The roles and functions of language in human life in the era of industrial revolution 4.0 and the twenty-first century

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ABSTRACT

The rapid development of technology in the era of the Industrial Revolution 4.0 and the twenty-first century has significantly transformed the way humans communicate, think, and interact. Language, as the primary medium of communication, has expanded beyond transmitting messages. It now serves as the foundation for digital identity formation, media literacy, and mastery of twenty-first-century competencies, including critical thinking, creativity, collaboration, and communication. This study aims to analyze the roles and functions of language in modern human life and identify the linguistic challenges that emerge in the digital era. Using a literature study method with a qualitative descriptive approach based on document analysis following Sugiyono's guidelines, this research reveals that language holds a strategic position in education, society, and technology. Language supports information processing, social relationship building, and individual adaptation to global environments. However, several challenges arise, such as the excessive use of abbreviations and digital symbols that lead to ambiguity, low levels of digital literacy, and increasing risks of misinformation and misinterpretation in cross-cultural communication. The study concludes that strengthening language and digital literacy is essential to ensure that individuals can effectively adapt to technological changes and maintain ethical, clear, and meaningful communication in the digital age.

Keywords: Language; Industrial Revolution 4.0; Twenty-first century; Digital literacy; Communication; Linguistic challenges.

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1. INTRODUCTION

The rapid advancement of technology in the era of the Fourth Industrial Revolution and the twenty-first century has brought profound changes to how humans live, think, and communicate. The integration of digital systems, artificial intelligence, and the Internet has reshaped social structures, accelerated information exchange, and created new patterns of human interaction. Language has become a central instrument that undergoes significant adaptation within these transformations. Language no longer functions merely as a system of sounds and symbols to convey messages; it now serves as a critical medium for navigating digital environments, constructing identity, and participating in global communication networks. In modern society, language plays a multidimensional role in communication. It facilitates interpersonal communication, expresses emotions and ideas, integrates social groups, and serves as a vehicle for cultural continuity. Simultaneously, it has become the foundation for administrative, educational, and professional functions (Aini, 2019). The emergence of digital platforms has amplified these roles, requiring individuals to master language not only for direct communication but also for navigating online spaces such as social media, virtual meetings, digital learning platforms and global information networks. These developments confirm that language is no longer limited to oral and written forms; instead, it has expanded into multimodal communication that includes symbols, icons, emojis, visuals, and digital text formats.

In the field of education, language holds an even more prominent position than in other fields. It serves as a medium for thinking, analyzing, constructing arguments, and engaging with complex information. Twenty-first-century learning emphasizes four essential competencies: critical thinking, creativity, collaboration, and communication. Each of these competencies relies heavily on mastery of language. Critical thinking requires the ability to comprehend texts, evaluate information, and articulate logical argument. Creativity is strengthened by linguistic expression, storytelling, and idea formulation. Collaboration depends on the capacity to negotiate meaning and maintain clarity in group interaction. Effective communication, both digital and face-to-face, requires appropriate language choice, coherence, and accuracy (Griffin et al., 2012). Thus, language functions as a cognitive foundation for mastering twenty-first-century skills. Language also contributes significantly to identity formation, cultural preservation, and the development of moral and social values. In the midst of globalization, language is the means through which individuals understand diversity, express cultural identity, and establish meaningful social relationships. As digital spaces allow interaction across countries and cultures, proficiency in language helps individuals interpret messages, respect differences, and prevent misunderstandings in multicultural communication (Devianty, 2017). In this context, strengthening linguistic competence is essential not only for academic purposes but also for building character and social awareness among students.

Despite its strategic role, language use in the digital era faces various challenges. One prominent issue is the tendency to excessively simplify language through abbreviations, acronyms, and truncated forms commonly used in online communication. While this phenomenon reflects the fast-paced nature of digital interaction, it often leads to misinterpretation, especially when the message reaches diverse audiences with different linguistic backgrounds and cultural contexts. Another challenge arises from the increasing use of emojis as digital, nonverbal expressions. Although emojis help clarify emotions, they may also create ambiguity because individuals interpret them differently based on their age, culture, or communicative experience (Muin & Ruslan, 2020). Such inconsistencies often result in communication breakdowns, particularly in conversations requiring precision and clarity. The digital era has amplified the spread of misinformation. Weak language comprehension, limited critical literacy, and reliance on provocative or sensational expressions increase vulnerability to hoaxes and deceptive narratives. In this context, linguistic literacy is crucial for evaluating text structures, detecting bias, and identifying persuasive techniques used to manipulate readers. The ability to critically analyze language helps individuals filter credible information from misleading content.

Moreover, the intensification of multilingual interactions in online spaces presents additional complexity. Users frequently switch between languages and incorporate foreign terms into their messages.

Although multilingualism enriches communication, it may also lead to semantic errors, incorrect translations, and inappropriate expressions when communicators lack pragmatic awareness. Misunderstandings often occur when messages are not adjusted to the audience's linguistic competence or cultural context (Rangkuti & Syahputro, 2019). This highlights the necessity for users to develop pragmatic and intercultural competence to maintain clarity and avoid conflict. Despite these challenges, the digital revolution presents vast opportunities for language development. Digital platforms allow individuals to create content in various forms, including articles, blogs, podcasts, videos, digital stories, and interactive educational media. Through these platforms, language has become a tool for innovation, creativity, and self-expression. Effective linguistic skills enhance a content creator's ability to reach wider audiences, promote learning, and contribute to knowledge-sharing ecosystems (Wijaya, 2018). Therefore, instead of diminishing the role of language, the digital environment expands its functions and demands more adaptive and dynamic language competencies.

Overall, the role and function of language in human life during the Industrial Revolution 4.0 and the twenty-first century continue to evolve. Language acts as the foundation of effective communication, supports digital literacy, and strengthens essential modern skills such as critical thinking, creativity, collaboration, and communication. At the same time, the digital era presents challenges such as ambiguous symbols, miscommunication, multilingual complexities, and misinformation that require individuals to enhance their linguistic and digital awareness. Understanding these dynamics is crucial for society, particularly educators and students, to navigate the rapidly changing world effectively. Strengthening language skills becomes a vital effort to ensure that communication remains meaningful, ethical, and adaptive in facing the demands of modern civilization.

2. METHOD

This study employs a qualitative descriptive approach using the library research method, as described by Sugiyono (2019), who explains that qualitative descriptive research aims to present a systematic description of phenomena through the analysis of written sources and documented information. This method is appropriate because the topic examined is conceptual and theoretical, focusing on the roles and functions of language in human life during the Industrial Revolution 4.0 and the twenty-first century. The data for this study were collected through documentary techniques, namely by reviewing books, journal articles, conference papers, and other scholarly publications relevant to language functions, technological development, digital literacy, and twenty-first-century communication. The selection of sources was conducted based on relevance, thematic alignment, and contemporary significance to ensure that the literature used supports a comprehensive theoretical analysis. Data analysis was carried out following the analytical procedures outlined by Sugiyono (2019), which consist of three stages: (1) data reduction, which involves selecting, simplifying, and focusing on essential information from each source; (2) data display, namely organizing the findings into thematic categories such as language function, the role of language in digital contexts, digital literacy, and linguistic challenges in modern society; (3) conclusion drawing, which is the process of synthesizing the analyzed data to generate an integrated understanding of how language operates within the dynamics of the Industrial Revolution 4.0 and the twenty-first century. Through this library research method, the study does not merely summarize existing theories but critically re-examines their relevance to current technological and social developments. This approach enables the researcher to present a comprehensive and structured analysis of the evolving role of language in contemporary human life.

3. RESULTS AND DISCUSSION

3.1 Reslut

3.1.1 Findings on the Role of Language in Human Life in the Industrial Revolution 4.0 and the Twenty-First Century

The findings of the literature review show that language has undergone a significant expansion of function in modern human life. Traditionally, language was primarily understood as a medium for communication and the transmission of ideas. However, in the context of the Industrial Revolution 4.0, language has developed into a multidimensional tool that plays a crucial role in information management, digital identity formation, media literacy, and global collaboration (Agustian et al., 2023). The integration of technologies such as the Internet of Things, artificial intelligence, big data, and cyber-physical systems demands that language adapt to communication that is increasingly fast, concise, interactive, and interconnected. The results indicate that language is central to thinking processes and decision-making. Individuals with strong language competence demonstrate better abilities in organizing information, interpreting complex messages, and formulating creative solutions. Language serves as the foundation for critical thinking, reasoning, and problem solving competencies that are indispensable in the twenty-first century. Moreover, the findings reveal that language also holds an important social function. It not only fosters unity among communities but also creates new spaces for interaction through digital platforms. On social media such as Instagram, TikTok, WhatsApp, and Twitter, language functions as a tool for self-branding, networking, and expressing values and attitudes. This transformation positions language as a central pillar in shaping both social and professional identities (Syahputra & Rangkuti, 2019). Within the educational sphere, the findings highlight language's centrality as a medium of learning and academic development. Language enables the comprehension of concepts, academic discussions, and creative expression. The twenty-first-century curriculum emphasizes communication, collaboration, creativity, and critical thinking skills that are directly dependent on linguistic competence. As such, language serves not only as a linguistic tool but also as a cognitive, social, and technological asset that equips learners to be adaptive and competitive in a global environment.

3.1.2 Findings on Linguistic Challenges in the Digital Era and Their Implications

The analysis also reveals numerous linguistic challenges brought about by digital technological development. One of the most prominent challenges is the shift toward communication styles that are shorter, denser, and heavily symbolic. The use of emojis, GIFs, stickers, acronyms, and abbreviations has become part of digital communication. While these features enhance efficiency, they frequently lead to ambiguity, as different audiences interpret these symbols inconsistently. Such conditions increase the risk of miscommunication, especially in cross-cultural contexts. The findings further indicate that digital multilingualism users switching between two or more languages within a single communication platform often leads to semantic inaccuracies. When users lack awareness of the social and cultural context of the language being used, errors in meaning and expression may occur. This is evident in uncontrolled patterns of code mixing and code switching across digital platforms. Additionally, low levels of digital and linguistic literacy make individuals vulnerable to hoaxes, misinformation, and opinion manipulation. The linguistic structure of misleading content is typically designed to be emotional, provocative, and persuasive. Users without strong analytical skills often struggle to differentiate factual content from fabricated narratives (Ruslan & Puspitasari, 2023). Furthermore, the evolving nature of social-media algorithms and shifting platform policies contribute to linguistic challenges. Users must continuously adjust their linguistic choices based on character limits, comment formats, trending mechanisms, and community norms. Consequently, language adapts rapidly, sometimes at the cost of abandoning formal linguistic standards necessary for academic or professional communication.

3.2 Discussion

3.2.1 Interpretation of Language's Role in Shaping Competence and Communication in the Modern Era

The discussion highlights that language is the foundational element of human life in the Industrial Revolution 4.0 era not merely as a communication tool, but as the structural basis for developing essential twenty-first-century competencies. Language is a prerequisite for critical thinking because information processing depends on the ability to read, interpret, and analyze messages. In an information-rich digital society, language competence determines whether individuals can navigate information effectively or become overwhelmed by it. Language is integral to collaboration, as effective teamwork requires clarity, empathy, and communicative precision. Many conflicts arise not from differences in opinion but from linguistic misunderstandings. Thus, strengthening language competence is equivalent to enhancing collaborative abilities. Language is also essential to creativity. It provides the medium through which ideas are articulated, narratives are built, and innovations are communicated. In the digital age, linguistic creativity appears in educational content creation, digital storytelling, marketing strategies, and social campaigns. The mastery of diction, tone, and narrative structure becomes a decisive factor in the success of digital communication.

Therefore, the role of language in the modern era extends beyond linguistic expression and becomes closely linked to cognitive, social, emotional, and technological domains. Language connects individuals to the broader digital world, which demands continuous adaptation, reflection, and communication literacy.

3.2.2 Implications of Linguistic Challenges for Education, Society, and Digital Ethics

The discussion also emphasizes that linguistic challenges in the digital era have broad implications for education and social interaction. The heavy use of abbreviations, emojis, and symbolic expressions requires strong pragmatic literacy. Without this, communication may lead to misunderstandings, conflict, and unethical interactions. In the educational context, linguistic challenges necessitate curriculum refinement to teach language not only from structural and grammatical perspectives but also from pragmatic, digital, and cultural dimensions. Students must understand that digital language carries risks such as misinterpretation, misinformation, hate speech, and biased meaning. Educators must integrate language literacy with digital literacy to help students analyze information critically and interact ethically.

Socially, linguistic challenges shape the way individuals relate to one another. Digital communication, while fast and borderless, often lacks the emotional nuance, clarity, and contextual cues found in face-to-face communication. This can lead to miscommunication or even social friction if individuals do not use language carefully. Language therefore acts as a form of social regulation that guides how people interact respectfully and responsibly online. Culturally, linguistic challenges test society's ability to preserve linguistic identity. Unfiltered and excessive mixing of foreign terminology and digital jargon may influence linguistic norms and shift cultural values. Strengthening language literacy becomes crucial to balancing modernization with cultural preservation. Overall, these findings reinforce that linguistic competence must evolve in parallel with technological advancement. The ability to use language wisely, critically, and ethically determines the quality of communication and social harmony in the digital age.

4. CONCLUSION

The findings of this study demonstrate that language plays a fundamental and multidimensional role in human life during the Industrial Revolution 4.0 and the twenty-first century. Language is not only a medium for conveying information, but also a critical foundation for cognitive development, social

interaction, digital participation, and the formation of personal and cultural identity. In an era characterized by rapid technological advancement, language enables individuals to navigate complex information flows, communicate effectively across diverse contexts, and participate in global networks that increasingly shape modern life. However, the evolution of digital communication has brought significant linguistic challenges. The rise of abbreviated expressions, symbolic communication, and multilingual interaction introduces risks of misunderstanding and semantic ambiguity. In addition, low levels of digital and linguistic literacy have heightened susceptibility to misinformation and problematic communication practices. These challenges underscore the need for stronger linguistic and digital competencies to maintain clarity, accuracy, and ethical responsibility in communication.

Overall, the study highlights that the role of language extends far beyond traditional communicative functions. Language is a key driver of twenty-first-century skills critical thinking, creativity, collaboration, and communication and is essential for individuals to adapt, compete, and thrive in a fast-changing digital environment. Strengthening linguistic literacy, integrating language with digital education, and promoting ethical language use are crucial steps in ensuring that society can respond effectively to technological and social transformations. With these efforts, language will continue to serve as a powerful tool that unites individuals, supports learning, and enables meaningful engagement in the globalized world.

Ethical Approval
Not applicable. This study is a literature-based research that does not involve human participants, experiments, or procedures requiring ethical clearance.

Informed Consent Statement
Not applicable. No primary data were collected from human subjects, and no interviews, surveys, or personal information were obtained in this study.

Authors' Contributions
All authors contributed equally to the development of this article. The conceptualization and formulation of the research focus were carried out collaboratively. The literature search, data selection, and analytical synthesis were jointly conducted by the authors. The drafting, revision, and finalization of the manuscript were completed through shared effort and mutual supervision. All authors have read and approved the final version of this manuscript.

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The authors declare that they have no known financial, personal, or institutional conflicts of interest that could have influenced the development of this research or the preparation of this manuscript. All stages of the study including the conceptualization, literature selection, analysis, and writing were conducted independently and guided solely by academic objectives. No external parties intervened or contributed in a way that may have impacted the neutrality, integrity, or outcomes of this article. The authors affirm that this work adheres to ethical research standards and that all referenced materials have been properly and transparently acknowledged.

Data Availability Statement
This study is based entirely on a qualitative literature review of publicly available academic sources. No primary empirical data were collected. All references used in the analysis are cited within the manuscript. Additional details regarding the literature selection process, analytical framework, or specific sources can be made available by the authors upon reasonable request for academic or research purposes.

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