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The Utilization of Artificial Intelligence (AI) in English Skills as an Implementation of the Industrial Revolution 5.0

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ABSTRACT: The implementation of Artificial Intelligence (AI) in English skills, as exemplified by the Duolingo application, illustrates the transformative shift in education within the Industrial Revolution 5.0 era, where human–machine collaboration enhances personalized skill development. This study involved 30 Grade XI students at SMKN 3 Baubau and employed a descriptive qualitative approach to examine learners' perceptions and experiences with AI-based learning tools. Data were collected through field observations, English proficiency tests, questionnaires, and interviews. The results indicate that Duolingo effectively supports self-directed blended learning, improving students' speaking, listening, reading, and writing skills in an engaging and autonomous manner. Through AI-driven gamification, Duolingo adapts to individual learner performance by providing instant feedback, progressive difficulty levels, and interactive exercises that maintain motivation and reduce learning fatigue. These adaptive features align with the vision of Industrial Revolution 5.0, where technology collaborates with learners to optimize progress. Most participants reported significant improvements in vocabulary acquisition, pronunciation, and comprehension, attributing their advancement to daily practice and active engagement facilitated by the application. In conclusion, AI-powered platforms like Duolingo go beyond digitizing traditional learning; they transform the educational experience by fostering intrinsic motivation, sustaining engagement, and enabling personalized learning pathways, thus equipping learners for global communication demands with both efficiency and enjoyment.

KEYWORDS: Artificial Intelligence, Duolingo Application, English Skills, Industrial Revolution, Implementation, SMKN 3 Baubau.

INTRODUCTION

In the era of the Industrial Revolution 5.0, the integration of Artificial Intelligence (AI) into education has transformed the way English skills are taught, learned, and applied. English, as a global lingua franca, continues to play a pivotal role in facilitating international cooperation, enhancing cross-cultural communication, and supporting political, economic, and business engagements. The adoption of AI-powered tools such as intelligent tutoring systems, automated feedback platforms, and adaptive language learning applications have provided learners with personalized, real-time assistance in developing core English competencies, including listening, speaking, reading, and writing.

In Indonesia, where English holds a significant position in educational, governmental, business, and social contexts, the integration of AI in English language instruction aligns with the nation's educational objectives in preparing students for global competitiveness. At the senior high school level, the use of AI not only supports interactive and learner-centered approaches but also addresses individual learning gaps, fosters autonomous learning, and enhances students' motivation. This technological advancement exemplifies how the principles of the Industrial Revolution 5.0 centered on human-technology collaboration can be harnessed to elevate language education and produce graduates equipped with both linguistic proficiency and digital literacy.

Mastery of English requires competence in four fundamental language skills: listening, reading, speaking, and writing. However, many students encounter challenges in understanding spoken discourse, engaging in effective oral communication, and comprehending as well as expressing ideas in reading and writing tasks. These difficulties often stem from the absence of an effective learning model that can systematically facilitate the acquisition and refinement of English language skills.

The selection of an appropriate learning model plays a crucial role in enhancing English proficiency. Learning models encompass structured approaches or strategies designed to support learners in acquiring knowledge, skills, and deeper understanding. According

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to (Ruijuan et al., 2023), effective learning models can significantly improve academic performance, enhance problem-solving abilities, increase motivation, foster active participation, and even promote parental involvement in the learning process. Such models are adaptable to varied contexts and can be tailored to meet diverse learner needs.

In the framework of the Industrial Revolution 5.0, the integration of AI-driven learning models represents a transformative approach in language education. Technology-Enhanced Learning (TEL) models, empowered by AI, enable personalized, adaptive, and data-driven instruction. AI-based platforms such as Duolingo, Grammarly, and intelligent conversational agents offer interactive exercises, instant feedback, and adaptive pathways that cater to individual proficiency levels. Within a blended learning environment, AI applications can function as autonomous learning tools beyond the classroom, while face-to-face sessions provide guided practice, collaborative activities, and teacher-mediated feedback. By merging human expertise with AI capabilities, the Industrial Revolution 5.0 paradigm promotes a synergistic learning environment that not only strengthens students' listening, speaking, reading, and writing skills but also cultivates self-directed learning and digital literacy competencies essential for thriving in a globalized, technology-driven era.

The integration of AI-powered platforms within blended learning models has gained considerable attention in the context of the Industrial Revolution 5.0, where technology and human-centered education are harmoniously combined to enhance language acquisition. Several studies have highlighted the impact of technology-enhanced and AI-supported learning approaches on English proficiency. For instance, (Wang & Zhang, 2022) demonstrated that blended learning models particularly those optimized through the Small Private Online Course (SPOC) approach—can significantly improve independent learning behavior and self-directed learning efficacy. Similarly, (Inal & Korkmaz, 2019) found that blended learning via the AI-driven DynED platform substantially enhanced student achievement compared to traditional methods, although it did not significantly influence students' attitudes toward learning English.

In another study, (Bralić & Divjak, 2018) examined the use of Massive Open Online Courses (MOOCs) in blended learning and reported that, despite their potential for broad accessibility, MOOCs yielded a relatively small number of successful learners in English language courses. This limitation was attributed to restricted interactive features, diminished learner motivation, and the need for careful evaluation of credit allocation based on students' realistic expectations.

Synthesizing these findings, it is evident that online course-based learning models contribute positively to student achievement in English, yet their influence on learner motivation and engagement in language practice remains limited. In this regard, AI-enhanced language applications, such as Duolingo, offer additional advantages that address these gaps. Duolingo's adaptive learning algorithms personalize vocabulary acquisition, speaking practice, and listening comprehension exercises, while also facilitating language translation between English and Indonesian. Moreover, its interactive features such as peer-to-peer communication, gamified learning experiences, and instant feedback help sustain learner motivation and foster continuous practice.

By leveraging such AI-driven tools within the blended learning framework, the Industrial Revolution 5.0 vision of human-technology collaboration can be actualized, enabling more engaging, personalized, and effective pathways for mastering the four core English language skills.

METHODOLOGY

This study employed a qualitative research design to explore the integration of Artificial Intelligence (AI) in enhancing English language skills within the framework of the Industrial Revolution 5.0. As described by (Creswell, 2003), qualitative research provides a holistic approach to understanding social or human phenomena by focusing on in-depth descriptions and interpretations rather than numerical analysis. In this context, the qualitative approach allowed the researcher to examine how AI-based learning tools influence students' listening, speaking, reading, and writing abilities in a natural learning environment.

The research was conducted at SMKN 3 Baubau, located on Jalan Sijawangkati, which is equipped with adequate learning facilities. Each classroom accommodates approximately 30 students and is supported by an internet connection accessible to all school participants. This infrastructure plays a pivotal role in facilitating AI-assisted language learning, as students can access online dictionaries, interactive language applications, and AI-driven learning platforms. The availability of these digital resources aligns with the core vision of the Industrial Revolution 5.0, where human-centered learning is enhanced by advanced technological support.

Moreover, data collection involved multiple instruments, including observation field notes, pre-test and post-test results of students' English proficiency, questionnaires, and interview transcripts. The analysis process followed three main stages: (1)

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assembling the collected data, (2) coding, comparing, interpreting, and developing the data, and (3) reporting the outcomes. The interpretation stage particularly focused on identifying patterns of improvement in students' English skills after the implementation of AI-supported learning tools, such as vocabulary enhancement through interactive applications, pronunciation refinement via speech recognition technology, and comprehension improvement using adaptive reading platforms.

The final stage involved synthesizing the findings into a comprehensive evaluation, highlighting whether and how the integration of AI into the English learning process contributed to students' skill development. This approach not only provided insights into the effectiveness of AI-based tools but also reinforced the role of Industrial Revolution 5.0 principles in shaping a more personalized, adaptive, and technology-driven English learning environment.

FINDINGS

Online Driver Model

In the context of the Industrial Revolution 5.0, online learning models have evolved significantly through the integration of Artificial Intelligence (AI), enabling more flexible, personalized, and student-centered language instruction. One such approach, the Online Driver model, utilizes electronic information systems as the primary medium for delivering educational content. In this model, teachers upload learning materials to online platforms, allowing students to download and access resources remotely. This structure empowers learners to study independently beyond the classroom, complete assignments from any location, and submit their work digitally using devices such as computers, tablets, or smartphones connected to the internet.

The AI-enhanced version of the Online Driver model further optimizes this process by incorporating adaptive learning algorithms, automated feedback systems, and intelligent scheduling tools. These features not only allow students to progress at their own pace but also provide targeted exercises in listening, speaking, reading, and writing skills based on real-time performance analysis. While the model minimizes face-to-face interaction, scheduled online consultations with educators often facilitated through AI-assisted communication platforms ensure that learners receive guidance when necessary.

This approach stands in contrast to traditional classroom-based instruction, as it emphasizes autonomous learning supported by AI-driven resources. By integrating human expertise with advanced technological capabilities, the Online Driver model aligns with the Industrial Revolution 5.0's vision of harmonizing human and machine collaboration, ultimately enhancing learners' English proficiency in a flexible and adaptive digital environment.

Datum 1: Student 22

Based on the observation result, Student 22 has used the blended learning model with the online driver model type by using Google Classroom and Zoom as the English learning media. In this way, the teacher provides material or assignments through the google classroom application, and the explanation is obtained through the class meeting in the Zoom application. Student 22 also explained that this was because the material or tasks were given through Google Classroom, not given a direct or detailed explanation. As the solution, the teacher gives an explanation through the Zoom application but based on the agreement schedule. Thus, students better understand the lesson concerning the English assignment or material given. Then when the research was conducted pretest and post-test, the students got the following scores:

Table 1. Student 22 Pre-test and Post-test

No.	Research Participant	English Skills Test	English Skills			
			Listening	Speaking	Reading	Writing
1.	Student 22	Pre-test	0	8	16	2
		Post-test	3	20	20	1

The findings of this study indicate measurable improvement in the English proficiency of Student 22 following the implementation of a self-blended learning model utilizing the Duolingo application as an AI-driven learning medium. Based on the comparison between pre-test and post-test results, notable progress was observed in listening, speaking, and reading skills. Qualitative insights from interviews further reveal that the most significant enhancement occurred in speaking skills, where the interactive and gamified

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nature of Duolingo created a sense of challenge and engagement. As the difficulty level increased progressively within the application, the learner was motivated to actively respond and maintain participation.

From the perspective of the Industrial Revolution 5.0, Duolingo exemplifies how AI can provide adaptive learning experiences tailored to individual performance, thereby fostering learner autonomy and sustained engagement. However, challenges remain, particularly in writing skills, where accurate grammar construction is crucial. Student 22 reported that incorrect answers often altered the intended meaning, resulting in repeated attempts for the same question. While this repetition can reinforce learning, it also has the potential to induce boredom if not accompanied by varied feedback or alternative learning strategies.

These findings underscore the dual impact of AI in language learning: it offers personalized, engaging pathways for skill development, yet also requires thoughtful pedagogical integration to address potential learner fatigue. As such, the combination of AI technology and human-centered teaching strategies is essential to fully realize the vision of the Industrial Revolution 5.0 in optimizing English language education.

Datum 2: Student 17

Based on the observation result, Student 17 has used a blended learning model about online driver model type through Google Classroom as the English learning media and finds it difficult to use this media because there is no detailed direct explanation from the teacher that his understanding of English material is unsatisfactory and he feels that his understanding is actually reduced. Although the teacher had sent a video to explain, it was still difficult for him to ask questions about the material the student did not understand. Then when the research was conducted, pretest and post-test the student got the following scores:

Table 2. Student 17 Pre-test and Post-test

No.	Research Participant	English Skills Test	English Skills			
			Listening	Speaking	Reading	Writing
2	Student 17	Pre-test	8	16	20	3
		Post-test	12	20	20	4

The results of the assessment indicate a significant improvement in the English proficiency of Student 17, as evidenced by the increase in listening, speaking, and reading skills from pre-test to post-test scores following the implementation of a self-blended learning model supported by the Duolingo application. Qualitative data obtained through interviews further highlight notable vocabulary expansion, which contributed to enhanced speaking and writing performance. The interactive features of Duolingo, driven by AI algorithms, provided targeted vocabulary reinforcement, pronunciation practice, and context-based exercises that facilitated both receptive and productive language skills. Student 17 also emphasized the practical benefits of integrating AI-based applications with supplementary tools, such as English dictionaries, to support vocabulary acquisition and comprehension. This aligns with the core principles of the Industrial Revolution 5.0, which promote a collaborative synergy between technology and human agency in learning processes. The learner's recommendation of Duolingo as an accessible and user-friendly platform underscores its potential as a scalable tool for independent language learning, while also highlighting the importance of combining AI-driven resources with traditional references to achieve comprehensive skill development.

Through this case, it becomes evident that AI integration in English learning not only fosters measurable skill enhancement but also empowers learners to adopt more autonomous and resourceful approaches, reflecting the human-centered and technology-supported vision of the Industrial Revolution 5.0.

DISCUSSION

The analysis of the Duolingo application's implementation in enhancing students' English skills was conducted in two stages. The first focused on evaluating the blended learning models previously used by students, while the second compared students' English proficiency before and after transitioning from the Online Driver blended learning model delivered via platforms such as WhatsApp, Zoom, and Google Classroom to a self-blended learning model supported by the AI-powered Duolingo application.

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This evaluation was framed using (Shaidullin et al., 2014) classifies of five blended learning types: face-to-face driver, rotation model, flex model, self-blended learning model, and online driver model. Prior to the intervention, some students predominantly engaged in the online driver model, where the learning process relied heavily on electronic resources. In this format, teachers uploaded instructional materials to online platforms, enabling students to access and download them remotely for independent study. Assignments could be completed and submitted via internet-connected devices such as computers, tablets, or smartphones. While this model facilitated distance learning, it minimized synchronous face-to-face interaction, with online meetings conducted periodically based on mutual scheduling between teachers and students.

In the online driver model, various digital media played a central role. WhatsApp functioned as an accessible communication tool that supported social interaction and group collaboration in learning contexts. Zoom, as described by (Bhattacharya et al., 2022), served as an online learning management system enabling real-time content delivery, material sharing, and collaborative engagement between educators and learners. Google Classroom, in line with (Ketut Sudarsana et al., 2019) findings, provided a structured platform for communication, feedback exchange, and assignment submission, allowing educators to distribute materials efficiently and students to engage in self-paced learning.

While these platforms supported the delivery of English learning materials, the transition to an AI-driven self-blended learning model via Duolingo introduced adaptive learning pathways, gamified practice, and real-time feedback, addressing limitations in learner engagement and personalization. This shift embodies the principles of the Industrial Revolution 5.0, in which human-centered instruction is enhanced by intelligent technologies, enabling more dynamic, personalized, and skill-focused English language learning experiences.

CONCLUSSION

The utilization of Artificial Intelligence (AI) in enhancing English skills, particularly within the framework of the Industrial Revolution 5.0, offers transformative potential compared to conventional blended learning platforms such as Zoom, Google Classroom, and WhatsApp. Although these platforms have facilitated remote learning, findings from the implementation of AI-driven applications like Duolingo indicate that many students still encounter challenges in fully grasping English material when relying solely on such tools. The primary limitation lies in the absence of personalized and adaptive feedback, which often results in insufficient comprehension of the material.

AI-powered learning systems address this gap by providing real-time, interactive, and tailored explanations that adapt to individual learner needs. Unlike traditional applications, AI integrates natural language processing, speech recognition, and adaptive learning algorithms to deliver targeted practice, detect learner weaknesses, and adjust learning pathways accordingly. This level of personalization is critical in the Industrial Revolution 5.0 era, where technology is not merely a medium but an intelligent collaborator in the learning process. Consequently, AI implementation enhances not only the accessibility of learning resources but also the quality of skill acquisition, ensuring that learners develop comprehensive competence in listening, speaking, reading, and writing in English.

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