

The Accuracy of ProWritingAid Application as the Automated Writing Evaluation Tools



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ABSTRACT: The implementation of AI-based applications in education is increasingly prevalent. The use of technology in learning has proven effective in improving student learning outcomes, as well as making the learning process more engaging and interesting. One of the AI-based applications used in learning activities is the Automated Writing Evaluation tool, among which the ProWritingAid application is included. Thus, this study aims to investigate the accuracy of the ProWritingAid application as an Automated Writing Evaluation Tool. The research employs a qualitative approach, using descriptive qualitative as the research design. For data collection, document artifacts were utilized. The documents analyzed in this study consist of students' work on the degree of comparison material. After collecting the data, it was analyzed using document analysis techniques. The respondents in this research were 25 eleventh-grade students, selected through a convenience sampling technique. The findings of this research indicate that the application demonstrates inaccuracies in providing feedback. Some writing errors were detected by the ProWritingAid application, while other errors were not identified by the application.

KEYWORDS: Automated Writing Evaluation Tool, English Language Teaching, ProWritingAid Application, Writing Learning.

I. INTRODUCTION

Writing skills are an integral part of the field of education. In an academic context, students need to write academic writing, which is in the form of formal English and be familiar with various kinds of text organizations (Perdana & Farida, 2019). Writing skill also need specific skills, one of the aspect that need to be considered is the grammatical rules (Ghufron & Rosyida, 2018; Karyuatry, Rizkan, & Darayani, 2018; Perdana & Farida, 2019; Yang, 2018), moreover, it integrates reading ability, and a large vocabulary (Fitria, 2023; Nasution & Fatimah, 2018).

Due to the inherent structural complexity of writing and the level of linguistic knowledge required to complete writing duties, writing has always presented a greater challenge for instructors of English as a foreign language (EFL) (Selvarasu et al., 2021). In addition, in the writing process, the writer needs to maintain focus, manage their time efficiently, and persevere despite setbacks and obstacle, because sometime writing can be a difficult and time-consuming process (Nazarov & Kuvandikova, 2023).

In the process of making writing work become perfect, the writer needs feedback toward his manuscript. In the school context, teacher can play an essential role as a feedback provider, especially in giving grammar corrective feedback (Perdana & Farida, 2019). Writers must be willing to revise and enhance their work based on the feedback they receive from peers, instructors, or editors. This iterative process of feedback and revision is crucial for the development of writing skills and the production of high-quality work (Fitria, 2023).

Feedback in the writing process has been proven helpful in improving student's writing skills (Daneshvar & Rahimi, 2014; Farjadnasab & Khodashenas, 2017; Hyland & Hyland, 2019; Kisananto, 2016). However, the problem occurs when the teacher correcting students' writing manuscript, namely time-consuming. As stated by (Cavaleri & Dianati, 2016; Lim & Phua, 2019), providing comprehensive feedback to numerous students in their classes regarding content quality, rhetorical effectiveness, and language accuracy can be a laborious and time-intensive task for teachers. In the present era, the use of computer-assisted technology and artificial intelligence in the learning process, including for writing correction, has become increasingly popular. The use of technology, for example Automated Writing Evaluation (AWE) tool considered as the solution to overcome the problem in providing feedback (Alruwais et al., 2018).

The innovative transformation of feedback and evaluation tools in foreign language education has substantially changed in recent years (Koka, Khan, & Jan, 2023). Numerous studies have been conducted to investigate the implementation of computer-

The Accuracy of ProWritingAid Application as the Automated Writing Evaluation Tools

assisted error analysis in correcting students' writing errors (Ariyanto, Mukminatien, & Tresnadewi, 2019; Parra & Calero, 2019; Rahma & Zen, 2023; Ro'isatin, Hoesny, & Adibah, 2023; Wahyuda, Putera, & Khuseini, 2022). One kind of tool that is used to provide feedback and evaluation in language learning is Automated Writing Evaluation (AWE), including grammar checker tool. In the last decade, the popularity of these programs has increased (Schmidt-Fajlik, 2023). The program operates by comparing a provided written text with an extensive database comprising texts of similar genres, all generated in response to a specific prompt or rubric (Hockly, 2019). The advancement of technology has inevitably led to the widespread popularity of online grammar checkers among academics and researchers (Perdana & Farida, 2019).

The presence of the Automated Writing Evaluation (AWE) tool is based on the teacher's need to simplify the process of correcting and evaluating students' written work (Alruwais, Wills, & Wald, 2018; Ariyanto et al., 2019; Gilbert, Whitelock, & Gale, 2011; Lim & Phua, 2019). In addition, this application also contributed value to the student's learning process (Sorensen, 2013). The development of the program has allowed for the ability to detect errors in writing and provide corrective feedback automatically and efficiently (Yang, 2018). Both language learners and native speakers have found the use of such software to help improve their writing skills and gain increased confidence in their writing (O'Neill & Russell, 2019). One of the benefit of using such application is students be able to get feedback from the drafting stages in writing, as well as along the process of writing. This may lead students to be less dependent on a teacher to check simple mistakes such as missing articles, verb agreement, and spelling, which they would be able to correct on their own before final submission (Schmidt-Fajlik, 2023).

A study conducted by Ariyanto et al. (2019) investigates the students' and teacher's perception about the implementation of ProWritingAid application compared with conventional teacher feedback in classroom activities. The teacher and students showed positive response against the implementation of ProWritingAid application and teacher feedback on the learning activities. From the implementation of ProWritingAid application, it can help teacher in saving time in giving feedback. In addition, as the application focused on the grammar, vocabulary, and mechanics aspect to be analyzed, the teacher can more focus on providing feedback on the content or idea development.

Another study was conducted by Schmidt-Fajlik (2023). The presence of ChatGPT as the sophisticated AI technology has a chance to integrate into learning activity. Thus, he investigates the utilization of ChatGPT to be a grammar checker tool and compares the performance with Grammarly and ProWritingAid application. The study revealed that ChatGPT offers the most effective and comprehensive support in assisting Japanese English Language Learners (ELLs) with their grammar. The researcher highlights the benefit of using a grammar checker application because it can use in drafting stage before final submission. This finding is in accordance with Ariyanto et al., (2019), which showed that the application is able to use in writing process rather than dependent on the teacher feedback which is given after the submission.

Rahma & Zen (2023) investigate the types of students' writing errors which are detected and not by ProWritingAid. The research was conducted toward 18 students in the eleventh grade. The investigation found that ProWritingAid is able to detect 21 types of writing errors, including missing pronouns, preposition, and determiner. However, there are several errors which are undetected with the application. Thus, the researchers conclude that teacher or human rater is still needed to overcome the undetected errors.

The previous studies focused on investigating the implementation of ProWritingAid application in writing activity, and some of them compare the performance with the other grammar checker applications as well as conventional teacher feedback. However, none of them aims to investigate specifically on the accuracy of the application and compare it with the human analysis result. Hence, in this research, the researcher aims to investigate the accuracy of the ProWritingAid application in the writing learning process. As a comparison, the researcher also reports the teacher or human rater analysis result of the students' work.

II. METHOD

This study employs a qualitative approach as its research method. A key characteristic of well-collected qualitative data is its emphasis on naturally occurring, everyday events within real-life settings (Miles, Huberman, & Saldaña, 2014). In addition, in terms of the nature of the data, qualitative data is popular with the richness and holism, with strong potential for revealing the complexity of the issue (Miles et al., 2014). Furthermore, descriptive data in qualitative research involve the collection and analysis of information in the form of quotes from documents, field notes, and interviews, as well as excerpts from videotapes, audiotapes, or electronic communications, which are used to present the study's findings (Ary, Jacobs, Sorensen, & Razavieh, 2010).

In this study, data collection was conducted through document analysis. Documents encompass both public and private records that qualitative researchers acquire regarding a research site or participants. These records may include newspapers, meeting minutes, personal journals, and correspondence (Creswell, 2012). The document comes from the students' work in the degree of comparison material. The use of document source in this research because it represents an excellent source for text (word) data for a qualitative study (Creswell, 2012). Following data collection, the analysis was conducted using the document

The Accuracy of ProWritingAid Application as the Automated Writing Evaluation Tools

analysis technique. This method involves a systematic process of reviewing and evaluating documents, both in printed and digital formats (including computer-based and internet-transmitted materials). The procedure encompasses skimming for an initial overview, thorough reading for in-depth examination, and interpretation to derive meaningful insights (Bowen, 2009).

The respondent in this research is 25 eleventh-grade students. They were chosen by convenience sampling technique. The researchers handpick the cases to be included in the sample based on their judgement of their typicality or possession of the particular characteristics being sought (Cohen, Manion, & Morrison, 2007). In this research, the sample class was chosen based on the heterogeneity of student competencies in English. In the classroom, it involves students with low and medium competence in English.

III. RESULT & DISCUSSION

A. Result

The data that have been collected from students' work manuscript on the "degree of comparison" material. The students translate nine sentences into English, and after that they check their work in ProWritingAid application. The researchers analysed the document to investigate the accuracy of the feedback provided by ProWritingAid application. The analysis result shows that there are several grammatical mistakes reported by the application. However, there are also several grammatical mistakes that are not reported in the application. Here are several grammatical errors that are reported by the ProWritingAid application.

Table 1. Reported grammatical errors

No.	Mistakes reported by application	Total	Percentage
1	Subject-verb agreement	25	45.5 %
2	Missing determiner	4	7.3 %
3	Inappropriate word form	5	9.1 %
4	Singular or plural noun form	5	9.1 %
5	Spelling	4	7.3 %
6	Missing verb	9	16.4 %
7	Inappropriate determiner	1	1.8 %
8	Generic structure of the material	2	3.6 %
Total		55	100.0 %

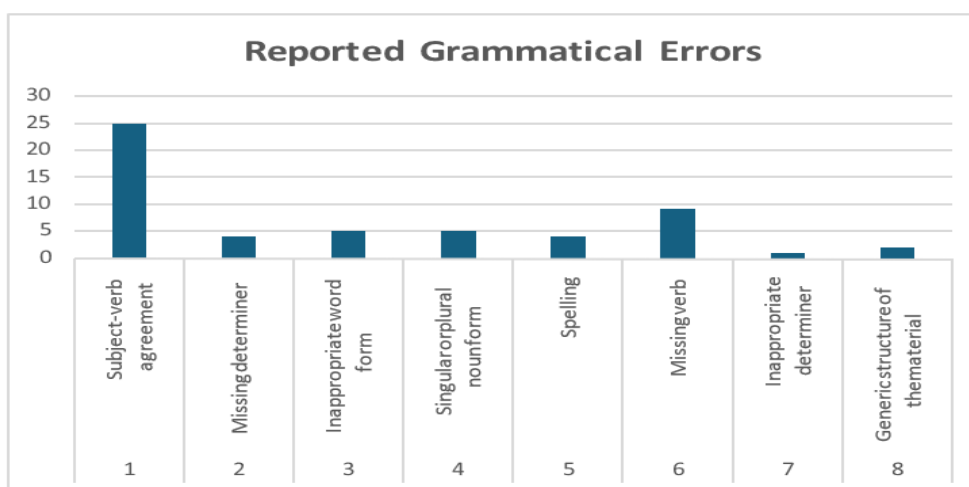


Figure 1. Reported grammatical errors

The Accuracy of ProWritingAid Application as the Automated Writing Evaluation Tools

From the table and chart above, it can be seen that there are eight kinds of grammatical mistakes that reported by ProWritingAid application in students' work. The grammatical mistakes are subject-verb agreement, missing determiner, inappropriate word form, singular or plural noun form, spelling, missing verb, inappropriate determiner, and generic structure of the material. The generic structure of the material means in this research is the sentence structure of degree of comparison material, including positive degree (e.g. as high as), comparative degree (e.g. faster, slower), and superlative degree (e.g. smartest, newest).

The most errors reported were subject-verb agreement with 25 mistakes. Here are examples of feedback provided by ProWritingAid application compared with human rater in subject-verb agreement mistake.

Table 2. Examples of feedback provided by application compared with human rater feedback

Student's answer	ProWritingAid correction	Human rater correction
Nia write slower than her friend.	Nia writes slower than her friend.	Nia writes slower than her friend.
Toni have two rulers.	Toni has two rulers.	Toni has two rulers.

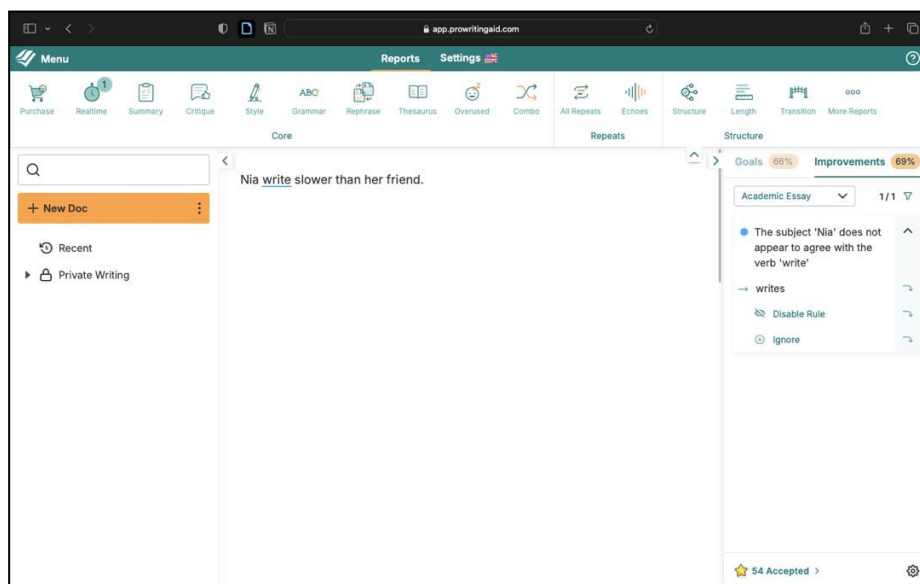


Figure 2. Feedback provided in ProWritingAid application

However, there are several grammatical mistakes that are not reported by the ProWritingAid application. Here are some kinds of mistakes that are not reported by the application.

Table 3. Unreported grammatical mistakes

No.	Mistakes unreported by application	Total	Percentage
1	Missing determiner	1	1.3 %
2	Generic structure of the material	37	49.3 %
3	Singular and plural noun form	4	5.3 %
4	Subject-verb agreement	22	29.3 %
5	Missing verb	5	6.7 %
6	inappropriate determiner	3	4.0 %
7	Missing noun	3	4.0 %
Total		75	100.0 %

The Accuracy of ProWritingAid Application as the Automated Writing Evaluation Tools

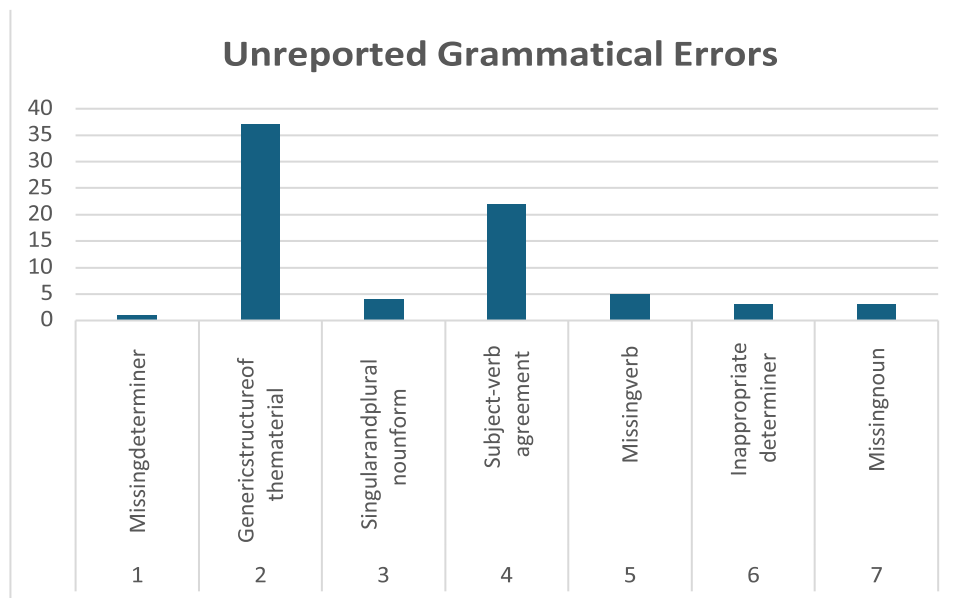
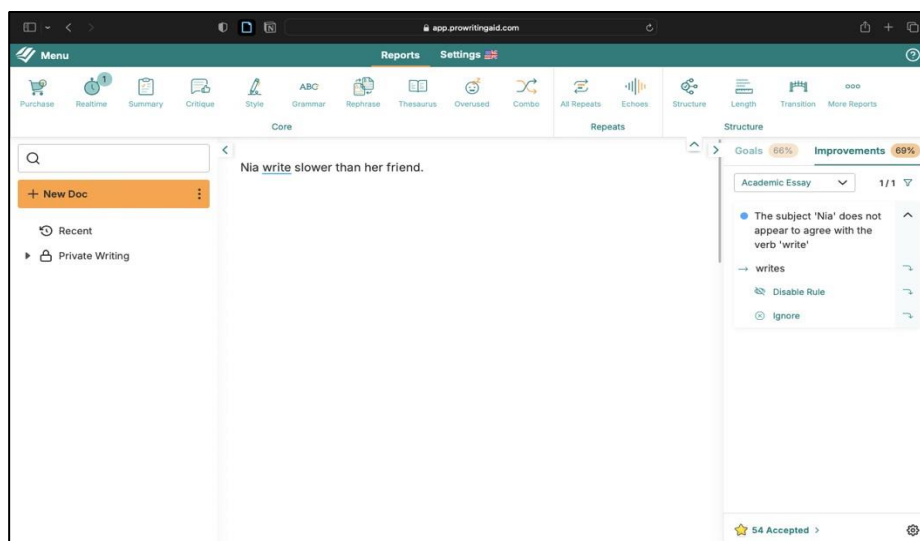


Figure 3. Unreported grammatical errors

From the data above, there are seven kinds of grammatical mistakes that are unreported by the ProWritingAid application, those mistakes are missing determiner, generic structure of the material, singular and plural noun form, subjectverb agreement, missing verb, inappropriate determiner, and missing noun. The most unreported grammatical errors based on the analysis result is the generic structure of the material with 37 mistakes. In addition, the analysis results also show that some unreported errors are types of errors that have actually been detected as errors in Table 1. This finding shows that sometimes ProWritingAid application is inconsistent in providing feedback. Here are examples of the unreported mistakes by ProWritingAid application compared with the human rater.

Examples of unreported mistakes by application compared with human rater feedback

Student's answer	ProWritingAid correction	Human rater correction
Nia writes more slowly than her friend.	Nia writes <u>more slowly</u> than her friend.	Nia writes slower than her friend.
Cheetah run more fast than Usain Bolt.	Cheetah <u>run more fast</u> than Usain Bolt.	Cheetah runs faster than Usain Bolt.



The Accuracy of ProWritingAid Application as the Automated Writing Evaluation Tools

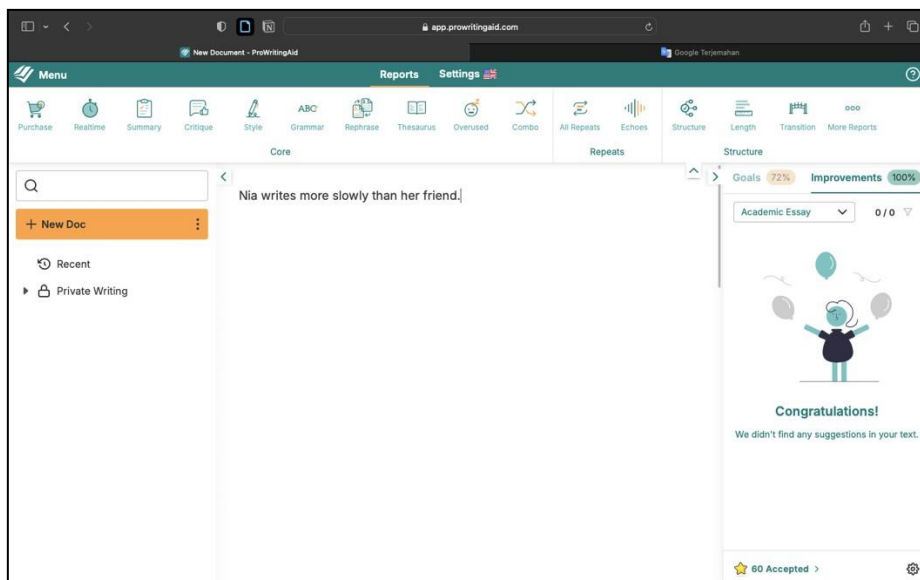


Figure 4. Unreported feedback in ProWritingAid application

B. Discussion

The use of applications in educational activities has proven effective in aiding the learning process of (AbdAlgane & Othman, 2023; Lim & Phua, 2019; Parra & Calero, 2019; Soleimani & Moqimi, 2023). Numerous studies have demonstrated that the use of applications also contributes to the development of various dimensions within the learning process, such as self-directed learning, autonomous learning, self-regulated learning, and others. Additionally, advancements in artificial intelligence (AI) technology have significantly impacted the field of education.

The use of AI-based technology in the learning process provides students with significant opportunities to learn independently according to their abilities and willingness. Therefore, the accuracy of such AI-based technology becomes a crucial factor that will influence the students' learning process.

Based on the aforementioned research findings, it is evident that the ProWritingAid application, used as a tool to check writing errors, detected several mistakes. However, it also missed some errors. This aligns with the study conducted by Rahma & Zen (2023), which states that there are several errors undetected by the application. In this research, eight types of writing errors were detected by ProWritingAid, with the most frequent being subject-verb agreement errors, accounting for 25 errors (45.5%). Regarding undetected errors, there were seven types of writing errors not identified by the application, with the most frequent being related to the generic structure of the material, comprising 37 errors (49.3%).

The presence of inaccuracies in the feedback provided by the application has the potential to reduce students' trust and confidence in using the application. Several solutions can be implemented to address the issue of inaccuracy in feedback provision by the application. The first solution is to avoid using the application with students who have low levels of English competence. This aligns with the findings of Ariyanto, Mukminatien, & Tresnadewi (2019), who suggest not implementing the ProWritingAid application with students possessing low-level English competence. The use of the application by these students results in them accepting all feedback without prior consideration, leading to the acceptance of some inaccurate errors.

The second solution involves consulting or questioning feedback that appears doubtful or difficult to understand with peers, teachers, or reference materials such as dictionaries. Students should be encouraged to verify feedback with additional sources, such as peers or teachers (Koltovskaia, 2020). Thus, it is essential for students to critically evaluate feedback before accepting or rejecting it (Guo et al., 2022; Koltovskaia, 2020). By verifying and filtering the feedback provided by the application, errors in feedback can be avoided. Consequently, students do not rely solely on the application but also engage in discussions and seek explanations from teachers.

III. CONCLUSIONS

Based on the research findings outlined above, it can be concluded that the ProWritingAid application exhibits several inaccuracies in providing feedback on writing errors. The application is less effective in identifying certain errors, particularly those related to the generic structure of sentences in relation to the learning material. This has the potential to influence students' perceptions of the application's use in the learning process.

The Accuracy of ProWritingAid Application as the Automated Writing Evaluation Tools

The role of the teacher becomes crucial in providing guidance, assisting students in revising, and explaining feedback that is inaccurate or difficult to understand. Ultimately, the ProWritingAid application can still be used, as previous research has also highlighted several benefits for students. However, it is essential that students do not accept all feedback blindly. They must verify and critically evaluate the feedback provided by the application.

The researchers recommend that teachers remain actively involved in guiding students in the use of the ProWritingAid application and that students actively seek clarification from teachers regarding feedback that is difficult to understand. The researchers also suggest that other researchers explore potential alternative solutions to address this issue.

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The Accuracy of ProWritingAid Application as the Automated Writing Evaluation Tools

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