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STRATEGIES FOR INTEGRATING ARTIFICIAL INTELLIGENCE TOOLS
INTO PROJECT-BASED ENGLISH LANGUAGE TEACHING TO ENHANCE
STUDENTS' COMMUNICATIVE COMPETENCE

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Annotation: *This methodological chapter presents the research design for a doctoral study investigating strategies for integrating artificial intelligence (AI) tools into project-based English language teaching (PBLT) to enhance learners' communicative competence. Grounded in Canale and Swain's (1980) model of communicative competence and Long's (1996) Interaction Hypothesis, the study adopts a mixed-methods action research design implemented over three iterative cycles in an authentic tertiary EFL classroom. Quantitative data are collected through pre- and post-intervention communicative competence assessments and structured questionnaires, while qualitative data are drawn from classroom observations, semi-structured interviews, student reflective journals, and AI-interaction logs. The intervention embeds generative AI tools—conversational chatbots, automated feedback systems, and AI-assisted collaborative platforms—within a sequence of extended, real-world communicative projects. Data are analyzed using descriptive and inferential statistics alongside thematic analysis, with triangulation ensuring methodological rigor. The chapter details the research paradigm, questions, context, procedure, instruments, and ethical safeguards, arguing that a convergent mixed-methods action research approach is best suited to capturing both measurable gains in communicative competence and the situated, evolving classroom dynamics of AI-mediated project-based instruction.*

This chapter presents the methodological framework underpinning the investigation of strategies for integrating artificial intelligence (AI) tools into project-based English language teaching (PBLT) with the aim of enhancing students' communicative competence. The chapter is organized to move from broad epistemological commitments to the concrete procedures of data collection and analysis, situating each methodological choice within the theoretical foundations of communicative language teaching (Canale & Swain, 1980) and interaction-driven second language acquisition (Long, 1996). Because the phenomenon under investigation is inherently dynamic—AI tools evolve rapidly, classroom conditions vary, and communicative competence develops gradually through iterative practice—the study requires a design capable of capturing both measurable outcomes and the lived, contextual experience of learners and teachers as they adopt new technologies within collaborative, task-driven project work. The chapter therefore justifies the selection of a mixed-methods action research design, defines the research questions and objectives that guide data collection, describes the setting and participants, details the pedagogical intervention through which AI tools are embedded in project-based instruction, and specifies



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the instruments, procedures, and analytic techniques used to answer the research questions. The chapter concludes with a discussion of validity, reliability, ethical considerations, and the limitations inherent to the chosen design. The study is situated within a pragmatic research paradigm, which privileges the research question over allegiance to a single epistemological tradition and licenses the combined use of quantitative and qualitative techniques within one coherent study (Johnson & Onwuegbuzie, 2004). A purely quantitative design would allow statistical comparison of communicative competence scores before and after the intervention but would offer little insight into how learners actually engage with AI tools, negotiate meaning during project tasks, or experience shifts in confidence and autonomy. Conversely, a purely qualitative design would illuminate lived experience but would not permit generalizable claims about the magnitude of gains in communicative competence. A convergent mixed-methods design, in which quantitative and qualitative strands are collected concurrently and integrated at the interpretation stage, is therefore adopted to provide a more complete account of the phenomenon (Creswell, 2022). This mixed-methods logic is embedded within an action research framework, which is particularly well suited to classroom-based pedagogical innovation because it treats the teacher-researcher as an active agent who plans, implements, observes, and reflects upon an intervention in successive cycles (Kemmis & McTaggart, 2005). Action research has been widely endorsed in the applied linguistics literature as a methodology that allows practitioners to generate locally relevant, evidence-based pedagogical knowledge while simultaneously refining practice (Maugeri & Fabbri, 2026). The combination of mixed methods and action research—sometimes termed mixed methods action research—enables the present study to mix quantitative instruments (assessments, questionnaires) with qualitative techniques (observation, interview, reflective journals) within each of three planned cycles, so that findings from one cycle inform the refinement of AI integration strategies in the next. The study is guided by three research questions: (1) What strategies most effectively integrate AI tools into project-based English language teaching? (2) To what extent does AI-integrated project-based instruction enhance students' communicative competence across its grammatical, sociolinguistic, discourse, and strategic dimensions (Canale & Swain, 1980)? (3) How do students and teachers perceive and experience the process of using AI tools within collaborative project work? Correspondingly, the study's objectives are to identify and document viable AI-integration strategies within a project-based framework, to measure changes in communicative competence using validated pre- and post-intervention instruments, and to interpret the perceptual and experiential dimensions of AI-mediated project-based learning through qualitative inquiry. The study will be conducted in an intact undergraduate EFL classroom at the tertiary level, a context selected because project-based instruction is already a recognized component of the curriculum and because learners possess sufficient digital literacy to engage independently with AI tools. Participants will be recruited through purposive sampling, targeting one or two intact class sections (approximately 60–90 students in total) taught by the researcher or a collaborating instructor, consistent with the participant numbers reported in comparable

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AI-and-project-based-learning studies (Liang & Luo, 2024; Ruiz Viruel et al., 2025). A smaller purposive subsample of 10–15 students and 2–3 instructors will be selected for the qualitative interview strand, chosen to represent a range of proficiency levels, technology-adoption attitudes, and project roles. Prior consent, described in Section 3.9, will be obtained from all participants and, where applicable, institutional gatekeepers. The intervention consists of a sequence of three extended communicative projects, each lasting approximately four to five weeks, in which learners work in small collaborative teams to research, design, and present a real-world communicative product (for example, a multimedia public-service campaign, a cross-cultural exchange proposal, or a professional portfolio). Within each project cycle, AI tools are deliberately embedded at specific pedagogical junctures: a conversational AI chatbot is used to provide learners with low-anxiety, goal-oriented speaking practice and immediate corrective feedback during rehearsal stages, consistent with evidence that such tools support communicative strategy development (Long & Lin, 2022; Qiao & Zhao, 2023); a generative AI writing assistant is used to scaffold collaborative drafting and revision of project documents, following the course-design logic proposed by Liang and Luo (2024) for integrating large language models into project-based curricula; and an AI-assisted presentation or feedback platform is used to support rehearsal of the final oral presentation. Each cycle follows the action research spiral of planning, action, observation, and reflection (Kemmis & McTaggart, 2005), with the researcher adjusting the specific AI-integration strategy for the subsequent cycle based on cycle-end data. Quantitative data will be collected using a communicative competence assessment battery, administered as a pre-test before Cycle 1 and a post-test after Cycle 3, comprising a structured oral interaction task, a written task, and a discrete-item component targeting grammatical and sociolinguistic sub-competencies, scored using an analytic rubric derived from the four-component model of communicative competence (Canale & Swain, 1980). A Likert-scale questionnaire will additionally measure learners' self-reported communicative confidence, perceived usefulness of AI tools, and engagement, administered at the end of each cycle to permit repeated-measures comparison. Qualitative data will be collected through three complementary instruments. First, semi-structured classroom observations, guided by a structured protocol, will document how learners interact with AI tools and with one another during project work, capturing instances of negotiation of meaning central to the Interaction Hypothesis (Long, 1996). Second, semi-structured interviews with the purposive subsample of students and instructors will explore perceptions of the AI-integration strategies, barriers encountered, and perceived changes in communicative confidence. Third, learners will maintain reflective journals across each project cycle, and AI-interaction logs (chat transcripts and feedback records) will be collected as a naturalistic trace data source, providing an unobtrusive record of learners' actual language production during AI-mediated exchanges. The study will unfold across one academic semester, organized into three action research cycles of approximately five weeks each, preceded by a one-week orientation period in which students are introduced to the AI tools and platform interfaces, and followed by a one-week post-intervention data collection period. Within each cycle, the researcher will

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plan the specific AI-integration strategy, implement it within the ongoing project work, observe and document classroom interaction, and hold a brief reflective debrief with the collaborating instructor before adjusting the strategy for the next cycle. This iterative structure allows the study to answer Research Question 1 empirically, by tracking which specific integration strategies are refined, retained, or discarded across cycles, while Research Questions 2 and 3 are addressed through the cumulative pre-post and end-of-cycle data described above. Quantitative data will be analyzed using descriptive statistics (means, standard deviations) and inferential techniques, including paired-samples t-tests or, where cycle-level repeated measures are involved, repeated-measures analysis of variance, to determine whether gains in communicative competence and confidence across cycles are statistically significant, following analytic approaches used in comparable AI-and-language-learning intervention studies (Qiao & Zhao, 2023). Effect sizes will be reported alongside significance values to indicate the practical magnitude of any observed change. Qualitative data (observation notes, interview transcripts, reflective journals, and AI-interaction logs) will be analyzed using thematic analysis, involving iterative coding to identify recurring patterns related to AI-integration strategies, communicative competence development, and learner and instructor perceptions. Codes will be organized into broader themes and cross-checked against the quantitative results in a joint display, a technique recommended for integrating strands in convergent mixed-methods designs (Creswell, 2022; Johnson & Onwuegbuzie, 2004). This integration stage—rather than the separate analysis of each data type—constitutes the central analytic move of the study, allowing statistically significant gains to be interpreted in light of the specific classroom processes that the qualitative data reveal. Multiple strategies will be used to strengthen the credibility of the study. Methodological triangulation, achieved by combining assessment scores, questionnaire data, observation, interview, and documentary evidence, will allow convergent or divergent findings across data sources to be identified and interpreted. The communicative competence assessment rubric will be piloted and reviewed by two independent raters, with inter-rater reliability calculated using Cohen's kappa or an intraclass correlation coefficient. Member checking will be used with the interview subsample, allowing participants to confirm or challenge the researcher's interpretation of their responses. Because the researcher may also act as the instructor, reflexive journaling and peer debriefing with the collaborating instructor will be used throughout the cycles to guard against undue influence on data interpretation, a safeguard consistent with recommended practice in practitioner action research (Kemmis & McTaggart, 2005; Maugeri & Fabbri, 2026). The study will be submitted for institutional ethical approval prior to data collection. Informed consent will be obtained from all participants, with clear information provided about the voluntary nature of participation, the right to withdraw without academic penalty, and the anonymization of all identifying information in reporting. Because the intervention involves learners submitting written and spoken output to third-party AI platforms, participants will be informed about what data such platforms may retain, and, where feasible, tools with transparent data-handling policies suitable for educational use will be prioritized. AI-interaction logs and journals will be stored

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securely and accessible only to the research team, and pseudonyms will be used in all excerpts reported in the findings chapters. Several limitations are acknowledged. The use of an intact classroom sample, rather than random assignment, limits the causal strength of quantitative findings and introduces the possibility of confounding variables such as instructor effect or prior technology exposure. The relatively short, single-semester timeframe may be insufficient to capture the longer-term development of communicative competence, which is widely regarded as a gradual, non-linear process. The researcher's potential dual role as both instructor and investigator, while mitigated through reflexive strategies, may still introduce a degree of observer bias. Finally, findings drawn from a single institutional and cultural context should be generalized to other settings with appropriate caution, and future replication across diverse EFL contexts is recommended to test the transferability of the AI-integration strategies identified here.

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