

THE EFFECT OF ONLINE WRITING TOOLS ON SYNTACTIC COMPLEXITY AMONG PAKISTANI UNIVERSITY L2 WRITERS

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ABSTRACT

The integration of online writing tools into L2 instruction remains a contested practice, particularly concerning its impact on genuine writing development. This quasi-experimental study investigates the effect of such tools on syntactic complexity in timed writing tasks among Pakistani ESL university students aged 18–20. Thirty-two participants were divided into two groups: one using online writing tools and one writing without them. Data included pre-test writing samples, a sentence-type quiz, a 30-minute timed essay, and post-task surveys. Results indicated that tool users produced significantly longer texts but showed no significant improvement in syntactic complexity. Prior experience with ESL writing courses influenced the effectiveness of the tools, with experienced learners demonstrating greater gains in accuracy. However, punctuation errors, especially in the use of commas, persisted across both groups. These findings suggest that while online tools enhance fluency and accuracy for prepared learners, they do not substitute for direct instruction in syntactic complexity and punctuation.

Keywords: Online Writing Tools, L2 Writing, Syntactic Complexity, Pakistani ESL Learners, Cognitive Load Theory, Writing Assessment.

1. Introduction

Academic writing proficiency is a crucial objective for university students globally, serving as a medium for knowledge acquisition and critical reasoning. Second language (L2) writers face the added challenge of navigating rhetorical, grammatical, and syntactic demands in English (Charpentier-Jiménez, 2020). In Pakistan, where English is the official medium of instruction, strong academic writing skills are essential for effective participation in higher education.

The proliferation of digital writing tools—such as spell-checkers and grammar assistants embedded in platforms like Google Docs—aims to ease the

cognitive burden associated with writing. By automating the correction of lower-order concerns, such as spelling and grammar, these tools may free cognitive resources for higher-order tasks, including content organization and syntactic complexity (Bulté & Housen, 2014). Syntactic complexity, often measured through subordination and sentence length, is a key indicator of advanced writing proficiency.

However, whether these tools have a positive influence on writing quality, particularly in terms of syntactic complexity, remains unclear. Some studies report benefits in error detection and learner autonomy (Moore et al., 2016; Tang &

Rich, 2017), while others warn against over-reliance, which may inhibit the internalization of grammatical rules (Ranalli, 2021; Oh, 2022). This issue is understudied in the Pakistani ESL context, where learners' linguistic backgrounds—often including Urdu, Punjabi, or other regional languages—create a distinct learning profile.

This study addresses this gap by examining the impact of online writing tools on syntactic complexity among Pakistani university students. It compares the performance of tool users and non-users and explores the role of prior ESL instruction in mediating tool effectiveness.

1.1. Research Questions

1. Is there a significant difference in the syntactic complexity of Pakistani university-level ESL students who use online writing tools compared to those who do not?
2. How does prior experience with ESL writing courses influence the effectiveness of online writing tools?

2. Literature Review

Online writing tools, though designed for first-language users, are widely adopted in L2 contexts with mixed outcomes. Some researchers caution that these tools may oversimplify the complex, proficiency-specific errors typical of L2 writers (O'Regan et al., 2010). Ranalli (2021) observed that learners often accept tool suggestions uncritically, leading to over-reliance without improved metalinguistic awareness. This is particularly concerning in Pakistan, where students may view automated feedback as infallible.

Conversely, several studies highlight potential benefits. Lin et al. (2017) found that spelling aids improved error detection, while Nobles and Paganucci (2015) reported that tool access encouraged learners to use more advanced vocabulary and complex structures. Such findings suggest that, under the right conditions, these tools can serve as effective scaffolds for learning.

From an assessment perspective, the use of writing tools remains a contentious issue. Some argue that tool-assisted writing inflates scores without reflecting true ability (Oh, 2022), while others contend that prohibiting tools introduces a "construct-irrelevant bias" in evaluation (Shin et

al., 2021). This debate is especially relevant in Pakistan, where universities aim to equip students with both academic and digital competencies.

Cognitive Load Theory (CLT) offers a valuable perspective for this discussion. Working memory is limited (Nawal, 2018), and L2 writers often struggle to manage multiple demands simultaneously. Online tools may reduce cognitive load by automating lower-order tasks, allowing writers to focus on complexity and organization (Li et al., 2015). This aligns with Skehan's (2009) Trade-off Hypothesis, which posits that learners cannot simultaneously maximize complexity, accuracy, and fluency. Tools may help mitigate these trade-offs.

Punctuation accuracy, particularly in the use of commas, is another critical dimension of syntactic complexity that is often overlooked in L2 writing analysis. Lelakova and Toman (2023) emphasize that punctuation errors can undermine syntactic accuracy, a concern highly relevant to Pakistani ESL learners, who frequently struggle with English punctuation norms due to L1 interference and inadequate pedagogical focus.

3. Methodology

This study was conducted at a public sector university in Punjab, Pakistan, with approval from the relevant ethics committee. Participants were recruited from two sections of a first-year "Writing and Composition" course. The cohort included speakers of Urdu, Punjabi, Sindhi, Pashto, and Balochi, aged 18–25, with 6–10 years of English instruction. All participants provided informed consent.

A mixed-methods approach was employed over six weeks. A Google Form collected demographic data and a baseline writing sample in response to the prompt: "What are you most excited about this semester and why?" (75–125 words, written without digital aids). Participants also completed a five-question quiz on sentence types (simple, compound, complex).

Participants were stratified by prior ESL course experience and randomly assigned to:

- **Group 1 (With Tools, n=16):** Used spell-check and grammar-check in Google Docs.
- **Group 2 (Without Tools, n=16):** Wrote with all automated feedback disabled.

Using personal laptops to emulate real-world conditions, participants completed a pre-survey on attitudes toward writing aids, a 30-minute timed essay on the topic "What is your biggest goal and how do you plan to achieve it?" (175–250 words), and a post-survey on their writing experience.

4. Data Analysis

Writing samples were analyzed for syntactic complexity based on Norris and Ortega (2009) and Kuiken and Vedder (2019), focusing on:

- **Length:** Average T-unit length, total word count.
 - **Subordination:** Dependent clauses per T-unit.
- Punctuation accuracy, especially comma splices and missing commas, was assessed following Lelakova and Toman (2023). Statistical analyses included independent samples t-tests, Mann-Whitney U tests, a two-way ANOVA, and multivariate regression.

5. Results

Demographic data confirmed a diverse sample, with 63% reporting Urdu as their L1 and 78% of the participants aged 18–25. Notably, 94% regularly used online writing tools, with translators (77%) being the most common.

Survey responses indicated positive perceptions of writing tools (Grand Mean = 3.6, SD = 0.6), though 59.4% expressed concern about over-reliance.

Independent t-tests revealed that Group 1 (with tools) produced significantly more words ($M = 210.1$, $SD = 28.7$) than Group 2 ($M = 191.6$, $SD = 16.5$), $t(30) = 2.23$, $p = .03$, Cohen's $d = 0.79$. However, no significant differences were found in subordination ($p = .84$), coordination between T-units ($p = .32$), or coordination within T-units ($p = .05$). Group 1 produced more correct sentences, but the difference was not statistically significant ($p = .09$).

Mann-Whitney U tests showed no baseline differences in quiz scores, word count, or correct sentences between students with and without prior ESL experience (all $p > .05$).

A two-way ANOVA revealed a significant interaction between tool use and prior ESL experience on correct sentence production, $F(1, 28) = 5.32$, $p = .03$. Tukey's HSD post hoc analysis showed that among students with prior ESL

experience, tool users produced significantly more correct sentences ($M = 9.0$, $SD = 3.7$) than non-users ($M = 3.9$, $SD = 2.3$), $p = .03$. No such advantage was observed among those without prior experience.

For word count, ANOVA confirmed a main effect for tool use but no main effect for prior experience and no interaction, indicating that tool use alone drove increased text length. Regression analysis confirmed that pre-assessment accuracy significantly predicted post-assessment accuracy ($p = .01$).

6. Discussion

The most significant finding of this study is that online writing tools enhanced fluency, as measured by word count, but did not improve syntactic complexity. This aligns with Skehan's (2009) Trade-off Hypothesis and Cognitive Load Theory: by offloading lower-order concerns, tools may help students write more but not necessarily more complex sentences.

A key insight from the Pakistani context is the moderating role of prior ESL instruction. Learners with prior training utilized tools to significantly enhance accuracy, likely due to their existing metalinguistic awareness. In contrast, those without such a background showed no comparable benefit, contradicting Ranalli's (2021) suggestion that lower-proficiency learners derive the most benefit from automated feedback. This suggests that foundational knowledge is essential for using tools effectively.

Punctuation, especially comma usage, emerged as a persistent challenge across all groups. This reflects L1 interference and gaps in local pedagogy, supporting Lelakova and Toman's (2023) emphasis on punctuation as a core component of syntactic complexity.

7. Suggestions for Teaching Practice

1. **Strategic Integration:** Instructors should explicitly teach critical evaluation of tool-generated suggestions to prevent over-reliance.
2. **Foundational Instruction:** Students lacking prior ESL training need direct instruction in sentence structure, grammar, and punctuation.

3. **Complexity-Focused Pedagogy:** Implement sentence-combining exercises, model text analysis, and assignments that reward syntactic variation.
4. **Balanced Assessment:** Combine tool-assisted and independent writing tasks to foster both practical skills and interlanguage development.

8. Limitations and Future Research

The study's limited sample size and single-institution focus may affect its generalizability. Although ecologically valid, the use of personal laptops limited control over ancillary tools, such as translators. Future longitudinal studies with larger samples should further explore the impact of translators and strategies for fostering complexity in tool-assisted writing.

9. Conclusion

This study demonstrates that online writing tools can enhance fluency and accuracy for Pakistani ESL learners with prior writing instruction, but they do not inherently foster syntactic complexity. Punctuation issues remain a significant hurdle. These findings underscore the need for pedagogical approaches that strategically integrate technology while addressing foundational writing skills. As digital tools become increasingly integrated into education, instructors must strike a balance between leveraging technology and providing targeted instruction to support the holistic development of writing.

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