

Research Article

Utilization, Challenges, And Opportunities Of AI-Driven English Language Development Software of Language Teachers

Joemar P. Antonio

Philippine Christian University

Abstract:

This study examines how English language teachers in private higher education institutions in Naga City, Philippines, utilize AI-driven English language development software, identifying attendant challenges and opportunities. Design/methodology/approach: A qualitative design, employing online focus group discussions with ten full-time English instructors from five institutions, was employed. Semi-structured prompts explored utilization (assessment, content, teaching strategies) and perceived impacts on teaching efficacy, effectiveness, methodology, and techniques. Transcripts were coded and analyzed using reflexive thematic analysis. Findings: Four themes emerged. (1) AI-driven assessment and feedback act as catalysts for learner autonomy by providing immediate, formative insights and progress analytics. (2) Personalized and multimodal content delivery supports inclusivity and engagement through adaptive tasks and rich media. (3) Limited institutional support, training, infrastructure, and policy undermine teaching efficacy and constrain sustained use. (4) Innovation and flexibility represent opportunities, with AI prompting reflective practice, blended learning, and gamified, student-centered pedagogy. Practical implications: The results suggest that effective AI integration requires coordinated investments in faculty development, infrastructure, and curriculum alignment with ethical and learner-centered principles. Originality/value: The study offers localized evidence from the Bicol region and integrates TAM, AIDT, and CALL perspectives to explain technology acceptance and pedagogical adaptation in AI-mediated English instruction. Findings inform policy and educator training.

Keywords: artificial intelligence; English language teaching; assessment and feedback; teacher efficacy; Philippines.

1. Introduction

The emergence of Artificial Intelligence (AI) has transformed the educational landscape worldwide, particularly in language instruction, where digital tools are redefining teaching and learning dynamics. The integration of AI in education is recognized for enhancing efficiency, personalization, and learner engagement (Singh Gill et al., 2024; Yasin & Safdar, 2025). In English language education, AI technologies, such as intelligent tutoring systems, chatbots, adaptive assessments, and natural language processing, support teachers in creating interactive and data-driven learning environments (Okaria, Ali, & Putra, 2023). As global education shifts toward technologically enhanced instruction, AI's potential to complement pedagogy and streamline instructional delivery becomes an essential focus of inquiry.

Within the Philippine educational context, the utilization of AI in teaching remains at an early stage of adoption, especially among English language educators. The Commission on Higher Education (CHED) encourages institutions to integrate emerging technologies to strengthen teaching innovation and learning quality. However, despite this policy direction, many teachers still face challenges in adapting to AI tools due to limited access, insufficient training, and ethical uncertainties (Funa & Gabay, 2025). Language instruction, in particular, demands not only linguistic proficiency but also pedagogical adaptability to emerging technologies—a demand many teachers find difficult to meet without proper support.

The English language proficiency of Filipino learners has shown a gradual decline in recent years, attributed to multiple factors, including limited exposure to authentic English use, ineffective teaching strategies, and learners' affective filters (Fontillas et al., 2022; Ramos & Gatcho, 2020). Following the pandemic, the integration of AI-driven language platforms has been proposed as a means to rebuild confidence in language learning and provide adaptive remediation for learners (Agbayani, 2022). Yet, while these tools offer convenience and accessibility, their pedagogical implications for teachers' professional performance and student learning outcomes remain underexamined.

Studies highlight both the opportunities and challenges of AI in education. Research has shown that AI technologies can enhance instructional efficiency, personalize learning paths, and improve feedback mechanisms (Liu et al., 2022; Firdaus & Nawaz, 2024). However, issues such as technological bias, limited teacher readiness, and pedagogical misalignment hinder effective implementation (Asri, 2024; Idris, 2024). The existing literature primarily addresses AI's technical and ethical aspects, but provides limited empirical evidence on how language teachers utilize AI-driven tools for teaching, performance improvement, and instructional design.

Moreover, the application of AI in English language teaching is often confined to theoretical or system-based evaluations rather than examining teachers' lived experiences and self-assessed competencies (Doty & Lipien, 2024). While computer-assisted

language learning (CALL) and mobile-assisted language learning (MALL) have been widely studied (Kacatl & Klímová, 2019; Su & Zou, 2022), AI-driven English language development software, which automates writing, grammar feedback, and pronunciation training, remains an underexplored frontier in the Philippine higher education context. This lack of localized research underscores the need to examine how teachers utilize such software and perceive its impact on pedagogy.

International studies have underscored the need for frameworks that explain the relationship between AI adoption and teaching performance. The Technology Acceptance Model (TAM) posits that teachers' acceptance of technology depends on its perceived usefulness and ease of use (Marikyan & Papagiannidis, 2024). Complementing this is the AI-Driven Digital Transformation (AIDT) model, which emphasizes readiness, piloting, and scaling phases in educational technology integration (Taherizadeh & Beaudry, 2023). Together, these frameworks highlight the cognitive and organizational factors influencing teachers' willingness to integrate AI into instruction, which is central to the present study.

Additionally, Computer-Assisted Language Learning (CALL) theory provides the pedagogical foundation for understanding how AI tools facilitate language acquisition through interaction, collaboration, and feedback (Akayoglu, 2019). CALL aligns with Social Constructivism and Sociocultural Theory, suggesting that digital learning environments can scaffold linguistic competence through authentic engagement and communicative tasks. Applying these frameworks enables a multidimensional exploration of how AI-driven English language development software supports or challenges teachers' pedagogical approaches.

Despite the abundance of literature on technology-enhanced learning, a research gap persists regarding how language teachers in the Bicol region of the Philippines utilize AI-driven software for English language development. No known studies have yet examined its pedagogical, methodological, and performance-related implications within this localized context. The absence of empirical evidence limits institutional policymaking and teacher training initiatives that could optimize the integration of AI in language education. Hence, this study bridges this gap by evaluating the utilization, challenges, and opportunities experienced by English language teachers in selected private higher education institutions in Naga City, Camarines Sur.

This research is guided by the following key questions: (1) How is AI-driven English language development software utilized in classrooms along with assessment, content, and teaching strategies? (2) What are the challenges and opportunities faced by language teachers in terms of teaching efficacy, effectiveness, methodology, and techniques? These questions align with the frameworks of TAM, AIDT, and CALL to comprehensively evaluate technology acceptance, pedagogical adaptation, and instructional innovation. Overall, this study aims to contribute to the growing body of knowledge on AI integration in language education by providing an empirical basis for developing contextualized computer-assisted learning materials. By capturing teachers' utilization patterns, perceived challenges, and opportunities, the research aspires to enhance professional practice and inform institutional policies for sustainable AI-driven pedagogy. Ultimately, the study highlights that while technology can enhance language instruction, its true value lies in empowering educators to utilize it as a tool for reflective, ethical, and learner-centered teaching.

2. Methodology

2.1 Research Design

This study employed a qualitative research design, which is appropriate for exploring experiences, perceptions, and meanings in a natural context. Qualitative inquiry enables researchers to investigate the “*what*,” “*how*,” and “*why*” of particular phenomena, uncovering complex human experiences (Creswell & Poth, 2018). According to Berk et al. (2023), qualitative research yields rich, descriptive data that supports evidence-based decision-making by identifying underlying patterns and contextual insights rather than quantifiable trends.

In this study, Focus Group Discussions (FGDs) were conducted with English instructors from private higher education institutions in Naga City, Camarines Sur. The FGDs aimed to gather detailed narratives about the teachers' utilization of AI-driven English language development software and their perceived challenges and opportunities in teaching. This approach allowed for the generation of an in-depth and contextualized understanding of how AI integration influences classroom practices (Merriam & Tisdell, 2016).

2.2 Research Instrument

2.2.1 Research Questions

The research instrument consisted of semi-structured, open-ended questions organized into two major parts. The first part focused on evaluating how language teachers utilized AI-driven software in their classes, particularly in assessment, content delivery, and teaching strategies. The second part explored teachers' self-assessment of their teaching efficacy, effectiveness, methodology, and techniques.

The questions were validated by three language experts—(a) a senior English instructor, (b) a department head of an English program, and (c) an experienced lecturer trained under the Commission on Higher Education (CHED) for teaching *Purposive Communication*. Expert validation ensured content clarity, relevance, and alignment with the study's objectives (McMillan & Schumacher, 2014).

2.2.2 Focus Group Discussion

The Focus Group Discussion (FGD) served as the primary data-gathering technique. It involved a small group discussion conducted online with 10 participants from five (5) private colleges and universities. The FGD format was selected because it fosters interaction among participants, leading to deeper insights and shared perspectives (Krueger & Casey, 2015). A semi-structured guide allowed the researcher to ask follow-up questions for elaboration, ensuring that emergent themes could be captured and clarified during the discussion.

2.3 Population, Sample, and Sampling Technique

The study was conducted among faculty members from five major private higher education institutions in Naga City: University of Nueva Caceres, Naga College Foundation Inc., Ateneo de Naga University, Mariners Polytechnic Colleges, and University of Saint Isabel de Naga, Inc. Two participants from each institution were selected using purposive sampling, a non-probability method commonly employed in qualitative research to select information-rich cases (Patton, 2015).

The selection criteria were as follows:

- a) The participant must be a full-time English instructor in the institution;
- b) The participant must have at least two (2) years of teaching experience in the said institution to ensure familiarity with instructional practices and institutional policies; and
- c) The participant must have handled at least one (1) Purposive Communication course within the past two years, ensuring exposure to AI-assisted teaching tools in language instruction.

This sampling strategy ensured that the selected participants could provide substantial and reflective insights into the use of AI in language teaching.

2.4 Data Gathering Procedure

Before the data collection, the researcher obtained permission from the participating institutions by sending a formal letter of request to their respective offices. Once approval was granted, schedules were arranged for the online FGDs. Participants received the Zoom meeting link, the informed consent form, and a copy of the discussion guide ahead of the session.

Each FGD lasted approximately 30 minutes, conducted in an interactive and respectful manner. Participants were informed of the confidentiality of their responses, and permission was sought to record the discussion. The recorded sessions were transcribed verbatim immediately after each discussion. Following transcription, the researcher performed initial coding to categorize responses and identify recurring themes, a procedure consistent with qualitative research practices (Braun & Clarke, 2019).

2.5 Data Analysis

2.5.1 Coding

Coding refers to the systematic process of labeling data segments to categorize and organize ideas, concepts, or experiences emerging from the participants' responses (Saldaña, 2021). The researcher employed open coding, allowing themes to emerge inductively from the data without pre-imposed categories. Each transcript was carefully reviewed to identify key words, phrases, and concepts relevant to the study objectives.

2.5.2 Thematic Analysis

Thematic analysis was used to identify, analyze, and interpret patterns of meaning from the transcribed FGDs. Following Braun and Clarke's (2006) six-phase model: familiarization, coding, theme development, review, definition, and reporting, the researcher systematically analyzed the data to construct themes related to the utilization, challenges, and opportunities of AI-driven language software. Thematic analysis provided flexibility in exploring participants' experiences while maintaining methodological rigor through transparency and reflexivity.

3. Results and Discussion

Theme 1: AI-Driven Assessment and Feedback as Catalysts for Learner Autonomy

The study revealed that college English teachers in private higher education institutions utilize AI-driven software primarily for formative assessment and immediate feedback. Teachers described how automated correction systems and analytics help students identify language errors in real-time, promoting learner autonomy and self-regulation. This immediacy in feedback eliminates traditional delays in evaluation, enhancing motivation and accountability among students.

One participant noted, *"As soon as students finish their writing tasks, the software highlights their errors and even suggests corrections. It helps them see their mistakes immediately without waiting for me to return their papers."* This reflection aligns with the findings of McPherson and Schubert (2021), who emphasized that AI-assisted assessment tools foster real-time learning cycles that improve writing proficiency and engagement.

Furthermore, AI analytics were reported to assist teachers in tracking learners' progress, identifying common grammatical

weaknesses, and customizing remediation activities. Huang (2023) also observed that data-driven assessment contributes to culturally inclusive pedagogy by accommodating diverse linguistic backgrounds. These results demonstrate that AI transforms assessment into a continuous and personalized process, thereby supporting both efficiency and pedagogical responsiveness.

However, participants emphasized that AI should complement, rather than replace, human evaluation. Teachers continued to be critical of the software's limitations in assessing the creative, pragmatic, and contextual aspects of language use. This hybrid approach, which merges machine precision with human judgment, reflects the balanced assessment framework advocated by Frank (2023), underscoring the indispensability of teacher discretion in culturally nuanced evaluations.

Theme 2: Personalized and Multimodal Content Delivery Through AI

Teachers consistently emphasized how AI tools personalize and diversify language content, making instruction more adaptive and multimodal. The AI software used in their classes was capable of adjusting reading passages, vocabulary tasks, and grammar drills based on individual learner proficiency levels. This personalization was seen to enhance inclusivity and engagement by ensuring that both advanced and struggling students received tasks at their respective levels of proficiency.

A respondent explained, *"The program adjusts the reading passages and practice exercises based on each student's performance, so weaker students don't feel left behind while advanced learners are still challenged."* This statement reflects Du and Leung's (2021) assertion that adaptive digital content ensures equitable learning by aligning instructional materials with learner diversity.

Additionally, the integration of text, visuals, audio, and interactive simulations was noted to sustain attention and reinforce comprehension—an approach consistent with Tan (2022), who found that multimodal AI environments promote better retention and reflective learning. Teachers viewed this capacity of AI to merge visual and auditory inputs as a pedagogical innovation that redefines classroom engagement.

Collectively, these findings highlight that AI not only personalizes content but also enhances multimodal engagement, aligning instruction with multiple learning styles. Such adaptive content delivery supports inclusive education and reflects global trends in learner-centered pedagogy (Gao, 2024; Zhang, 2025).

Theme 3: Limited Institutional Support Undermines Teaching Efficacy

While teachers acknowledged AI's instructional benefits, limited institutional support and insufficient professional training emerged as critical challenges. Several participants expressed frustration over the lack of workshops, technical infrastructure, and administrative encouragement for sustained AI integration. These constraints reduced their confidence in effectively using AI-driven tools.

One participant shared, *"I want to use the software more effectively, but the lack of training makes me unsure if I'm doing it right."* This sentiment echoes Darling-Hammond's (2017) argument that teacher efficacy is strongly mediated by systemic and institutional support rather than individual motivation alone. Similarly, Ford (2020) and Zhang (2025) emphasized that without adequate institutional investment, even technologically adept teachers struggle to sustain innovative practices.

Thus, the findings indicate that teaching efficacy in AI-enhanced classrooms depends not only on individual adaptability but also on organizational readiness. Institutional backing—in terms of infrastructure, capacity-building, and leadership—serves as the foundation for translating AI's potential into pedagogical effectiveness. Teachers' perceived competence and willingness to innovate increase significantly when they are provided with both material and moral support (Wong & Yung, 2021; Li, 2023).

Theme 4: Innovation and Flexibility as Opportunities for Pedagogical Growth

Despite challenges, teachers identified innovation and flexibility as major opportunities that emerged from the integration of AI. Many described how exposure to new technologies pushed them to rethink lesson design, adopt student-centered approaches, and experiment with interactive techniques such as gamification, flipped learning, and AI-supported feedback.

A teacher reflected, *"We are challenged to innovate because students get bored with repetitive methods; they want new and creative ways to learn."* This reinforces the findings of Rahman and Singh (2021) and Nguyen (2024), who asserted that innovation and flexibility are core competencies for teachers in technology-rich environments. By experimenting with new methods, teachers not only sustain engagement but also cultivate resilience and continuous improvement.

Furthermore, AI integration fosters reflective teaching, as educators analyze performance analytics and adjust strategies accordingly. Huang (2023) highlighted that reflective practices linked to digital feedback loops strengthen adaptability and professional growth. This indicates that innovation is not merely a byproduct of AI use but a deliberate pedagogical response to evolving learner needs.

Ultimately, these findings reveal that AI integration, while initially challenging, stimulates a culture of continuous professional learning and creative pedagogical transformation. Teachers who embrace innovation view technology not as a threat but as a catalyst for enhancing engagement, inclusivity, and lifelong learning (Taylor, 2022; Liu, 2024).

4. Conclusions and Recommendations

The findings of this study affirm that AI-driven English language development software is transforming the pedagogy of language

teaching in higher education. Teachers in private higher education institutions in Naga City have begun to adopt AI tools primarily for formative assessment, personalized content delivery, and multimodal instruction. The integration of automated feedback systems promotes learner autonomy, while adaptive platforms support inclusivity by providing differentiated materials. These results substantiate earlier works by McPherson and Schubert (2021) and Tan (2022), who demonstrated that AI integration leads to more learner-centered, responsive, and data-driven instruction.

However, the research also revealed persistent institutional and professional challenges that undermine teachers' efficacy and the sustainability of AI integration. Limited training opportunities, inadequate digital infrastructure, and inconsistent administrative support were found to hinder teachers' confidence and readiness to maximize AI tools. Consistent with Darling-Hammond (2017) and Ford (2020), this study confirms that systemic readiness is as critical as teacher adaptability in realizing the pedagogical potential of AI. Without structured institutional investment, AI adoption risks being fragmented and unsustainable.

Despite these barriers, AI integration presents opportunities for innovation, flexibility, and reflective practice. Teachers' exposure to emerging technologies encouraged the rethinking of classroom methodologies, experimentation with interactive and gamified learning, and enhanced responsiveness to diverse learner needs. This aligns with the findings of Rahman and Singh (2021) and Nguyen (2024), who stressed that innovation-oriented teaching promotes adaptability and resilience in rapidly evolving educational settings. The results thus highlight that technological integration is not merely a technical transition but a transformative pedagogical process that redefines teacher roles and learning experiences.

Overall, the study concludes that the successful utilization of AI in English language teaching depends on the interplay of three key factors—technological competence, institutional support, and pedagogical innovation. When these elements co-exist, AI-driven instruction becomes a powerful catalyst for professional growth and student engagement. The findings contribute to the growing discourse on AI-enhanced language education, particularly within the Philippine higher education context, by underscoring the need for both technological and human-centered approaches to sustainable AI integration.

Based on the study's findings, several recommendations are proposed. First, higher education institutions should institutionalize continuous professional development programs that focus on AI literacy, ethical use of educational technology, and pedagogical alignment with digital tools. Workshops, mentoring programs, and peer learning communities may enhance teacher readiness and confidence, ensuring that technology complements rather than replaces traditional pedagogical expertise.

Second, administrators should strengthen institutional infrastructure and policy support for the integration of AI. This includes providing access to licensed AI platforms, stable internet connectivity, and technical assistance teams. As Ford (2020) and Wong and Yung (2021) suggested, sustainable innovation requires systemic backing that empowers teachers to explore, adapt, and innovate within a supportive environment.

Third, curriculum designers and policymakers should promote adaptive and inclusive AI frameworks aligned with national education goals and CHED directives. Integrating AI-based modules within English language courses, especially Purposive Communication, will ensure alignment between digital literacy and communicative competence. Collaboration between HEIs and software developers may also help localize AI platforms to the linguistic and cultural contexts of Filipino learners.

Finally, future research should expand on this study by exploring longitudinal and quantitative dimensions of AI integration to assess its long-term effects on learning outcomes, teacher development, and institutional innovation. Comparative studies between public and private higher education institutions in the Philippines can further contextualize the findings and contribute to national and regional strategies for digital transformation in education.

References

1. Akayoğlu, S. (2019). Theoretical frameworks used in CALL studies: A systematic review. *Teaching English with Technology*, 19(3), 104–118.
2. Asri. (2024). Utilization of artificial intelligence in improving student achievement. *Jurnal Ilmu Ekonomi*, XX(X), 451–465.
3. Berk, M., Otmar, R., Dean, O., Berk, L., & Michalak, E. (2023, May 12). The use of mixed methods in drug discovery. In M. Tohen, A. Nierenberg, C. Bowden, & J. Geddes (Eds.), *Clinical trial design challenges in mood disorders*. Academic Press. Retrieved from <https://www.entropik.io/>
4. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
5. Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589–597.
6. Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.
7. Darling-Hammond, L. (2017). *Empowered educators: How high-performing systems shape teaching quality around the world*. Jossey-Bass.
8. Doty, K., & Lipien, L. (2024). Online K–12 teachers' perceptions of students' AI utilization and teachers' outlook on the future of education in the context of artificial intelligence. *American Journal of Educational Research*, 12(5), 319–328.
9. Du, J., & Leung, B. (2021). The sustainability of multicultural music education in Guizhou Province, China. *International Journal of Music Education*, 40(1), 131–148. <https://doi.org/10.1177/02557614211027375>

10. Firdaus, A., & Nawaz, S. (2024). Viewpoints of teachers about the usage of artificial intelligence in ELT: Advantages and obstacles. *University of Chitral Journal of Linguistics & Literature*, 8(1), 83–93.
11. Ford, B. (2020). Can culturally specific perspectives to teaching Western classical music benefit international students? A call to re-examine “What the teacher does.” *Frontiers in Education*, 5, Article 113. <https://doi.org/10.3389/feduc.2020.00113>
12. Funa, A. A., & Gabay, R. A. (2025). Policy guidelines and recommendations on AI use in teaching and learning: A meta-synthesis. *Social Sciences & Humanities*, XX(X), XX–XX.
13. Huang, R. (2023). Reflective practices and assessment in global music classrooms. *Music Education Review*, 14(2), 90–104.
14. Idris, S. P. (2024). Utilization of artificial intelligence in developing educational methods: Opportunities, challenges, and ethical implications. *Journal of Education Innovation and Curriculum Development*, XX(X), 74–81.
15. Kacetl, J., & Klímová, B. (2019). Use of smartphone applications in English language learning—A challenge for foreign language education. *Education Sciences*, 9(3), 179.
16. Li, X. (2023). The impact of Chinese music on students’ cultural awareness in higher education. *Arts and Humanities in Higher Education*, 22(4), 489–502.
17. Liu, Y., Chen, L., & Yao, Z. (2022). The application of artificial intelligence assistant to deep learning in teachers’ teaching and students’ learning processes. *Frontiers in Psychology*, 13, 1–13.
18. Marikyan, D., & Papagiannidis, S. (2024). Technology Acceptance Model: A review. In S. Papagiannidis (Ed.), *TheoryHub Book*. United Kingdom.
19. McPherson, G. E., & Schubert, E. (2021). Self- and peer-assessment challenges in music education. *Psychology of Music*, 49(4), 509–522.
20. Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey-Bass.
21. Nguyen, T. (2024). Teacher adaptability and innovation in technology-enhanced classrooms. *International Journal of Innovation in Teaching and Learning*, 12(3), 112–130.
22. Oktaria, R., Ali, I., & Putra, P. (2023). The potential utilizing ChatGPT for education and teaching students: Understanding, prospects, challenges, and utilization. *Educative: Jurnal Ilmiah Pendidikan*, 8(1), 87–94.
23. Patton, M. Q. (2015). *Qualitative research and evaluation methods* (4th ed.). SAGE Publications.
24. Saldaña, J. (2021). *The coding manual for qualitative researchers* (4th ed.). SAGE Publications.
25. Singh Gill, S., Xu, M., Patros, P., Wu, H., Kaur, R., Kaur, K., ... Kanhere, S. S. (2024). Transformative effects of ChatGPT on modern education: Emerging era of AI chatbots. *Internet of Things and Cyber-Physical Systems*, XX(X), 13–19.
26. Su, F., & Zou, D. (2022). Technology-enhanced collaborative language learning: Theoretical foundations, technologies, and implications. *Computer Assisted Language Learning*, 35(9), 1754–1788.
27. Taherizadeh, A., & Beaudry, C. (2023). An emergent grounded theory of AI-driven digital transformation: Canadian SMEs’ perspectives. *Industry and Innovation*, 30(7), 1244–1273.
28. Tan, H. (2022). Traditional and contemporary elements in music education curricula. *Asian Journal of Music Pedagogy*, 10(1), 60–75.
29. Wong, L., & Yung, A. (2021). Teaching methods and cultural continuity in multicultural music classrooms. *International Music Education Review*, 6(4), 89–104.
30. Yasin, F., Safdar, & Ghulam. (2025). Exploring the utilization and understanding level of artificial intelligence (AI) technology among university students in Pakistan. *Online Media & Society*, XX(X), 55–69.
31. Zhang, F. (2025). Fairness and adaptability in assessment: A multicultural perspective. *Global Review of Music Education*, 15(1), 72–85.



By accessing and using the content from Medicine &Community Health Archives, users agree to adhere to the terms of the Creative Commons Attribution (CC BY) license. We encourage the responsible and ethical use of the published material to promote the advancement of knowledge in the field of medicine and community health

<https://creativecommons.org/licenses/by/4.0/>.

© The Author(s) 2025 _