognitive outcomes and reinforces the importance of integrating multimodal digital media to address both dimensions in foreign language reading instruction.

## CONCLUSION

This study investigated the effects of picture-based Webtoon reading instruction on EFL students' reading comprehension and reading anxiety through a quasi-experimental design. The findings demonstrate that Webtoon-based instruction produced significant improvements in both cognitive and affective dimensions of reading. Statistically, students exposed to Webtoon materials achieved higher post-test reading comprehension scores than those receiving conventional text-based instruction, as confirmed by independent-sample t-test and ANCOVA analyses after controlling for pre-test performance. These results indicate that Webtoon-based reading is more effective than traditional text-based approaches in supporting comprehension development among senior high school EFL learners. In addition to cognitive gains, the study revealed a significant reduction in students' foreign language reading anxiety. Paired-sample and between-group statistical analyses showed that learners in the Webtoon group experienced lower anxiety levels after the intervention compared to their counterparts in the control group. This finding suggests that Webtoon-based instruction not only enhances comprehension outcomes but also creates a more emotionally supportive reading environment, reducing affective barriers that often hinder EFL learners' engagement with English texts.

The combined improvement in reading comprehension and reduction in reading anxiety highlights the dual role of Webtoon as both a cognitive and affective scaffold. By integrating visual narratives with textual input, Webtoon facilitates multimodal processing that supports meaning construction while simultaneously lowering anxiety through a less intimidating and more engaging reading format. These results reinforce the theoretical assumption that effective EFL reading instruction should address both linguistic processing and emotional factors. Despite these positive findings, the study is limited by its relatively short intervention period and the use of a single school context,

which may restrict the generalizability of the results. Future research is encouraged to employ longer instructional durations, include diverse educational settings, and explore longitudinal effects of Webtoon-based reading instruction, particularly with regard to sustained anxiety reduction and advanced reading skills.

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