

Culturally Responsive Pedagogy in Language Education: Exploring Grammarly and Web-Based Language Learning for Diverse Learner Personalities in Basic Grammar Instruction

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Abstract

The increasing integration of digital technologies into language education has transformed the ways learners engage with grammar instruction. However, the effectiveness of technological tools cannot be separated from learners' diverse cultural backgrounds, identities, and learning preferences. Grounded in the framework of culturally responsive pedagogy, this qualitative case study explores how Grammarly and Web-Based Language Learning (WBLL) facilitate grammar learning among university students with different personality orientations, namely extrovert and introvert learners. The study was conducted with first-year Nursing and Midwifery students at the Ministry of Health Polytechnic Semarang, Indonesia. Data were collected through classroom observations, semi-structured interviews, reflective journals, and document analysis of students' grammar-learning tasks. The findings reveal that Grammarly supported learner agency, self-expression, and exploratory learning, particularly among extroverted students, while WBLL fostered structured learning, autonomy, and reflective engagement that were appreciated by introverted learners. Furthermore, both technologies provided opportunities for personalized learning experiences that aligned with culturally responsive teaching principles. The study argues that effective technology integration in language education should move beyond standardized instructional models and embrace learner diversity, individual differences, and culturally situated learning practices. The findings contribute to ongoing discussions on rethinking culturally responsive approaches in literature and language education in digitally mediated learning environments.

Keywords: *culturally responsive pedagogy, Grammarly, Web-Based Language Learning, learner diversity, personality orientation, grammar instruction*

INTRODUCTION

The rapid advancement of educational technology has significantly transformed language teaching and learning practices across the globe. Digital tools have become increasingly integrated into English language classrooms, offering learners greater flexibility, accessibility, and opportunities for autonomous learning. Among various technological innovations, grammar-support applications such as

Grammarly and Web-Based Language Learning (WBLL) platforms have attracted considerable attention due to their potential to enhance learners' grammatical competence and engagement.

Despite these technological developments, language education continues to face challenges in addressing learner diversity. Students enter classrooms with different cultural experiences, identities, learning preferences, and personality orientations that shape their learning processes. Traditional approaches to grammar instruction often emphasize uniformity and standardized teaching practices, which may not adequately accommodate diverse learners. Consequently, contemporary educational discourse has increasingly emphasized culturally responsive pedagogy as a framework for creating inclusive and equitable learning environments.

According to Gay (2018), culturally responsive teaching recognizes learners' cultural knowledge, prior experiences, and performance styles as valuable resources for effective learning. Similarly, Hammond (2015) argues that culturally responsive instruction promotes deeper cognitive engagement by connecting learning experiences to students' identities and ways of knowing. In language education, culturally responsive approaches encourage teachers to acknowledge and respond to learners' diverse linguistic, social, and psychological characteristics.

One important aspect of learner diversity concerns personality orientation. Research on second language acquisition has frequently examined extroversion and introversion as influential factors in language learning outcomes (Dewaele & Furnham, 2000; Hsain & Suliman, 2015). Extroverted learners are generally characterized by sociability, active participation, and willingness to take risks, whereas introverted learners often prefer reflection, careful analysis, and independent learning environments.

The integration of digital technologies provides opportunities to accommodate these diverse learning preferences. Grammarly offers immediate feedback, opportunities for experimentation, and self-directed revision. Meanwhile, WBLL platforms provide structured learning pathways, multimedia resources, and flexible access to learning materials. Nevertheless, little research has explored how these technologies can support culturally responsive language teaching by addressing learners' personality differences. This study therefore seeks to examine how Grammarly and WBLL contribute to grammar learning among extrovert and introvert learners within a culturally responsive pedagogical framework.

This study seeks to explore how students with different personality orientations, namely extrovert and introvert learners, experience the use of Grammarly and Web-Based Language Learning (WBLL) in learning basic grammar. Furthermore, it aims to investigate how these digital learning tools can support culturally responsive language education by accommodating diverse learner characteristics, promoting learner agency, and creating inclusive learning environments that recognize and respond to individual differences in language learning.

Culturally Responsive Pedagogy in Language Education

Culturally responsive pedagogy (CRP) has gained significant attention as an educational framework that promotes equity, inclusion, and meaningful learning



experiences for diverse student populations. As classrooms become increasingly multicultural and technologically mediated, educators are challenged to design learning environments that acknowledge and value students' diverse cultural backgrounds, identities, and ways of learning. According to Gay (2018), culturally responsive teaching involves using learners' cultural knowledge, prior experiences, frames of reference, and performance styles as meaningful resources for teaching and learning. Rather than viewing diversity as a challenge to overcome, culturally responsive educators recognize it as a valuable asset that enriches classroom interactions and enhances student engagement.

Within the field of language education, culturally responsive pedagogy extends beyond the incorporation of cultural content into instructional materials. It emphasizes recognizing learners' linguistic repertoires, identities, learning preferences, and social experiences as integral components of the learning process. This perspective aligns with sociocultural theories of language learning, which view language development as deeply embedded in social, cultural, and contextual practices. Consequently, language educators are encouraged to create learning opportunities that reflect learners' diverse backgrounds and provide multiple pathways for participation and achievement.

Building upon culturally responsive teaching, Paris and Alim (2017) introduced the concept of culturally sustaining pedagogy, which advocates not only for recognizing learners' cultural and linguistic diversity but also for actively sustaining and nurturing these practices within educational settings. Culturally sustaining pedagogy challenges deficit perspectives that privilege dominant cultural norms and instead promotes the maintenance of students' cultural identities while supporting academic success. In language classrooms, this approach encourages educators to adopt flexible instructional strategies that accommodate diverse learner characteristics and foster equitable access to learning opportunities.

The increasing integration of digital technologies in language education offers new possibilities for implementing culturally responsive practices. Technology-enhanced learning environments can provide personalized learning experiences, flexible access to instructional resources, and opportunities for learner autonomy. When thoughtfully implemented, digital tools can support culturally responsive language education by accommodating different learning preferences, communication styles, and levels of learner engagement. Therefore, examining the role of digital learning tools such as Grammarly and Web-Based Language Learning (WBLL) through the lens of culturally responsive pedagogy can provide valuable insights into how technology can contribute to more inclusive and learner-centered language instruction.

Digital Technologies and Grammar Learning

The integration of digital technologies has significantly transformed language teaching and learning practices, particularly in grammar instruction. Technology-enhanced learning environments provide learners with greater access to learning resources, immediate feedback, and opportunities for autonomous learning, making grammar instruction more interactive and learner-centered. As educational institutions increasingly adopt digital tools, researchers have emphasized their potential to support language development while accommodating diverse learner needs and preferences.

One of the most widely used digital tools in language learning is Grammarly, an artificial intelligence (AI)-powered writing assistant that provides automated feedback on grammar, punctuation, spelling, vocabulary usage, and writing style. According to Ghufroon and Rosyida (2018), Grammarly assists learners in identifying and correcting linguistic errors while encouraging self-monitoring and independent revision. By offering immediate and individualized feedback, Grammarly enables students to engage in reflective learning and develop greater awareness of grammatical structures. Previous studies have reported that the use of Grammarly contributes to improved writing accuracy, learner autonomy, and self-regulated learning practices, as students are encouraged to revise and evaluate their own work rather than relying solely on teacher feedback (Karyuatry et al., 2018; O'Neill & Russell, 2019). Furthermore, AI-assisted feedback can create a supportive learning environment that allows learners to experiment with language use and develop confidence in their grammatical competence.

Another important technological approach in language education is Web-Based Language Learning (WBLL). WBLL refers to the use of internet-based platforms and online resources to facilitate language learning through interactive, flexible, and learner-centered environments. Yusof and Saadon (2012) argue that WBLL provides learners with access to authentic language materials, multimedia resources, collaborative activities, and self-paced learning opportunities that are often unavailable in traditional classrooms. Through online exercises, discussion forums, instructional videos, and digital assessments, WBLL enables learners to engage with language content anytime and anywhere, thereby extending learning beyond classroom boundaries.

Moreover, WBLL supports the pedagogical shift from teacher-centered instruction toward learner-centered learning. In such environments, students assume greater responsibility for their learning processes by selecting resources, managing learning schedules, and monitoring their progress. This flexibility allows learners to engage with instructional materials according to their individual needs, preferences, and learning styles. Previous research has demonstrated that WBLL can enhance learner motivation, digital literacy, engagement, and language proficiency while fostering independent learning habits (Arteaga & Rodas, 2018; Hamamorad, 2016; Yusof & Saadon, 2012).

From a culturally responsive perspective, both Grammarly and WBLL offer opportunities to personalize learning experiences and accommodate learner diversity. The adaptability and accessibility of digital technologies can support students with different linguistic backgrounds, personality orientations, and learning preferences. Consequently, these technologies have the potential to contribute to more inclusive and equitable language-learning environments where learners can engage with grammar instruction in ways that align with their individual characteristics and educational needs.

Personality Orientation and Language Learning

Personality has long been recognized as an important individual difference factor influencing language learning processes and outcomes. Within the field of educational psychology and second language acquisition, personality traits are often associated with learners' preferences, behaviors, and strategies in various learning contexts. One of the most influential frameworks for understanding

personality was proposed by Jung (1971), who distinguished between two primary personality orientations: extroversion and introversion. Extroverted individuals tend to direct their attention toward the external world, seeking social interaction, active engagement, and stimulation from their surroundings. In contrast, introverted individuals are more likely to focus on their internal thoughts and reflections, preferring independent work, careful analysis, and less socially demanding learning environments.

In language learning contexts, extroverted learners are often characterized by their willingness to communicate, participate in classroom discussions, and take risks when using a second or foreign language. Their tendency to engage actively with peers and instructors may provide greater opportunities for language practice and interaction. Introverted learners, on the other hand, frequently demonstrate strengths in reflection, concentration, and analytical thinking. They may prefer to process information independently and engage in learning activities that allow sufficient time for contemplation and self-paced study. As a result, extrovert and introvert learners may approach language learning tasks differently, utilizing distinct strategies that reflect their personality orientations.

Previous studies have shown that personality orientation can influence various aspects of language learning, including learning strategies, classroom participation, communication behaviors, motivation, and technology use (Dewaele & Furnham, 2000; Hsain & Suliman, 2015; Zafar & Meenakshi, 2012). Extroverted learners generally benefit from collaborative and interactive learning environments, whereas introverted learners often perform well in structured settings that support independent learning and reflection. In technology-enhanced learning environments, these differences may also affect how learners engage with digital tools, online resources, and feedback mechanisms. For example, extroverted students may be more inclined to explore interactive features and collaborative activities, while introverted students may appreciate opportunities for self-paced learning and individualized feedback.

However, contemporary research cautions against viewing personality as a fixed predictor of academic success or language achievement. Personality traits do not determine learners' abilities; rather, they shape preferences and tendencies that interact with contextual, social, and instructional factors. From a culturally responsive perspective, personality should be understood as one dimension of learner diversity that contributes to the complexity of classroom experiences. Consequently, educators are encouraged to design flexible and inclusive learning environments that accommodate multiple learning preferences rather than privileging a single mode of participation or engagement. By recognizing personality differences as valuable aspects of learner diversity, teachers can create more equitable educational experiences that support the success of all learners regardless of their personality orientation.

METHODOLOGY

Research Design

This study employed a qualitative case study design to explore students' experiences of using Grammarly and Web-Based Language Learning (WBLL) in learning basic grammar within a culturally responsive language education

framework. A qualitative approach was considered appropriate because it enables researchers to investigate participants' perspectives, perceptions, and lived experiences in depth and within their natural educational context (Merriam & Tisdell, 2016). Rather than measuring the effectiveness of instructional technologies through statistical comparisons, this study sought to understand how learners with different personality orientations, namely extrovert and introvert students, engaged with digital learning tools and how these tools supported their grammar-learning processes.

The case study design was selected because it allows for a detailed examination of a contemporary educational phenomenon within its real-life setting (Yin, 2018). In this study, the phenomenon under investigation was the use of Grammarly and WBLL as technology-enhanced learning tools in basic grammar instruction. The research focused on understanding how students experienced these learning environments, how they interacted with digital feedback and online learning resources, and how their personality orientations influenced their learning experiences. Furthermore, the study examined how the integration of these technologies could contribute to culturally responsive language education by accommodating learner diversity, fostering learner autonomy, and creating inclusive learning opportunities.

By adopting a qualitative case study approach, the research aimed to generate rich descriptions and nuanced insights into students' learning experiences that may not be captured through quantitative measures alone. This approach also enabled the researcher to explore the complex relationships among technology use, learner characteristics, and culturally responsive teaching practices in contemporary language education.

Data Collection

Data were collected through multiple qualitative methods to obtain a comprehensive understanding of students' experiences using Grammarly and Web-Based Language Learning (WBLL) in learning basic grammar. The use of multiple data sources enabled methodological triangulation, thereby enhancing the credibility and trustworthiness of the findings (Creswell & Poth, 2018).

First, semi-structured interviews were conducted with selected participants representing both extrovert and introvert personality orientations. The interviews explored students' perceptions of Grammarly and WBLL, their learning experiences, challenges encountered during the learning process, and the ways in which digital technologies influenced their engagement with grammar learning. The semi-structured format allowed participants to elaborate on their experiences while providing flexibility for the researcher to probe emerging themes and insights.

Second, classroom observations were carried out during grammar-learning activities involving Grammarly and WBLL. The observations focused on students' participation, interaction patterns, engagement with digital learning tools, responses to feedback, and learning behaviors. Field notes were recorded throughout the observation process to capture contextual information and naturally occurring classroom interactions that could not be fully obtained through interviews alone.

Third, reflective learning journals were collected to gain insights into students' personal reflections on their learning experiences. Participants were invited to document their perceptions, feelings, challenges, and achievements while using Grammarly and WBLL throughout the instructional period. These reflective accounts provided valuable information regarding learners' self-awareness, learning preferences, and evolving attitudes toward technology-enhanced grammar instruction.

Finally, document analysis was conducted on students' grammar-learning artifacts, including writing assignments, revision drafts, online learning tasks, and feedback generated through Grammarly and WBLL platforms. These documents served as supplementary evidence that helped illustrate how students engaged with digital tools and applied grammatical knowledge during the learning process.

By combining interviews, observations, reflective journals, and document analysis, the study was able to develop a rich and holistic understanding of students' experiences and the role of digital technologies in supporting culturally responsive grammar instruction.

Data Analysis

The collected data were analyzed using the thematic analysis framework proposed by Braun and Clarke (2006). Thematic analysis was selected because it provides a flexible and systematic approach for identifying, analyzing, and interpreting patterns of meaning across qualitative data. This method enabled the researcher to explore students' experiences with Grammarly and Web-Based Language Learning (WBLL) and to examine how these technologies supported culturally responsive language learning practices.

The analysis followed six phases. First, the researcher engaged in data familiarization by repeatedly reading interview transcripts, observation notes, reflective journals, and learning artifacts to gain a comprehensive understanding of the data. During this stage, preliminary observations and initial impressions were recorded.

Second, initial coding was conducted by systematically identifying meaningful segments of data relevant to the research questions. Codes were assigned to participants' statements, observed behaviors, and written reflections that reflected their experiences, perceptions, and interactions with Grammarly and WBLL.

Third, the researcher proceeded to theme generation, in which related codes were grouped into broader categories representing recurring patterns across the dataset. These preliminary themes captured significant aspects of students' learning experiences, including learner autonomy, engagement, feedback utilization, learning preferences, and technology-mediated participation.

Fourth, the preliminary themes underwent theme review to ensure their consistency, coherence, and relevance to the research objectives. During this process, themes were refined, combined, or reorganized based on their relationships and supporting evidence from multiple data sources.

Fifth, theme definition and naming were carried out by clearly specifying the scope and meaning of each theme. The researcher developed detailed descriptions

of the themes and examined how they contributed to understanding the role of Grammarly and WBLL in supporting culturally responsive grammar instruction.

Finally, the findings were presented through report writing, in which themes were interpreted and discussed in relation to existing literature on culturally responsive pedagogy, digital language learning, learner diversity, and personality orientation. Representative excerpts from interviews, reflective journals, and observational data were incorporated to illustrate and support the identified themes.

To ensure the trustworthiness of the study, several validation strategies were employed. Methodological triangulation was achieved by comparing data obtained from interviews, classroom observations, reflective journals, and document analysis. Member checking was conducted by inviting participants to review and verify the accuracy of the researchers' interpretations of their experiences. In addition, peer debriefing was employed through discussions with fellow researchers and academic colleagues to enhance analytical rigor, minimize researcher bias, and strengthen the credibility of the findings. These procedures contributed to the dependability, credibility, and confirmability of the study (Lincoln & Guba, 1985).

FINDINGS AND DISCUSSION

Grammarly Promoted Exploratory Learning Among Extrovert Students

Analysis of the interview data, classroom observations, reflective journals, and learning artifacts revealed that Grammarly fostered exploratory learning among students with extrovert personality orientations. Participants frequently described Grammarly as an engaging and interactive learning tool that encouraged them to experiment with language structures, revise their writing, and actively participate in the learning process. The immediate feedback provided by Grammarly enabled students to identify grammatical errors, evaluate alternative language choices, and independently refine their written work. Rather than relying solely on teacher correction, students were able to interact directly with the feedback system and make informed decisions about language use.

Several extrovert participants reported that Grammarly created a supportive environment for experimentation because mistakes were treated as opportunities for learning rather than indicators of failure. One participant explained that the instant feedback motivated them to try different sentence constructions and vocabulary choices without fear of being judged by peers or instructors. This finding suggests that the technology encouraged learners to take ownership of their learning process and engage more actively with grammatical concepts.

Classroom observations further indicated that extrovert students tended to explore Grammarly's features extensively, including grammar suggestions, vocabulary recommendations, and writing style feedback. They frequently discussed their revisions with classmates and demonstrated enthusiasm when comparing alternative language choices. Such behaviors reflected characteristics commonly associated with extrovert learners, including sociability, curiosity, and willingness to engage in trial-and-error learning experiences.

The findings also suggest that Grammarly contributed to increased learner confidence. Participants reported feeling more comfortable producing written

English because the system provided immediate guidance and support throughout the writing process. As students became more familiar with the feedback mechanisms, they demonstrated greater willingness to take risks in language production, experiment with more complex grammatical structures, and express their ideas more freely. This increased confidence appeared to reduce anxiety associated with grammatical accuracy and encouraged students to focus on communication and meaning-making.

From a culturally responsive perspective, Grammarly supported learner agency by allowing students to engage with language learning according to their individual preferences and learning styles. Rather than imposing a uniform learning pathway, the technology enabled learners to explore, revise, and learn at their own pace. This flexibility aligns with the principles of culturally responsive pedagogy, which emphasize recognizing learner diversity and creating learning environments that build upon students' strengths and preferred ways of learning (Gay, 2018). For extrovert learners in particular, Grammarly provided opportunities for active engagement, self-expression, and exploratory learning that enhanced their participation in grammar instruction.

Introvert Students Preferred Structured Learning Pathways

The findings revealed that students with introvert personality orientations demonstrated a strong preference for structured and self-paced learning environments. Data obtained from interviews, classroom observations, reflective journals, and learning artifacts indicated that Web-Based Language Learning (WBLL) provided learning conditions that aligned closely with the characteristics and preferences of introvert learners. Participants frequently described WBLL as a supportive platform that enabled them to access learning materials repeatedly, review grammar explanations independently, and complete learning tasks at a pace that suited their individual needs.

Many introvert participants emphasized that the availability of online resources and asynchronous learning opportunities allowed them to engage more deeply with grammar content. Unlike traditional classroom settings that often require immediate responses and active verbal participation, WBLL provided learners with sufficient time to process information, reflect on grammatical concepts, and carefully construct their responses. One participant noted that being able to revisit instructional materials multiple times enhanced their understanding and reduced the anxiety associated with missing important information during classroom instruction.

Classroom observations further demonstrated that introvert students tended to engage quietly but consistently with online learning activities. They frequently reviewed grammar explanations, completed exercises independently, and revisited feedback before submitting their work. Reflective journals revealed that students appreciated the flexibility of WBLL because it allowed them to learn without the social pressures that sometimes accompany face-to-face classroom interactions. Several participants reported feeling more comfortable asking questions through online platforms and exploring learning resources independently than speaking publicly during classroom discussions.

Another significant finding was the role of WBLL in reducing classroom pressure and facilitating concentration. Participants reported that online learning environments minimized distractions and provided a sense of psychological comfort that supported sustained attention and deeper engagement with learning tasks. The ability to control the pace of learning enabled students to focus on understanding grammatical structures rather than keeping up with the speed of classroom instruction. As a result, learners perceived WBLL as a learning environment that respected their individual learning preferences and promoted meaningful engagement with course content.

From a culturally responsive perspective, these findings highlight the importance of recognizing diverse learner characteristics and providing multiple pathways for participation and achievement. Culturally responsive pedagogy emphasizes the need to accommodate different ways of learning rather than privileging a single mode of engagement (Gay, 2018). In this study, WBLL created an inclusive learning environment by supporting learners who preferred reflection, independence, and self-regulated learning. The flexibility and accessibility of the platform allowed introvert students to participate in grammar learning in ways that aligned with their strengths and learning preferences. Consequently, WBLL can be viewed as a valuable tool for fostering equitable learning opportunities and promoting learner-centered language education that acknowledges and responds to individual differences among students.

Digital Feedback Fostered Learner Autonomy

A prominent theme emerging from the data was the role of digital feedback in fostering learner autonomy. Analysis of interviews, classroom observations, reflective journals, and students' learning artifacts revealed that both Grammarly and Web-Based Language Learning (WBLL) encouraged students to take greater responsibility for their learning processes. Participants consistently reported that access to immediate feedback, online resources, and self-paced learning opportunities reduced their dependence on teacher guidance and enabled them to monitor their own progress more effectively.

Students described Grammarly as a valuable tool for self-correction and independent learning. The automated feedback provided clear explanations of grammatical errors, allowing learners to identify mistakes, revise their writing, and evaluate alternative language choices without waiting for teacher intervention. Several participants explained that the instant nature of the feedback encouraged them to review their work critically and develop greater awareness of grammatical patterns. As a result, students became more actively involved in the revision process and demonstrated increased confidence in making independent learning decisions.

Similarly, WBLL contributed to the development of learner autonomy by providing continuous access to learning materials, practice exercises, and instructional resources. Participants reported that the flexibility of the online learning environment enabled them to determine when, where, and how they engaged with grammar-learning activities. Many students appreciated the opportunity to revisit instructional content, repeat exercises, and review feedback multiple times until they felt confident in their understanding. This level of control

over the learning process encouraged self-regulation and promoted a sense of ownership of learning.

Reflective journals further indicated that students gradually shifted from viewing teachers as the sole source of knowledge to perceiving themselves as active participants in constructing their own learning. Several participants noted that digital tools motivated them to identify their strengths and weaknesses independently and to seek additional resources when needed. This increased self-awareness contributed to the development of metacognitive skills, including self-monitoring, self-assessment, and goal setting, which are essential components of autonomous learning.

From a culturally responsive perspective, the promotion of learner autonomy aligns closely with the goal of empowering students as active agents in their educational journeys. Culturally responsive pedagogy encourages instructional practices that recognize learners' voices, experiences, and capacities for self-directed learning (Gay, 2018). By providing personalized feedback and flexible learning opportunities, Grammarly and WBLL enabled students to engage with grammar instruction according to their individual needs, preferences, and learning styles. Such opportunities supported equitable participation and encouraged learners to develop the confidence and independence necessary for lifelong learning.

These findings suggest that digital feedback systems can play a significant role in fostering learner autonomy in language education. Rather than replacing teachers, technologies such as Grammarly and WBLL function as supportive learning tools that encourage reflection, self-regulation, and independent knowledge construction. Consequently, the integration of digital feedback into grammar instruction may contribute to more learner-centered and culturally responsive educational practices.

Technology Enhanced Inclusivity in Grammar Learning

The findings indicate that both Grammarly and Web-Based Language Learning (WBLL) contributed to the creation of more inclusive grammar-learning environments by providing multiple pathways for learner engagement. Across interviews, classroom observations, reflective journals, and document analysis, participants reported that the flexibility offered by these digital technologies enabled them to interact with grammar content in ways that aligned with their individual preferences, learning styles, and personality orientations. Rather than imposing a single instructional approach, the technologies allowed students to engage with learning activities through various modes, including self-paced practice, automated feedback, independent exploration, and repeated access to instructional materials.

Students highlighted that the availability of diverse learning options made grammar instruction more accessible and less intimidating. Extrovert learners appreciated opportunities to experiment with language, explore feedback interactively, and discuss their learning experiences with peers. In contrast, introvert learners valued the ability to study independently, review materials repeatedly, and complete tasks in a less socially demanding environment. These findings suggest that technology-mediated learning environments can accommodate diverse learner characteristics by offering flexible pathways that support different approaches to learning.

Classroom observations further revealed that students engaged with Grammarly and WBLL in highly individualized ways. Some learners actively explored advanced features and sought immediate feedback to improve their writing, while others preferred to spend time reviewing grammar explanations and practicing exercises independently. This variation in learning behavior demonstrates how digital technologies can support differentiated learning experiences without requiring separate instructional materials for each learner group. Consequently, students were able to participate in grammar learning according to their strengths, preferences, and levels of confidence.

Reflective journals also indicated that participants perceived the learning environment as more inclusive because they were not expected to conform to a single mode of participation. Several students reported that technology reduced barriers to engagement by allowing them to learn at their own pace and according to their personal learning needs. This flexibility was particularly important for students who might feel disadvantaged in traditional classroom settings due to differences in personality, communication style, or learning preferences.

From a culturally responsive perspective, these findings underscore the potential of digital technologies to support equitable and inclusive educational practices. Culturally responsive pedagogy advocates for learning environments that recognize and value learner diversity while providing meaningful opportunities for all students to succeed (Gay, 2018). By offering multiple pathways for engagement, Grammarly and WBLL enabled learners to access grammar instruction in ways that respected their individual identities and preferences. Such flexibility aligns with culturally responsive principles that emphasize learner-centered instruction, inclusivity, and responsiveness to diverse educational needs.

Furthermore, the findings support the notion that inclusivity in language education extends beyond cultural and linguistic representation to include responsiveness to individual differences in learning. Technology-enhanced learning environments can contribute to this goal by providing adaptable and personalized learning experiences that empower students to participate meaningfully in the learning process. Therefore, the integration of digital tools such as Grammarly and WBLL can be viewed as a practical strategy for promoting culturally responsive and inclusive grammar instruction in contemporary language education.

Discussion

The findings of this study demonstrate that culturally responsive language education extends beyond the incorporation of cultural content into curriculum materials. Instead, it encompasses the recognition and accommodation of diverse learner characteristics, including personality orientations, learning preferences, and individual approaches to knowledge construction. In the context of grammar instruction, the findings suggest that digital technologies such as Grammarly and Web-Based Language Learning (WBLL) can serve as valuable pedagogical tools for creating inclusive learning environments that respond to learner diversity and promote equitable participation.

A key finding of the study is that Grammarly and WBLL supported learners in different yet complementary ways. Grammarly appeared particularly beneficial for extrovert learners, who valued opportunities for active exploration, experimentation,

and immediate interaction with feedback. The automated feedback system enabled students to test language choices, revise their work independently, and engage actively in the learning process. These findings are consistent with previous research suggesting that extroverted learners tend to benefit from interactive learning experiences that encourage participation, risk-taking, and engagement with external stimuli (Dewaele & Furnham, 2000; Hsain & Suliman, 2015). Through immediate feedback and opportunities for self-expression, Grammarly created a learning environment that aligned with extrovert learners' preferences for exploration and active involvement.

In contrast, WBLL appeared particularly supportive of introvert learners. Participants with introvert personality orientations appreciated the structured and self-paced nature of web-based learning environments, which enabled them to engage deeply with instructional materials and revisit content as needed. The flexibility of WBLL reduced the pressure often associated with immediate classroom participation and provided learners with opportunities for reflection and independent study. This finding supports earlier studies suggesting that introvert learners often perform effectively in learning environments that promote concentration, autonomy, and thoughtful engagement with content (Zafar & Meenakshi, 2012). Consequently, WBLL served as an instructional medium that accommodated learners who preferred reflective and systematic approaches to learning.

These findings align closely with Gay's (2018) conceptualization of culturally responsive teaching, which emphasizes building instruction upon learners' strengths, experiences, and preferred ways of learning rather than imposing uniform instructional approaches. From this perspective, culturally responsive language education requires educators to recognize that learners may engage with educational content differently and that these differences should be viewed as resources rather than obstacles. The results of this study suggest that digital technologies can facilitate this responsiveness by offering flexible learning opportunities that accommodate diverse learner needs.

The findings also support Hammond's (2015) assertion that learner-centered environments promote deeper cognitive engagement and more meaningful learning experiences. Both Grammarly and WBLL enabled students to assume greater responsibility for their learning by providing immediate feedback, flexible access to resources, and opportunities for self-regulated learning. As students interacted with grammar content according to their individual preferences and learning styles, they became more actively engaged in the learning process. This increased engagement contributed not only to the development of grammatical competence but also to the cultivation of learner autonomy and confidence.

Another important contribution of this study is its challenge to simplistic binary interpretations of personality in language learning. Although extrovert and introvert learners demonstrated different preferences in their use of Grammarly and WBLL, the findings do not suggest that one personality type is inherently superior to the other. Rather, both groups benefited from learning environments that aligned with their individual characteristics and learning preferences. This perspective is consistent with contemporary views of learner diversity, which emphasize the dynamic and context-dependent nature of individual differences. Personality should

therefore be understood as one aspect of learner diversity that educators need to consider when designing inclusive instructional practices.

Furthermore, the findings contribute to ongoing discussions regarding the role of technology in promoting educational equity and inclusion. Digital technologies are often evaluated primarily in terms of learning outcomes or technical effectiveness. However, the present study suggests that their value also lies in their capacity to provide multiple pathways for participation and engagement. By allowing learners to access content, receive feedback, and interact with instructional materials in diverse ways, technologies such as Grammarly and WBLL can support more inclusive and culturally responsive learning environments. This flexibility is particularly important in higher education contexts, where student populations are increasingly diverse in terms of cultural backgrounds, learning preferences, and educational experiences.

Overall, the findings indicate that culturally responsive language education should move beyond standardized instructional models and embrace pedagogical approaches that recognize learner diversity as a fundamental component of effective teaching and learning. The integration of digital technologies offers promising opportunities for achieving this goal by supporting personalized, flexible, and learner-centered educational experiences. Consequently, language educators are encouraged to adopt technology-enhanced instructional practices that not only improve linguistic outcomes but also foster inclusivity, learner agency, and equitable participation in the learning process.

CONCLUSION

This study explored the use of Grammarly and Web-Based Language Learning (WBLL) in basic grammar instruction through the lens of culturally responsive language education. By adopting a qualitative case study approach, the research examined how students with different personality orientations, namely extrovert and introvert learners, experienced technology-enhanced learning environments and how these technologies contributed to more inclusive and learner-centered educational practices. The findings demonstrate that digital technologies can play a significant role in supporting culturally responsive pedagogy by accommodating learner diversity, promoting learner autonomy, and providing multiple pathways for engagement with grammar learning.

The study revealed that Grammarly supported exploratory learning, active engagement, and self-expression among extrovert learners. The immediate and individualized feedback provided by the platform encouraged experimentation with language, increased learners' confidence, and enabled them to take greater ownership of the writing process. In contrast, WBLL was found to be particularly beneficial for introvert learners, who valued structured learning experiences, opportunities for reflection, and the flexibility to engage with learning materials at their own pace. These findings suggest that different digital tools may support different learner preferences, highlighting the importance of offering varied instructional approaches within technology-enhanced learning environments.

Another important finding is that both Grammarly and WBLL fostered learner autonomy by encouraging students to monitor their own progress, engage in self-directed learning, and become less dependent on teacher intervention.

Furthermore, the technologies contributed to more inclusive grammar-learning environments by allowing students to interact with instructional content in ways that aligned with their individual characteristics, learning preferences, and personality orientations. Such flexibility reflects the core principles of culturally responsive pedagogy, which emphasize responsiveness to learner diversity and equitable access to meaningful learning opportunities.

The findings also underscore the need to broaden contemporary understandings of culturally responsive language education. While discussions of culturally responsive pedagogy often focus on cultural and linguistic representation, this study highlights the importance of recognizing diversity in learning preferences, participation styles, and personality orientations. Effective language instruction should therefore move beyond standardized teaching approaches and embrace pedagogical practices that accommodate multiple ways of learning and knowing. In this regard, digital technologies offer promising opportunities to create more adaptive, inclusive, and learner-centered educational environments.

Despite its contributions, this study is limited to a specific educational context and participant group. Therefore, caution should be exercised when generalizing the findings to other settings. Future research may investigate the implementation of culturally responsive technology-enhanced learning across different educational levels, disciplines, and cultural contexts. Further studies may also explore the experiences of learners with other individual characteristics, such as learning styles, motivation, digital literacy, or linguistic backgrounds, to develop a more comprehensive understanding of how technology can support equitable and inclusive language education. Through such efforts, researchers and educators can continue to rethink and refine culturally responsive approaches to literature and language education in an increasingly digital world.

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