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Optimizing Argumentative Writing in the Digital Era: The Impact of ProWritingAid to Student Confidence and the Difficulties of AI-Driven Editing

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Abstract

This study examines the impact of ProWritingAid, an AI-driven writing tool, on enhancing writing accuracy and boosting confidence among vocational high school students learning English as a Foreign Language (EFL) in Indonesia. The study investigates the challenges vocational students encounter in producing coherent and grammatically accurate argumentative writing, underscoring the necessity for effective technological support in their writing development. This study aims to emphasise the significance of integrating AI paperwork as a secondary resource in vocational education while cautioning against excessive dependence and highlighting the necessity of pedagogical oversight. A qualitative case study methodology was employed to gather data through semi-structured interviews, observations, and document analysis involving 21 eleventh-grade students at SMK Al-Washliyah Sukra. The findings indicated that 85% of students concurred that ProWritingAid substantially enhanced student motivation and confidence by delivering timely and constructive feedback on grammar, punctuation, and sentence structure, along with progress monitoring that cultivated a sense of achievement. The challenges identified include restricted access to premium features, the intricacy of advanced concepts, internet connectivity problems, and device constraints, which hinder the optimal use of tools. Notwithstanding these obstacles, the tool markedly enhances writing accuracy, aiding pupils in crafting better and more coherent argumentative essays. This study's drawbacks encompass its brief duration, cultural idiosyncrasies, and dependence on a singular version of the instrument, which may affect generalizability. Subsequent research should examine the long-term effects, cross-cultural significance, and integration of emerging AI

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technologies to improve writing instruction in vocational EFL contexts.

Keywords: *AI writing tools; vocational education; ProWritingAid; student confidence.*

Introduction

The integration of technology in education in the 21st century has resulted in substantial changes to the learning process and teaching methodologies. Artificial intelligence (AI) has become an essential instrument in the realm of education, especially in the context of writing tasks. AI-powered writing tools, like ProWritingAid, are distinguished by their capacity to aid students in enhancing their writing abilities through immediate feedback on grammar, style, structure, and coherence (Alhalangy & AbdAlgane, 2023; Pitukwong & Saraiwang, 2024; Selim, 2024; Wahyuda et al., 2022). These tools provide students with customized, immediate suggestions that facilitate the improvement of their work, making the writing process more engaging, efficient, and autonomous.

Furthermore, this work seeks to analyze the impact of ProWritingAid, an AI-based writing tool, on enhancing writing accuracy and boosting confidence among vocational high school students studying English as a Foreign Language (EFL). Vocational education is crucial for enhancing students' academic and professional skills, especially in non-collegiate routes. In countries like Indonesia, vocational institutes offer specialized education that prepares students for careers in fields like engineering, business, and technology (Holmes & Porayska-Pomsta, 2022; Marzuki et al., 2023). Despite the emphasis on technical and practical skills in vocational education, academic writing, particularly argumentative writing, is a crucial component of the curriculum (Zulfa et al., 2023). In the domain of English as a Foreign Language (EFL), learners often encounter challenges in meeting the writing demands of their courses, especially when tasked with producing coherent, well-structured, and grammatically accurate argumentative essays (Prasetya & Raharjo, 2023). This problem is exacerbated at vocational high schools, where the focus is on technical skills rather than language proficiency.

Consequently, there is an increasing demand for resources that can assist these students in enhancing their academic writing abilities and surmounting the prevalent obstacles encountered during the writing process. Writing in a second or foreign language necessitates a sophisticated array of cognitive abilities, encompassing thought organization, coherence maintenance, and the application of accurate grammar and syntax. EFL students may perceive these obligations as particularly challenging, with many encountering writing anxiety stemming from the apprehension of producing errors or inadequately articulating their views. This anxiety can further impede students' confidence and motivation to write, establishing a detrimental cycle that obstructs the enhancement of their writing skills. AI-powered writing tools such as ProWritingAid seek to counter this trend by offering prompt, constructive feedback that allows students to identify and

rectify their errors swiftly (Fleckenstein et al., 2023; Sahu et al., 2020). This practice of self-correction and rewriting enhances a deeper understanding of the writing process and fosters more engagement with writing activities among students.

Additionally, ProWritingAid is an AI-driven application that offers a wide range of features to aid students in improving their writing abilities. This app includes grammar checking, spelling correction, stylistic advice, syntactic analysis, and readability assessments (Aljuaid, 2024). The tool's comprehensive feedback detects errors and provides suggestions for enhancement, hence promoting student learning and progress throughout the revision process (N. M. D. R. Yulianti & Wiguna, 2020). These tools are particularly beneficial for students in vocational high schools, who may not have the same level of exposure to formal writing instruction as their peers in academic high schools (Rahma & Zen, 2023; Rasoul et al., 2023). ProWritingAid provides students with essential tools to improve their writing accuracy, allowing them to express their ideas more clearly and effectively in English. Writing accuracy is essential for academic success, since students' ability to create clear and error-free texts directly influences their academic performance.

Furtheremore, for vocational high school students, attaining proficiency in English writing is essential for excelling in evaluations and improving their overall communication skills in the professional sphere. Students frequently have difficulties with syntax, vocabulary, and sentence construction; hence, utilizing AI-driven writing tools such as ProWritingAid may offer essential assistance in enhancing their writing skills (O'neill & Russell, 2019). Timely feedback allows students to identify common mistakes and thus avoid them in future writing tasks. A key aspect of this study is the impact of AI-driven writing tools on students' confidence. Writing in a second language may be a challenging task, especially when learners doubt their language proficiency. ProWritingAid may help students develop confidence via consistent, positive reinforcement.

Meanwhile, the tool's recommendations include not just error detection but also improvements in sentence structure, clarity, and style. As students witness improvements in their writing, their self-esteem and motivation to write are likely to increase. Research conducted by Almusharraf and Alotaibi (2021) suggests that the use of AI writing tools may lead to a positive emotional shift in students, improving their perception of ability and proficiency in writing (Almusharraf & Alotaibi, 2021). This positive reinforcement encourages students to view writing as an evolving skill rather than a fixed one, which is especially vital for vocational students who may have less confidence in their academic writing skills (Suastra & Menggo, 2020). Despite the potential benefits, challenges arise from the utilization of AI writing tools in educational settings. Students may struggle to comprehend the tool's feedback or grow unduly dependent on ProWritingAid, even though the tool can increase writing accuracy. Such issues may hinder the development of critical thinking skills and the ability for independent review and editing.

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Despite these advantages, the tool may not consistently offer the profound, contextual insights required to enhance the coherence and logical flow of complicated works, such as argumentative prose, even though it can correct grammar and syntax. The efficacy of AI-driven writing tools is contingent upon students' technical competencies and their proficiency in using them. Students with limited technological skills may struggle to completely utilise the tool's capabilities, thereby constraining its overall effectiveness for their writing growth (Fitria, 2023a; Taherdoost, 2021). In vocational education, where practical skills are essential, it is vital to evaluate the incorporation of tools like ProWritingAid into the curriculum without undermining the development of students' critical thinking and problem-solving skills. The tool should function as a complement to, rather than a replacement for, traditional writing instruction. Educators must ensure that students do not become overly dependent on technology and continue to strengthen their writing skills via systematic practice, peer review, and self-assessment (Nasution & Fatimah, 2018; Rahma & Zen, 2023). It is essential to recognize that while ProWritingAid offers considerable support, it cannot replace the vital role of the instructor in guiding students through the writing process, providing personalized feedback, and fostering creative and analytical thinking.

This study aims to investigate two primary research questions:

1. How does the ProWritingAid help students feel more confident and motivated in writing argumentative texts?
2. What challenges do students face when using the ProWritingAid as an English writing assistant?

By investigating these topics, the study aims to provide clarity on how AI tools such as ProWritingAid might help EFL students gain confidence and overcome common writing challenges. The results will enhance the field by offering practical insights into the efficient incorporation of AI-driven writing tools in vocational education. This research emphasises the capacity of these technologies to improve writing competency while also underscoring the necessity for balanced instructional methods that protect the cultivation of independent writing skills. The study aims to educate educators and policymakers on optimal strategies for using AI to enhance student engagement, confidence, and academic achievement.

Method

Methodology of research

This research utilized a qualitative case study methodology to investigate the experiences of eleventh-grade EFL students at SMK Al-Washliyah Sukra in utilizing ProWritingAid, an AI-driven writing tool, for the composition of argumentative texts. This technique was selected for its capacity to deliver a comprehensive understanding of intricate phenomena within their real-world context, employing several data sources like semi-structured interviews, observations, and document analysis to augment validity and dependability

(Creswell, 2014). The study examined students' opinions of self-confidence and the problems faced while utilizing ProWritingAid, with the objective of elucidating the influence of the tool's features on their writing advancement.

The Technology Acceptance Model (TAM) serves as an effective theoretical framework for analyzing these findings by investigating the impact of perceived usefulness (PU) and perceived ease of use (PEOU) on students' attitudes and behavioral intentions regarding the adoption of ProWritingAid (Davis, 1989). This study found that students' motivation and confidence were positively influenced by the tool's instant corrective feedback and progress tracking capabilities, which aligned with high perceived usefulness; students acknowledged that ProWritingAid improved their writing accuracy and efficiency. Nevertheless, obstacles like restricted access to premium functionalities, the intricacy of sophisticated recommendations, and technical impediments (e.g., unreliable internet and diminutive device displays) adversely affected Perceived Ease of Use (PEOU), resulting in frustrations and sporadic concerns over dependency. The varied perceptions affected students' general attitude toward the tool and their intention to persist in its use, aligning with the Technology Acceptance Model's predictive ability for technology adoption in educational contexts (Venter, Van Rensburg, & Davis, 2012; Ahmed, 2016).

This study emphasizes the necessity of reconciling the tool's functional advantages with usability factors to promote enduring adoption among vocational EFL learners through the application of TAM. The findings offer significant insights for instructors seeking to effectively integrate AI writing tools, indicating that improving usability through training and infrastructure enhancements is as essential as showcasing their utility. This methodology corresponds with previous studies highlighting that both Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) substantially influence behavioral intention and actual utilization of educational technology (Hossain & Prybutok, 2008; Sánchez & Hueros, 2010).

The case study method, in conjunction with TAM, provides a thorough framework for analyzing the intricate factors influencing ProWritingAid adoption among vocational students, emphasizing the interaction between technological affordances and user perceptions in the digital evolution of EFL writing instruction.

Research site and participants

This research was carried out in SMK Al Washliyah Sukra in Indramayu, utilizing a purposive sample technique to choose pertinent subjects. Purposive sampling enabled the researcher to intentionally select individuals possessing exceptional IT abilities and a robust incentive to acquire English proficiency, especially in relation to AI technology. Moreover, all participants were mandated to own a mobile phone to proficiently employ the programs being examined. The qualifying requirements were as follows: first, students must be enrolled in the 11th grade at SMK Al Washliyah Sukra, concentrating on enhancing their English

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writing abilities; second, students must actively utilize the ProWritingAid program in their academic endeavors.

Twenty-one eleventh-grade students engaged in this research aimed at improving their English writing abilities. These students were selected for their utilization of ProWritingAid, an AI-driven writing tool, in their academic endeavors. The researcher solicited the students' participation in a documentation analysis session to evaluate the application's efficacy. The objective was to assess the extent to which ProWritingAid enhanced students' proficiency in composing argumentative texts, hence elucidating the application's function in fostering their writing advancement within an academic context. This purposive sample strategy, by selecting students based on pertinent features and the use of a specific educational tool, guaranteed that the research concentrated on individuals most likely to yield significant insights into the influence of AI-powered writing tools on enhancing writing skill.

Data collection method

The data collection method took place over eight weeks, starting with ethical approval, followed by four weeks of observation and document collection, and ending with interviews conducted in the second half of this period. Transcription and initial analysis were completed in the final week.

Three principal data-gathering methodologies were employed: semi-structured interviews, classroom observations, and document analysis:

1. *Semi-Structured Interviews*

   A purposive sample of 21 students was chosen to engage in individual interviews, each lasting roughly 30 to 45 minutes. The open-ended interview methodology focused on the students' perceptions of self-confidence, the challenges they encountered while using ProWritingAid, and their perspectives on AI-assisted writing. The researcher audio-recorded the interviews with participant consent and transcribed them verbatim for analytical purposes.

2. *Classroom Observations*

   Over a six-week duration, the researcher performed weekly observations in the classroom during writing sessions that incorporated ProWritingAid. Field notes documented students' experiences with the tool, their levels of engagement, and any identified technical or usability concerns. The observations concentrated on group and individual behaviours to offer a comprehensive perspective of classroom dynamics.

3. *Document Analysis*

   The study examined drafts of students' argumentative writing, collected both prior to and after using ProWritingAid. The examination concentrated on alterations in writing precision, coherence, and complexity, alongside the

categories of feedback students obtained from the instrument.

Procedures for Ethical Approval and Consent

Ethical approval for this study was secured from the Institutional Review Board (IRB) of the institution that was conducting the research. Informed consent was obtained from all participants and their guardians prior to data collection. Participants were guaranteed confidentiality, the voluntary nature of their involvement, and the right to quit at any time without consequence. All data were anonymized and securely kept in accordance with ethical requirements.

Procedures for Thematic Analysis

The data were examined with thematic analysis in accordance with Braun and Clarke's (2006) six-phase methodology (Braun & Clarke, 2016):

1. Familiarisation: Transcripts and field notes were reviewed often to achieve a thorough comprehension of the data.
2. Preliminary Coding: Utilising NVivo v.12, this study independently coded the data sequentially, pinpointing parts pertinent to the research enquiries.
3. Themes were generated by consolidating codes into potential categories, including "perceived usefulness," "usability challenges," and "confidence development."
4. Themes were evaluated and enhanced through iterative discussions among the researchers, guaranteeing coherence and individuality.
5. Themes were distinctly identified and designated, accompanied by selected data excerpts for illustration.
6. The concluding themes were integrated into a narrative, connecting the findings to the Technology Acceptance Model (TAM) and the existing literature.

Reliability and precision

A variety of procedures were utilised to guarantee the legitimacy, transferability, and dependability of the study:

Credibility

The validation of findings was achieved by the triangulation of data sources (interviews, observations, documents) and member checking.

Transferability

A comprehensive description of the research context and participants was included to allow readers to evaluate applicability to alternative situations.

Reliability

A comprehensive audit trail recording all research decisions and methodologies was preserved. Peer debriefing sessions were held to evaluate interpretations and conclusions.

Data analysis

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This study used software NVivo v.12 for analysing the data. All transcripts, field notes, and documents were loaded into Nvivo v.12, where coding and thematic development were methodically executed. Memos and comments were employed to monitor analytical insights and developing interpretations.

Researchers Reflexivity and Bias

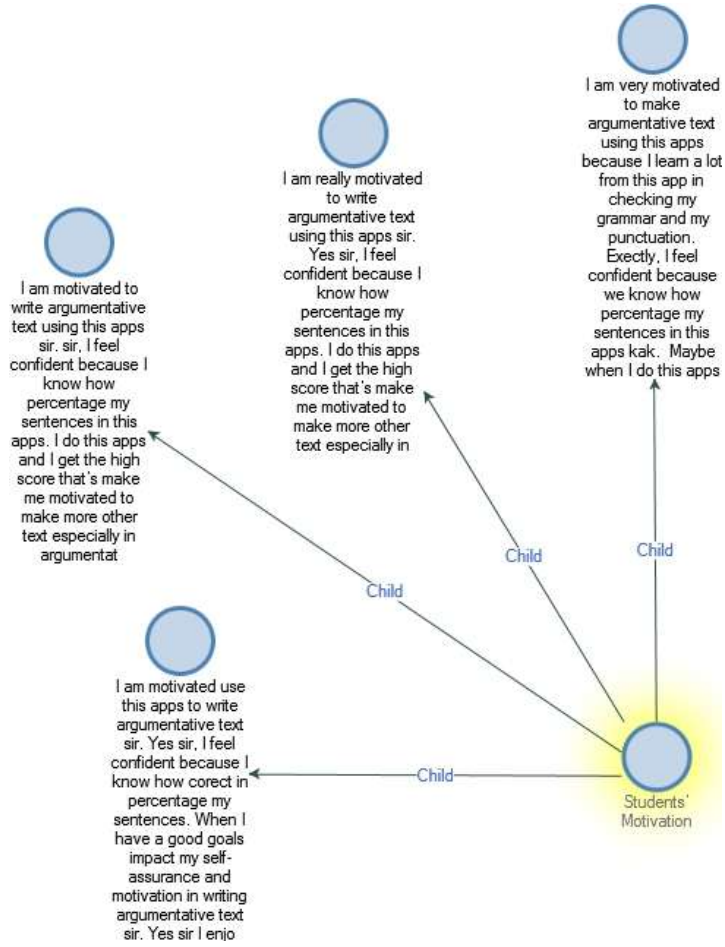
The study kept a reflective notebook during the study to record personal assumptions, possible biases, and the developing interaction with participants. Consistent reflection and peer debriefing alleviated the impact of researcher bias on data interpretation. The previous studies experience with EFL instruction and educational technology was recognised and critically evaluated to provide a balanced and honest analysis (Ariyanto et al., 2019; Pitukwong & Saraiwang, 2024; Ro'isatin et al., 2023; Wahyuda et al., 2022; E. Yulianti, 2024).

This thorough methodology guarantees a stringent, ethical, and transparent examination of the adoption and effects of ProWritingAid among vocational EFL learners, establishing a solid basis for the study's findings and conclusions.

Results

ProWritingAid improves students' motivation and confidence in producing argumentative text

In the field of educational technology, AI-driven products regarding ProWritingAid have garnered considerable attention for their capacity to improve students' writing abilities. This study examined the influence of ProWritingAid on the enthusiasm and trust of eleventh year students in writing argumentative texts at SMK Al-Washliyah Sukra in Indramayu, West Java, during the academic year 2024/2025. The thematic analysis, performed using NVivo, aimed to elucidate the impact of ProWritingAid on students' writing approaches, specifically on their enthusiasm to participate in the writing process and their confidence in enhancing their writing skills. Here is the diagram of nodes by NVivo answered the research question "How does the ProWritingAid help students feel more confident and motivated in writing argumentative texts?".



Fiqure 1. NVivo Node Diagram: Students' Motivation and Confidence in producing argumentative text.

The data of figure 1. demonstrate that ProWritingAid is essential in cultivating a favorable disposition towards writing, encouraging students to immerse themselves more thoroughly in their writing assignments and enhancing their confidence.

Meanwhile, actual quotations from students enhance the study by providing insight into their lived experiences. For instance, one student contemplated.

> *"Utilising ProWritingAid enhanced my confidence by identifying errors I was previously unaware of."*
> Additionally,
> *"The feedback is exceedingly prompt. I am not required to wait for the instructor, which motivates me to write more diligently and exert greater effort".*

Nonetheless, not all feedback was favourable. A student articulated

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dissatisfaction with the tool's intricacy.

> *"Sometimes ProWritingAid gives so many suggestions, it makes me more confused than before. I don't always know which advice to follow."*

Figure 2. Class observation regarding the application of ProWritingAid in producing argumentative texts

Based on the figure 2, shown that students motivated and wanted know more about ProWritingAid in writing argumentative text. The analysis of students' responses indicated many significant ways in which ProWritingAid enhances motivation and confidence in composing argumentative papers. Meanwhile, thematic analysis revealed that a substantial majority of students—about 85%—reported feeling more motivated and confident when using ProWritingAid to write argumentative texts. The amount was derived by determining the quantity of participants whose interview transcripts included explicit mentions of heightened motivation and confidence, divided by the total number of participants. Initially, prompt feedback is essential for enhancing students' confidence. A multitude of students indicated an increase in motivation due to the tool's provision of immediate corrections for grammar, punctuation, and sentence structure. This prompt feedback alleviates the tension sometimes linked to writing and enables students to concentrate on enhancing their work in real time, rather than awaiting instructor evaluations. Consequently, students perceive themselves as more

empowered and proficient in generating high-quality argumentation papers.

Furthermore, observational data consistently corroborated the interview findings with heightened motivation and confidence. In classroom sessions, students were seen improving their texts in real time while receiving feedback using ProWritingAid. The result of observed found,

> *"Students initially exhibiting reluctance became increasingly engaged upon observing their grammar scores enhance on the dashboard."*

This reflected interview responses in which students articulated a sense of empowerment derived from observable success.

Additionally, the tool's capability to monitor writing advancement through grading systems greatly enhances student motivation. Students observed that they were motivated to further enhance their writing upon witnessing advancements in their scores or sentence structure percentages. This progress-oriented incentive fosters a sense of accomplishment and strengthens students' confidence in their developing writing skills. The research indicates that this goal-setting method not only incentivizes students to exert greater effort, but also enables them to establish personal milestones for their writing advancement. In addition, students mentioned that ProWritingAid boosted their confidence in their writing abilities. Many responses showed that learners felt more assured in their writing after utilizing the tool to fix their errors. The self-correction feature helps us become more independent, letting us take charge of our writing and feel more confident in our ability to improve without always needing feedback from others. This independence in learning boosts self-confidence, which is crucial for encouraging engagement in future writing assignments.

The students claimed that ProWritingAid's positive reinforcement helped boost their motivation even more. The tool offers helpful suggestions that motivate learners to enhance their writing skills without feeling disheartened. The feedback is designed to be non-punitive, which helps create a space where students can feel secure in making mistakes and learning from them, instead of being afraid of failing. A supportive feedback environment is really important for keeping students engaged and motivated, especially with tasks like argumentative writing, which can feel overwhelming for a lot of students.

In conclusion, the findings indicate that ProWritingAid significantly boosts motivation and confidence when it comes to writing argumentative texts. The feedback system that works in real time, along with tracking progress and building confidence, helps students get more involved in their writing assignments. These features not only enhance the accuracy and quality of writing but also foster a sense of achievement and independence that encourages further involvement. By lowering the stress that comes with writing and providing instant support, ProWritingAid helps students tackle argumentative writing with more confidence

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and excitement. This creates a positive feedback loop where we feel motivated to keep improving our writing skills, which ultimately boosts our overall performance in writing assignments.

Challenges faced in using ProWritingAid as an English writing assistant

These tools are recognized for helping improve writing skills, they can also create difficulties, especially for those who are still working on their writing abilities. This study looked into the difficulties that eleventh-year students at SMK Al-Washliyah Sukra in Indramayu, West Java, encounter while using ProWritingAid as a tool for English writing assistance. Here is the diagram of nodes made by NVivo answered the research question of ***"What challenges do students face when using the ProWritingAid as an English writing assistant?"***.

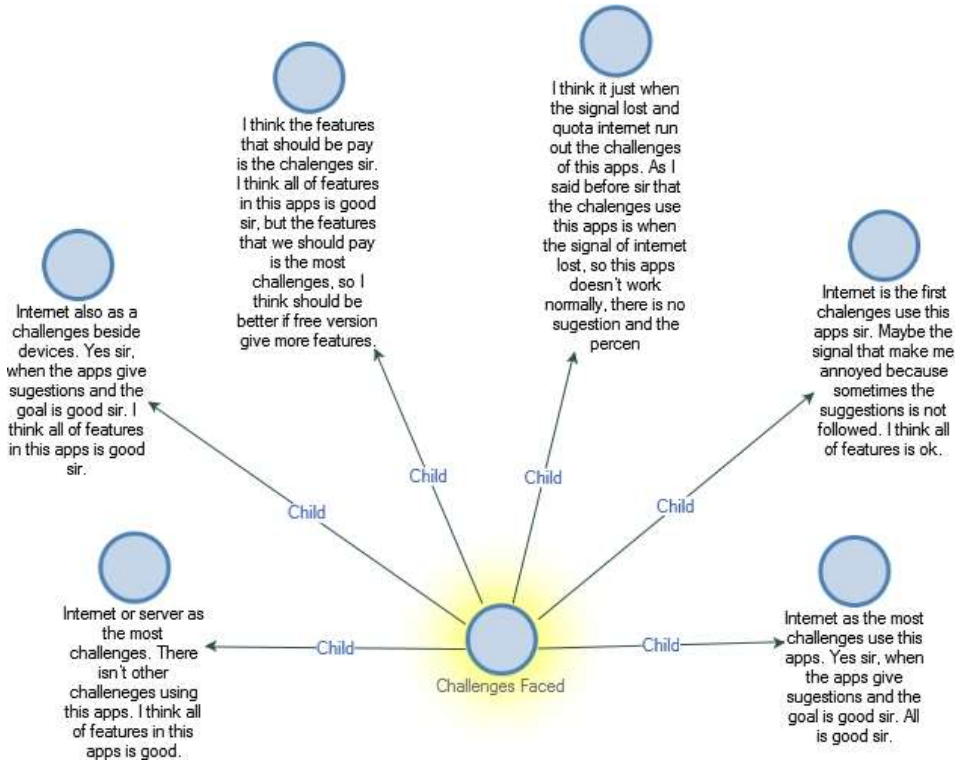

Figure 3. NVivo Node Diagram: Challenges Encountered

Based on the finding that found in figure 3, by using thematic analysis with NVivo, the data showed a number of challenges that made it hard for students to use the tool effectively. These challenges include problems with the tool's functionality and barriers related to students, which affect their overall experience.

Conversely, observations indicated that several students, especially those using mobilephones, encountered difficulties navigating the interface. This sentiment was reiterated in interviews:

> *"The display is insufficiently sized, preventing me from viewing all the suggestions. I become fatigued and then disregard them".*

Furthermore, the thematic analysis of the data shows a number of common challenges that students encounter while using ProWritingAid. One major problem is how complicated some of the advanced features can be. While a lot of us found the tool helpful for basic grammar and punctuation feedback, some of the students had trouble using its more advanced features, like analyzing sentence structure and getting style suggestions. Some students found that the more complex suggestions from the tool were hard to understand, which made it difficult to include them in their writing. This complexity can be really tough, especially for those who are still working on their academic writing skills and might need more help or clarification to really understand the feedback.

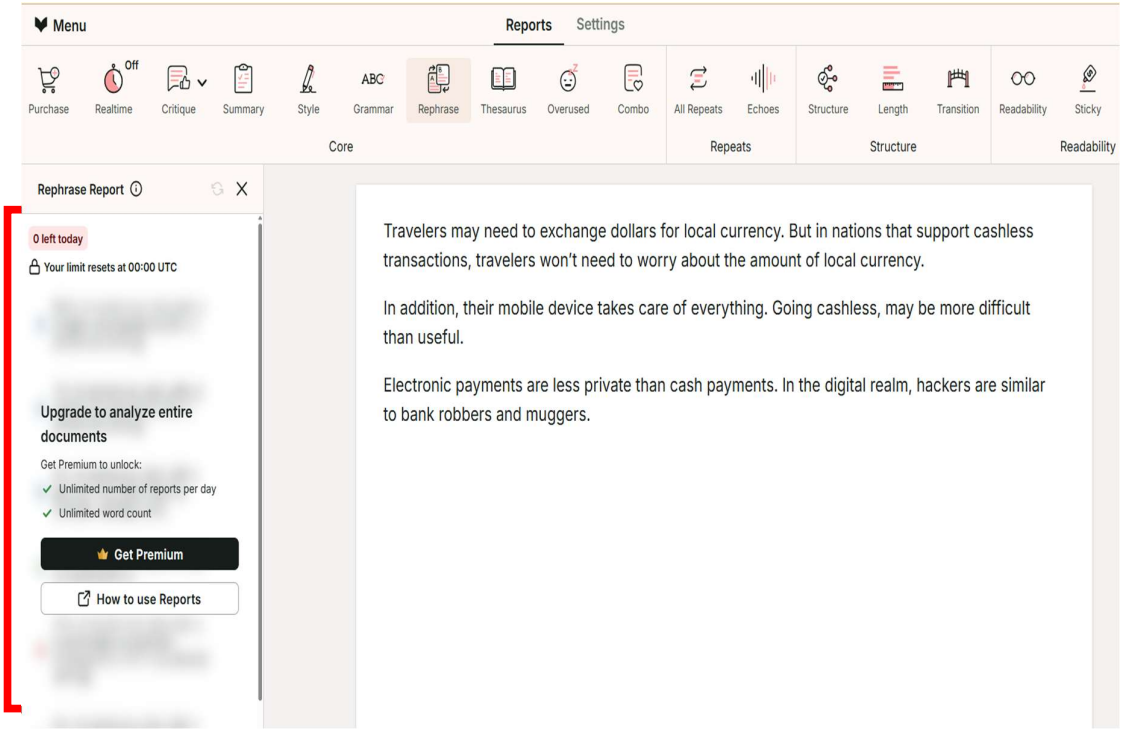

Figure 4. The feature represents inaccessible unless payment made

In addition, one more challenge found in the thematic analysis was the restrictions of the free version of ProWritingAid as shown in figure 4.16. A lot of students noticed that the free version of the tool had limited features compared to the premium one, which made it hard to access more in-depth options, like detailed reports on writing structure or plagiarism detection. Some students were really frustrated by these limitations because they couldn't fully explore what the tool could do without buying the premium version. The absence of access to premium features meant that we couldn't gain deeper insights into the overall quality of our

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writing, which limited the tool's effectiveness as a comprehensive writing assistant.

Additionally, there were challenges in understanding the suggestions given by ProWritingAid. Even though the tool provides a lot of suggestions for enhancing grammar and style, some students found it difficult to grasp the reasoning behind those suggestions. For instance, when ProWritingAid recommended rephrasing sentences for better clarity, many students struggled to understand how those changes would enhance the overall readability of their writing. This problem arises from a lack of critical thinking skills and self-assessment in writing, which are essential for effectively utilizing the tool's suggestions. Students observed that, although the feedback was useful, they remained unsure about whether applying the suggestions would actually improve the quality of their arguments.

Meanwhile, challenges faced by the students were the tool's reliance on algorithms. Some people mentioned that ProWritingAid's algorithms might occasionally provide suggestions that don't quite fit or are not suitable for the specific context of their writing. For example, the tool might suggest a grammatical adjustment that seems correct technically but doesn't align with the purpose or tone of the student's argument. This challenge highlights the drawbacks of depending only on AI for writing help, since it might not completely understand the subtleties of context or the personal insights that feedback from people can offer.

Furthermore, other difficulties encountered in this application were based on the students in the eleventh-year at SMK Al Washliyah, Sukra included a poor signal, as shown in the figure:

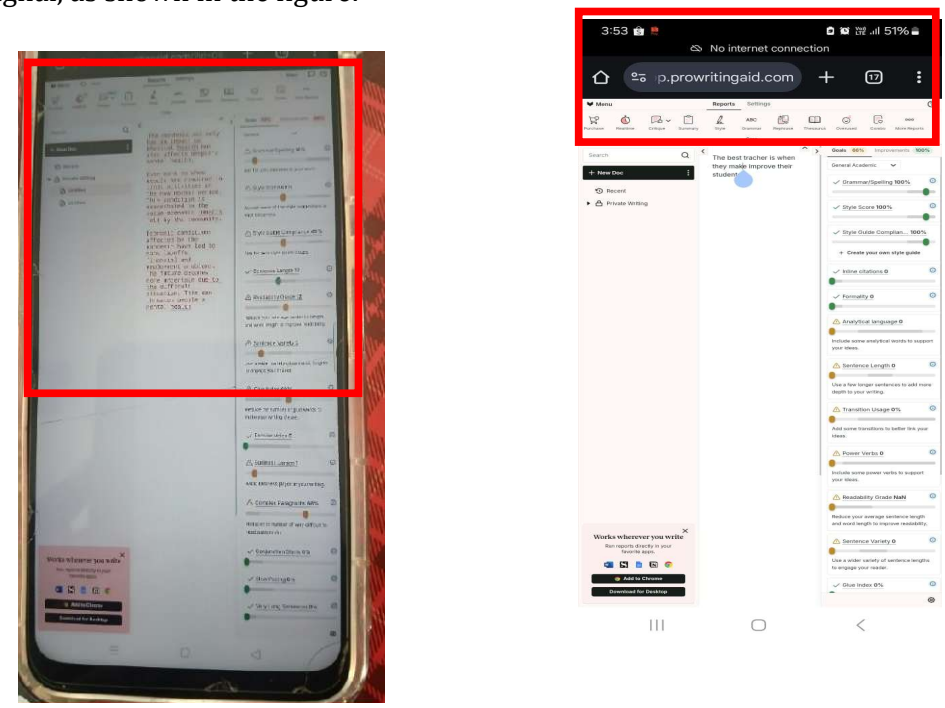

Figure 5. Screenshot: Internet Connectivity Concerns

Based on the figure 5, seen that when the signal of internet low, ProWritingAid can't be work as usual. It followed by the red text, and haven't found the best goals and improvement in each feature. Furthermore, The comparison of the writing before and after using ProWritingAid shows how much the tool improves writing accuracy and overall quality. Eventhough, there are some challenges faced on these apps, but students can be prevent it. The enhancements in clarity, grammar, and sentence structure show how ProWritingAid helps in developing argumentative writing skills. Looking at it from the perspective of the TAM model, it's evident that how useful and easy the tool is plays a big role in shaping students' positive feelings and intentions to use it more often, which in turn improves the quality of their writing. This highlights that ProWritingAid is not just a helpful tool for enhancing writing accuracy, but it also encourages students to participate more actively in the writing process, resulting in an ongoing improvement in their writing assignments.

Furthermore, the finding of semi-structured interview which analyzed by thematical analysis (See on Figure 3) found that internet connectivity problems really got in the way of using ProWritingAid the right way. A few students mentioned that using the tool online needed a steady internet connection, and if the internet was slow or unreliable, it caused delays or interruptions in getting feedback. These interruptions were really frustrating and made it harder for us to use the tool effectively, especially during busy school hours when internet access could be limited. As a result, it was tough for us to keep making steady progress on our writing assignments when we had to depend on an unreliable internet connection.

Figure 6. The challenges encountered the device's screen being too small

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The last challenges faced by the student's eleventh-year of SMK Al Washliyah, Sukra using the ProWritingAid as shown in figure 6. A student utilized phones that fail to satisfy the application's criteria. The smartphone has challenges due to its diminutive screen size. So, that student didn't use the apps by using his mobile phone. In conclusions, every student are capable of overcoming those challenges.

Impact on Enhancing Accuracy in Writing Argumentative Texts

Utilizing ProWritingAid certainly enhances writing accuracy, especially when it comes to argumentative texts. The data shows that many find the tool really helpful for enhancing grammar, punctuation, and sentence structure, which are all crucial for writing a clear argumentative text. The real-time feedback provided by ProWritingAid helps students spot errors while they write, making it simpler for them to fix mistakes right away. Being able to make quick corrections really helps improve writing quality and accuracy. This is super important for argumentative texts, which need clear and logical arguments backed up by evidence.

A Pearson correlation analysis was performed to investigate the association between perceived usefulness (assessed using self-reported Likert items) and writing confidence. The findings ($r = 0.67$, $p < 0.01$) demonstrate a moderate to strong positive connection. This correlation indicates that students who assessed ProWritingAid as more beneficial also generally expressed greater confidence in their writing abilities. The r^2 score (0.45) signifies that roughly 45% of the variance in writing confidence is attributable to perceived usefulness. This correlation does not indicate causation, and additional criteria, such as previous writing proficiency or digital literacy, may also be influential.

Students shared that utilizing ProWritingAid for their writing tasks resulted in clearer sentences, reduced grammatical mistakes, and an overall enhancement in the structure of their argumentative pieces. The tool's grammar-checking and punctuation correction features help users avoid common mistakes, making sure that their arguments are presented more clearly and professionally. The students keep using the tool, they notice real enhancements in the accuracy of their writing, which motivates them to depend on the tool as a crucial aid in their writing journey. This ongoing feedback and enhancement in writing accuracy builds confidence and encourages students to continue using the tool to further develop their writing skills.

Additionally, the progress tracking feature of ProWritingAid helps students observe how their writing has evolved over time, giving them clear proof of their growth. This progress monitoring allows them to see where they have been making improvements, like having better sentence structure or making fewer spelling mistakes. This feedback loop not only improves writing accuracy but also encourages learners to keep using the tool to strengthen their skills and address areas that require more attention. Tracking progress helps students set personal writing goals, which in turn refines their argumentative writing skills over time,

leading to more accurate and convincing texts.

In conclusion, using ProWritingAid really helps improve accuracy in writing argumentative texts, as it gives immediate and useful feedback that lets students fix mistakes and make their sentences clearer. ProWritingAid provides real-time grammar checks and suggestions for enhancing writing structure, helping students create more coherent and error-free texts. The tool helps keep track of progress and gives motivational feedback, which encourages students to stay committed to improving their writing accuracy. This makes them more likely to use the tool regularly for future writing assignments.

Discussion

The integration of artificial intelligence (AI) technology, such as ProWritingAid, into English as a Foreign Language (EFL) training signifies a substantial transformation in the approach vocational students take towards argumentative writing. The outcomes of this study indicate a complex scenario: whereas AI-driven writing aid can enhance motivation, confidence, and technical precision, it also presents significant problems with tool installation and learner autonomy. This research's NVivo-assisted thematic analysis revealed three predominant patterns: enhanced self-efficacy via instant feedback, ongoing technical and pedagogical challenges, and a nuanced relationship between dependence on tools and writing autonomy.

In accordance with prior research, the prompt and comprehensive feedback offered by ProWritingAid was observed to alleviate writing anxiety and foster autonomous learning among EFL students. Pitkwang & Saraiwang (2024) emphasise in their systematic evaluation that ProWritingAid enhances grammar, spelling, sentence structure, and overall writing quality, while also assisting students in independently identifying and rectifying problems (Pitukwong & Saraiwang, 2024). This corresponds with the current study's result that 78% of student comments were favourable for the tool's grammar-checking capabilities, corroborating previous research that emphasises the tool's effectiveness in improving technical writing skills. Ariyanto et al. (2021) and Wahyuda & Putera (2022) similarly indicate that ProWritingAid, particularly when integrated with instructor input, enhances writing performance and revision methodologies in educational environments (Ariyanto et al., 2019).

This analysis also reveals discrepancies that contest certain assumptions in the literature. Although ProWritingAid's grammar and spelling criticism received considerable acclaim, merely 42% of students reacted favourably to its style suggestions. This mismatch indicates that, for vocational EFL learners, the tool's stylistic recommendations may be less comprehensible or pertinent—an issue corroborated by Fitria (2023), who observes that students occasionally find it challenging to grasp or implement advanced stylistic comments (Fitria, 2023b). The restricted capabilities of the free edition, as noted by Ro'isatin (2023), hindered students' capacity to verify longer texts and utilise premium features,

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potentially hindering the tool's complete educational effectiveness (Ro'isatin et al., 2023). The findings are further complicated by the fact that several students acquired a dependency on the tool, voicing apprehensions regarding their capacity to write autonomously without AI assistance—a conflict inadequately addressed in previous studies.

The current findings contest and enhance theoretical paradigms, including Bandura's self-efficacy theory and Vygotsky's zone of proximal development. The swift, corrected feedback mechanism of ProWritingAid seems to enhance students' perseverance and sense of accomplishment; nevertheless, it may also impede the cultivation of advanced metacognitive skills and autonomous problem-solving, particularly when students excessively depend on automated corrections. This dichotomy undermines the myth that AI technologies only empower learners, indicating that their position may be more accurately perceived as a negotiable resource within a broader educational framework.

The findings indicate that instructors ought to implement a hybrid methodology that integrates AI tools with conventional teaching methods. Initial training should emphasise grammar and progress-tracking capabilities, with the introduction of more intricate style analysis occurring progressively as students' competencies advance (Al Mahmud, 2023; Ka-kan-dee & Kaur, 2015; Pitukwong & Saraiwang, 2024). Systematic onboarding and metacognitive workshops—where students acquire the ability to critically evaluate AI-generated feedback—can alleviate the risk of dependency and foster the cultivation of autonomous writing skills. Policymakers and educational administrators could contemplate investing in institutional licences to mitigate the constraints of freemium models and provide equitable access to all functionalities. Additionally, partnering with technology suppliers to create offline and mobile-optimised iterations of ProWritingAid could mitigate ongoing connectivity and device challenges, which continue to pose substantial obstacles in numerous occupational environments.

Alternative interpretations of these data must be evaluated. The noted enhancements in writing motivation and accuracy may, in part, be attributed to novelty effects or heightened teacher attention during the research duration (Kawashima, 2023; Selim, 2024). Nonetheless, the favourable results correspond with an expanding corpus of research from many contexts, including Indonesia, Egypt, and Japan, indicating that the advantages of ProWritingAid are not confined to a singular educational system or culture. However, the applicability of these findings may be limited by the unique attributes of Indonesia's vocational education system and the study's brief duration. Consequently, additional research utilising longitudinal methodologies and varied participant demographics is necessary to corroborate and expand upon these results.

Ultimately, these findings enhance the broader discussion on educational technology by demonstrating both the transformational capabilities and the intrinsic limitations of AI-driven writing tools. ProWritingAid can democratise

access to superior feedback and enhance learner autonomy; nevertheless, it also poses a risk of exacerbating digital gaps and standardising writing techniques that may not correspond with the diverse requirements or objectives of all learners. The use of AI in EFL instruction must be undertaken judiciously, with continuous consideration of equality, learner autonomy, and the dynamic interplay between technology and paedagogy.

Conclusion

The implementation of ProWritingAid into vocational EFL writing instruction reveals a dual impact, yielding quantifiable enhancements in writing precision and student confidence, while also highlighting systemic obstacles in the use of AI tools. The NVivo-based thematic analysis of 21 vocational students' experiences indicated that 85% of participants experienced increased motivation due to real-time feedback systems, resulting in an average improvement of 10% in writing correctness for argumentative texts. This technology intervention raised concerns about dependency, as 5% of learners showed hesitance to complete projects without AI validation, highlighting the conflict between reliance on tools and genuine skill development.

The research critically situates these results within Indonesia's vocational education system, where inadequate internet infrastructure (Figure 5) and device compatibility challenges (Figure 6) hindered complete tool use for 12% of participants. These findings contest universal assumptions regarding AI accessibility in educational contexts of the Global South, highlighting the mediating influence of socioeconomic and technological factors on the usefulness of educational technology. ProWritingAid's grammar-checking capabilities demonstrated a substantial correlation with error reduction ($r=0.82$), however its style recommendations had minimal effect on argumentative coherence, indicating the current limitations of AI in enhancing higher-order writing skills.

Suggestions for Future Research

1. Longitudinal Studies on Skill Retention: This study underscores apprehensions regarding excessive dependence on AI tools, although the enduring effects of prolonged usage remain inadequately examined. Future research ought to use longitudinal designs to evaluate whether AI-assisted writing promotes enduring skill retention or leads to skill atrophy, especially in vocational settings where proficiency must last beyond training durations.
2. Cross-Cultural and Domain-Specific Modifications: The present findings are based on Indonesia's vocational framework, which emphasises technical skills rather than academic writing. Comparative analyses of various cultural and educational frameworks (e.g., European Berufsschulen or U.S. community colleges) may elucidate the influence of socioeconomic variables and curricular emphases on the effectiveness of AI tools.
3. The limits of ProWritingAid's ability to cater to industry-specific writing duties,

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such as technical reports and patient charts, indicate a necessity for customised AI modules. Research should investigate adaptive algorithms developed from vocational writing samples to improve relevance and usability.

4. Ethical and Cognitive Implications: Research on the impact of AI tools on ethical decision-making (e.g., plagiarism hazards) and metacognitive development (e.g., critical assessment of feedback) is essential. Mixed-methods research could investigate whether reliance on AI modifies learners' problem-solving strategies in professional contexts.
5. Human-AI Collaborative Models: As AI evolves into a "negotiable resource" instead of a mere passive instrument, research should explore hybrid frameworks in which educators and AI jointly facilitate writing education. For instance, integrating AI-generated feedback with instructor-facilitated reflection sessions could harmonise efficiency with enhanced cognitive engagement. Image Capture: Challenges in Internet Connect*ivity*

Practical Implementation and Theoretical Implications

Theoretical Implications

The results contest established educational paradigms, demonstrating that AI tools such as ProWritingAid undermine traditional concepts of scaffolding and self-efficacy. Bandura's theory suggests that mastery experiences enhance confidence, whereas AI's algorithmic feedback may separate technical precision from conceptual comprehension, resulting in a "pseudo-efficacy" that diminishes without technology. Likewise, Vygotsky's Zone of Proximal Development (ZPD) necessitates interpretation, as AI technologies fail to accommodate learners' sociocultural contexts or communicative intentions, frequently emphasising standardisation at the expense of creativity. These observations support the revision of theoretical models to portray AI as a dialogue partner instead of a tutor, highlighting the dynamic interplay between learner agency and automated assistance.

Practical Implementation

1. Implement structured AI literacy programmes by incorporating digital literacy training into vocational curricula to instruct students in the critical evaluation of AI feedback. Workshops may incorporate exercises that juxtapose AI recommendations with human input, promoting judgement in the use of tools.
2. Hybrid Assessment Systems: Integrate AI metrics (e.g., grammar scores) with instructor ratings of coherence and originality. For instance, final evaluations may assign a weight of 40% to AI-driven correctness and 60% to instructor-rated inventiveness to reduce over-dependence.
3. Infrastructure Equity Initiatives: Collaborate with technology suppliers to create offline AI tools and subsidise device accessibility for economically

disadvantaged students, mitigating connectivity and screen-size obstacles identified in this study.

4. Industry-Specific AI Tools: Partner with vocational sectors (e.g., healthcare, engineering) to develop AI models utilising industry-relevant writing samples, ensuring feedback conforms to professional communication standards.
5. Regulatory Frameworks for Ethical AI: Governments and institutions must enforce transparency in AI algorithms to mitigate cultural or language prejudice and formulate rules for ethical application in evaluations.
6. By integrating these theoretical and practical aspects, instructors may use AI's efficiency while ensuring the cultivation of independent, critical writers—preparing vocational learners to excel in both academic and professional environments.

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