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Pronunciation and intelligibility in CLIL contexts and implications for teacher education

ABSTRACT

This article examines evidence on pronunciation and intelligibility in content and language integrated learning (CLIL) and derives implications for initial English language teacher education. A critical narrative review used targeted searches of publisher sources and institutional repositories. The corpus comprised 32 documents, prioritizing publications from 2021 to 2026 while retaining conceptual foundations. The synthesis distinguished CLIL-specific evidence, complementary pronunciation research, and proposed pedagogical applications. The reviewed studies showed heterogeneous outcomes: additional exposure did not consistently yield phonological advantages, whereas focused instruction and selected technological resources offered opportunities contingent on tasks and outcome measures. The analysis highlighted the need to distinguish intelligibility, comprehensibility, accentedness, and fluency. A design sequence is proposed to connect disciplinary content, phonological attention, interaction, and listener-based assessment. Teacher education should combine phonological knowledge, teaching practice, and communicative assessment. These recommendations require validation in Ecuadorian higher education.

Keywords: language teaching; pronunciation; teacher education; intelligibility; CLIL

Pronunciación e inteligibilidad en contextos CLIL e implicaciones para la formación docente

RESUMEN

El objetivo de este artículo es examinar la evidencia sobre pronunciación e inteligibilidad en contextos de aprendizaje integrado de contenidos y lenguas extranjeras (CLIL) y derivar implicaciones para la formación inicial de docentes de inglés. Se desarrolló una revisión narrativa crítica mediante búsqueda dirigida en fuentes editoriales y repositorios institucionales. El corpus comprendió 32 documentos, con prioridad para publicaciones de 2021 a 2026 y recuperación de antecedentes conceptuales. La síntesis distinguió evidencia específica de CLIL, investigación complementaria sobre pronunciación y orientaciones de transferencia pedagógica. Los estudios mostraron resultados heterogéneos: la exposición adicional no se tradujo uniformemente en ventajas fonológicas, mientras que la enseñanza focalizada y determinadas mediaciones tecnológicas ofrecieron posibilidades condicionadas por las tareas y medidas utilizadas. Se identificó la necesidad de diferenciar inteligibilidad, comprensibilidad, acento y fluidez. Se propone una secuencia que vincula contenido disciplinar, atención fonológica, interacción y evaluación mediante oyentes. Se concluye que la formación docente debe integrar conocimientos fonológicos, práctica de enseñanza y evaluación comunicativa. Las orientaciones requieren validación en educación superior ecuatoriana.

Palabras clave: enseñanza de idiomas; pronunciación; formación de docentes; inteligibilidad; CLIL

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Pronúncia e inteligibilidade em contextos CLIL e as suas implicações para a formação de professores.

RESUMO

Este artigo examina as evidências sobre pronúncia e inteligibilidade na aprendizagem integrada de conteúdos e línguas estrangeiras (CLIL) e apresenta implicações para a formação inicial de professores de inglês. Realizou-se uma revisão narrativa crítica mediante buscas direcionadas em fontes editoriais e repositórios institucionais, atualizadas até 10 de novembro de 2026. O corpus compreendeu 32 documentos, priorizando publicações de 2021 a 2026 e preservando fundamentos conceituais. A síntese distinguiu evidências específicas de CLIL, pesquisas complementares sobre pronúncia e aplicações pedagógicas propostas. Os estudos apresentaram resultados heterogêneos: a exposição adicional não proporcionou vantagens fonológicas consistentes, enquanto o ensino focalizado e determinados recursos tecnológicos ofereceram possibilidades condicionadas pelas tarefas e medidas utilizadas. Destacou-se a necessidade de distinguir inteligibilidade, compreensibilidade, grau de sotaque percebido e fluência. Propõe-se uma sequência didática que articula conteúdo disciplinar, atenção fonológica, interação e avaliação baseada na compreensão dos ouvintes. Conclui-se que a formação docente deve integrar conhecimentos fonológicos, prática de ensino e avaliação comunicativa. Essas recomendações requerem validação no ensino superior equatoriano.

Palavras-chave: ensino de línguas; pronúncia; formação de professores; inteligibilidade; CLIL.

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INTRODUCTION

Pronunciation is part of the resources through which learners understand, explain, and negotiate knowledge in an additional language. In English language teacher education, it has a dual role: supporting future teachers' own communication and developing their ability to

identify needs, provide feedback, and assess learners' speech. This role becomes especially relevant when disciplinary content is taught through content and language integrated learning (CLIL). Oral participation then involves constructing knowledge and making it accessible to interlocutors. The pedagogical problem is to determine how phonological learning should be supported within that integration and which outcomes are justified by the available evidence.

CLIL connects content and language objectives through planning that brings together content, communication, cognition, and culture. Using a foreign language as the medium of instruction does not exhaust this integration: learners also need support to understand and communicate disciplinary knowledge. Coyle et al. (2010) provide a foundation for this relationship, while Dalton-Puffer (2011) locates CLIL research in contextualized educational practices. Focusing on pronunciation, Nikolić (2017) argues for an explicit place for intelligibility within CLIL communication. This position is valuable because it connects phonological decisions to the understanding of content rather than treating pronunciation exercises as an unrelated addition to a lesson.

A locally situated antecedent is an intervention proposal at Universidad Técnica de Machala (UTMACH), Ecuador. It links pronunciation activities to the subject Educational Contexts in initial language teacher education. The document presents activities and prospective assessment but does not report implementation outcomes. It is therefore treated here as a design antecedent requiring conceptual updating. It motivates a relevant question for Ecuadorian higher education without providing a current diagnosis of students or empirical evidence of an institutional intervention's effectiveness. Its proposed participants cannot be regarded as the sample of the present review.

The intended outcome needs to be defined before activities are selected. Levis (2005) distinguishes pronunciation priorities associated with native likeness and intelligibility. More recently, Chau and Huensch (2025) show that intelligibility, comprehensibility, accentedness, and fluency are associated to different degrees. A noticeable accent should consequently not be equated with failure to understand. This distinction also matters when interpreting research: improvement in sound discrimination or isolated word reading does not necessarily demonstrate improvement in spontaneous communication. Teacher education needs to prepare practitioners to identify both the value and the limits of the measures they use.

Updating the topic requires attention to findings that do not support a uniform CLIL advantage. Pérez Fernández and Gómez Lacabex (2026) found no statistically significant differences between primary CLIL and EFL learners in phoneme discrimination. Azpilicueta-Martínez (2025) found advantages limited to vocabulary when comparing levels of exposure. These studies encourage examination of learning conditions and outcome measures before phonological improvement is attributed to additional exposure. Research on explicit instruction, teacher preparation, and technology offers complementary resources, although applying them to university CLIL remains an inference requiring local investigation.

This article aims to critically examine evidence on pronunciation and intelligibility in CLIL contexts to inform initial English language teacher education. Its guiding question is: What does research on CLIL and pronunciation instruction contribute to teacher education oriented toward intelligibility? The review distinguishes conceptual foundations, CLIL-specific findings, complementary evidence, and proposed applications. The discussion connects these areas and develops a design sequence that can be evaluated in subsequent research. Its contribution is to make the steps between evidence and pedagogical implication explicit, without presenting the recommendations as an already validated intervention.

Methodology

The study adopted a critical narrative review with a documentary design. This approach was selected to relate heterogeneous research on CLIL, pronunciation, and teacher education and develop a bounded pedagogical interpretation. Consistent with the differentiation of review purposes discussed by Snyder (2019), the retrieval and selection process is made explicit

without claiming that the corpus is exhaustive. The study is neither a systematic review nor an original meta-analysis. Documents were the units of analysis. No participants were recruited, and no personal data, recordings, or grades were collected from UTMACH students.

The targeted search was updated to November 10, 2026. Web search engines were used to locate publications on publisher platforms and in institutional repositories. Bibliographic records were checked against Crossref and available original records. Sources included Cambridge Core, Wiley, Oxford Academic, John Benjamins, ScienceDirect, Springer Nature, and university portals. These platforms served as routes for retrieval and verification; consulting them was not treated as equivalent to an exhaustive search of the bibliographic databases indexing their journals. Reference lists of relevant publications also supported the retrieval of conceptual and methodological antecedents.

Search combinations linked CLIL or content and language integrated learning with pronunciation, intelligibility, comprehensibility, phonological development, and teacher education. Complementary searches addressed pronunciation instruction, teacher cognition, automatic speech recognition, and computer-assisted pronunciation training. Queries actually used included "CLIL pronunciation intelligibility 2024 2025 study," "CLIL pronunciation comprehensibility phonological 2021 2022 2023," and "pronunciation instruction meta analysis intelligibility comprehensibility 2021 2024." Subsequent updating included title searches and verification of a 2026 publication on phoneme discrimination. Years appearing within individual queries were retrieval aids rather than the sole eligibility filters.

Priority was given to publications from 2021 to 2026, in English or Spanish, addressing at least one of three areas: phonological outcomes in CLIL; pronunciation instruction and assessment; and preparation for integrating language and disciplinary teaching. Earlier sources were retained for conceptual or methodological relevance. News items, application advertisements, conference abstracts, and sources whose accessible content could not support the intended claim were excluded. The 2018 dissertation was included only as a local antecedent. Different versions of the same publication were identified through title and DOI to avoid treating them as separate studies.

The synthesis organized the material into four categories: exposure and CLIL outcomes; definition and measurement of speech dimensions; instruction and technological mediation; and teacher preparation and assessment. Evidence obtained directly in CLIL was distinguished from findings originating in other language learning contexts. Effect sizes were not pooled, and participant numbers from potentially overlapping reviews were not added. Critical interpretation considered baseline comparability, task characteristics, measure specificity, and relevance to the proposed transfer context. No formal risk-of-bias scale was applied. Pedagogical recommendations were developed as design inferences and are identified as proposals requiring validation.

DEVELOPMENT AND CRITICAL SYNTHESIS

Intelligibility and integrated learning

Intelligibility concerns how much of a message a listener actually understands; comprehensibility concerns the perceived difficulty of understanding it. Accentedness describes perceived distance from a reference variety, whereas fluency concerns temporal delivery or listeners' impressions of it. In their meta-analysis of 49 reports, Chau and Huensch (2025) found associations of different strengths among these dimensions. The implication for this review is methodological: a label must correspond to the task and should not be exchanged for another construct when a score is interpreted. Related dimensions are not interchangeable outcomes.

A rating of ease of understanding provides evidence about comprehensibility. Transcription or information recovery can provide an operational approximation to intelligibility. Accurate production of a phoneme is a more specific outcome. Saito and Plonsky (2019) distinguish

the target construct, scoring procedure, and knowledge elicited, including controlled versus spontaneous production. Kostromitina et al. (2025), in a broad methodological synthesis, identify the need for greater attention to instrument validity and interrater reliability. These distinctions prevent correct repetition of a word from being treated as equivalent to an understandable explanation of a disciplinary concept.

Connecting pronunciation with CLIL requires retaining the disciplinary purpose. Explaining a relationship between family and school involves selecting information, establishing connections, and making a position understandable. Word stress practice may support that purpose when it helps listeners recognize terms and follow the message, but it does not independently demonstrate content learning. Drawing on Coyle et al. (2010) and Nikolić (2017), phonological attention is interpreted here as support for communicating knowledge. This is a pedagogical interpretation of the frameworks, not an experimental finding derived from them. Content learning remains an outcome to be assessed in its own right.

CLIL exposure and phonological outcomes

General language learning outcomes do not establish pronunciation effects. Lee et al. (2023) synthesized 38 studies of secondary-level EMI-CLIL and found overall advantages, with smaller effects for productive dimensions and for studies verifying initial group homogeneity. Because the synthesis combined EMI and CLIL contexts, it did not isolate the effect of integrated pronunciation instruction. Feddermann et al. (2021), using a global English measure, showed the importance of controlling selection and preparation. Both publications are used here as interpretive cautions rather than direct evidence about change in intelligibility. A general language advantage cannot be assigned to a specific phonological mechanism.

More directly relevant evidence reveals a differentiated picture. Gallardo-del-Puerto and Gómez-Lacabex (2024) followed English coda perception and production over two years among secondary CLIL learners. They reported slight overall improvement and variation across sounds, with some realizations remaining less successful. Overall individual performance did not show a simple perception–production relationship. The study identifies differentiated trajectories within a program; its longitudinal observations should not be read as attributing every change to CLIL or as demonstrating an immediate transfer to university students. Learning opportunities and developmental outcomes need to be examined at the relevant level of analysis.

Pérez Fernández and Gómez Lacabex (2026) compared 320 learners aged 8–10, including 171 CLIL and 149 EFL pupils, through vowel and consonant discrimination. No statistically significant group differences were found. This finding is restricted to the phonemic perception task: it does not establish that CLIL lacks educational value or that the groups' oral production was identical. Its contribution is to challenge the inference that increased exposure necessarily produces better phonological representations. For teacher education, the cautious implication is that the need for support must be established separately for the dimensions and learners under consideration.

Azpilicueta-Martínez (2025) compared groups of young learners with different CLIL exposure levels, examining pronunciation, fluency, and productive vocabulary. Reported significant advantages were concentrated in vocabulary for the high-exposure groups relative to the non-CLIL group. Uneven outcomes prevent lexical performance from serving as a pronunciation proxy. In another study, Azpilicueta-Martínez and Ocáriz-Tejada (2025) compared audio-synchronized keyword captions with uncaptioned video. The caption format showed no significant advantage; production improved in both groups, while phonological judgment did not improve significantly. A differential benefit cannot therefore be attributed to captioning when the study did not establish it.

Pronunciation instruction and technological mediation

Complementary research supports instructional possibilities without replacing CLIL-specific evidence. Lee et al. (2015) and Thomson and Derwing (2015) examine pronunciation instruction and variation in its conditions and assessment. Their contributions justify examining duration, tasks, and measures rather than treating instruction as a uniform activity. Saito (2021) reports larger instructional gains in comprehensibility than native likeness and links comprehensibility judgments to segmental, prosodic, and temporal features. These findings support communicative targets while retaining attention to sounds that interfere with word recognition. They do not establish a single phonological priority order applicable to every class.

Gordon and Darcy (2022) investigated a ten-week intervention with university EFL learners in Costa Rica. The suprasegmental group improved in comprehensibility and fluency, while accentedness did not improve across groups. This offers a Latin American university antecedent, but the context was not CLIL and the findings do not establish the universal superiority of one instructional component. Galante and Piccardo (2022) describe a 40-hour university course combining controlled practice, drama, recordings, and reflection. Together, these publications support considering a progression toward spontaneous speech while preserving differences in population, instructional design, and assessment when adapting their implications.

Technology offers distinct opportunities and limitations. Ngo et al. (2024) synthesized 15 automatic speech recognition studies and reported a medium overall effect, with more favorable outcomes for segmental than suprasegmental pronunciation. Metruk (2024), reviewing 15 mobile learning studies, identified generally beneficial outcomes and positive learner attitudes. These syntheses do not validate every commercial application or establish that automatic transcription is equivalent to human intelligibility assessment. In this review, technology is interpreted as support for practice and feedback, contingent on the resource's specific functions and the learning goal. Device use alone is not an instructional explanation.

Amrate and Tsai (2025) reviewed 30 computer-assisted pronunciation training studies and identified a predominance of repetition and reading activities, alongside limited use of global intelligibility and comprehensibility measures. This observation qualifies innovation claims based solely on the digital medium. A tool may facilitate repeated trials while assessing a narrower skill than content communication. Resource selection for CLIL should begin with the communicative function learners need to develop and include a listener's check of the message, alongside any automated indicator. A change in the practice interface does not by itself demonstrate transfer to disciplinary interaction.

Teacher preparation and cognition

Integrating pronunciation does not depend solely on teachers' personal English proficiency. Kochem (2022) found that trainees mainly used controlled activities and requested more practice designing free activities. Couper (2021) documented techniques, knowledge, and beliefs through interviews and classroom observation. These findings distinguish knowing how to describe a sound from creating opportunities to use it. Teacher preparation therefore needs to connect phonological knowledge with decisions about models, instructions, feedback, and participation. Learning to teach pronunciation includes selecting an intervention that fits a communicative difficulty rather than simply identifying a non-target-like realization.

Within CLIL, Porcedda and González-Martínez (2020) emphasize initial preparation and continuing collaborative development. Kim and Graham (2022) identify uneven coverage of teachers' needs and professional development across linguistic, pedagogical, and other competence areas. Scherzinger and Brahm (2023) connect bilingual teacher competence with pedagogical knowledge, academic language, and cooperation. These reviews support preparation linking content and language specialists. They do not describe the present situation of UTMACH faculty. Their role in the current review is conceptual and comparative,

informing questions to investigate locally rather than supplying an institutional needs assessment.

Nguyen and Burri (2024), studying 20 Vietnamese teachers, found insufficient preparation for pronunciation teaching despite participants' reported confidence. Tsunemoto et al. (2023) related experience, beliefs, and speech ratings among 77 Japanese prospective teachers. Gonçalves and Zárate-Sández (2024) reviewed teacher cognition research and discussed implications for pronunciation instruction. Together, these contributions encourage examination of how teachers decide what to correct and how they judge progress. Reported confidence and years of exposure should not be treated as sufficient indicators of pedagogical competence. Observed teaching decisions and their justification provide a different and necessary source of professional learning evidence.

DISCUSSION

Answering the guiding question requires distinguishing learning opportunities from demonstrated outcomes. CLIL creates occasions to use language while constructing knowledge; the selected literature does not establish that those occasions uniformly produce more intelligible pronunciation. The studies of codas, exposure intensity, and phoneme discrimination identify bounded gains or absent differences on particular tasks (Azpilicueta-Martínez, 2025; Gallardo-del-Puerto & Gómez-Lacabex, 2024; Pérez Fernández & Gómez Lacabex, 2026). These differences matter because they locate the pedagogical problem in learning conditions and dimensions rather than resolving it through program membership. The defensible argument concerns the need for purposeful support, not an assumed deficit shared by all CLIL learners.

A first implication is to avoid equating exposure quantity with the quality of phonological processing. Program comparisons need to consider starting knowledge and opportunities for language use outside the classroom. The cautions from Feddermann et al. (2021) and Lee et al. (2023) concern general learning, but their methodological relevance is clear: pre-existing group differences prevent subsequent performance from being attributed entirely to the approach. Evaluating a future university proposal would require documenting those conditions rather than carrying forward the numbers or profile of a cohort described in 2018. A historical planning document cannot replace a current account of who the learners are.

A second implication is to specify the improvement to be observed. Saito and Plonsky (2019) and Kostromitina et al. (2025) help organize the measurement problem around the construct, elicitation task, and scoring procedure. When the objective is to communicate course content, a word list can diagnose specific contrasts but needs to be complemented by an explanation, discussion, or problem-solving task. Ratings of ease of understanding and actual information recovery represent different evidence. Both can be useful if interpreted separately and accompanied by information about who listened, what they heard, and how judgments were made. A single overall score can conceal the source of change.

This reasoning also changes instructional target selection. Saito (2021) and Gordon and Darcy (2022) support attention to features involved in comprehensibility without making accent elimination a success criterion. The proposed sequence prioritizes features that interfere with recognizing disciplinary terms or following a message: relevant segmental contrasts, lexical stress, prominence, and discourse chunking. Their importance in a particular group must be established through local diagnosis. The same priority order cannot be prescribed solely because learners share a first language. Teacher educators should ask what a feature does for the message and which evidence shows that it needs attention in the current task.

Explicit instruction can be integrated with communication through short interventions addressing observable difficulties. Identifying a problem, modeling an alternative, and rehearsing a feature acquire curricular meaning when learners return to the content task. Lee et al. (2015) and Thomson and Derwing (2015) offer a general rationale for examining instruction, but they do not determine an optimal duration for a particular CLIL course. Time

allocation is therefore treated here as a design decision to be adjusted to cognitive demands and curricular objectives and evaluated subsequently. A sequence should remain responsive to the lesson's disciplinary purpose instead of imposing an unrelated pronunciation syllabus on every activity.

Technological mediation warrants the same care. Ngo et al. (2024) support the pedagogical use of speech recognition, but their findings do not justify replacing listener understanding with the percentage of words recognized by a system. Metruk (2024) supports considering mobile devices for practice, whereas Amrate and Tsai (2025) show that digital provision does not ensure task diversity. A recording–review–revision cycle would consequently have stronger curricular coherence if it led to an activity in which another learner uses the information to make a decision or explain a relationship. The outcome of interest would remain the communication of meaning, supplemented by focused pronunciation evidence.

Azpilicueta-Martínez and Ocáriz-Tejada (2025) reinforce a related point: a technically elaborated audiovisual resource is not necessarily superior to its comparison format. The learning task accompanying a resource may matter as much as its presentation. Prospective teachers should justify what learners will attend to, what support will be offered, and which evidence will indicate learning. Such justification helps avoid selecting captioning, repetition, or recordings merely for novelty. It also makes room for low-connectivity alternatives without assuming they are pedagogically inferior. A resource's suitability depends on whether it serves the intended activity and on what learners can actually access.

Professional preparation requires opportunities to teach, receive feedback, and revisit decisions. Kochem (2022), Couper (2021), and Nguyen and Burri (2024) raise different issues that converge on this need. Preparation should not be confined to the phonetic alphabet or improvement of trainees' own speech. It needs practice in organizing interaction, responding to a difficulty, and checking whether support makes disciplinary communication more successful. Kim and Graham (2022) and Scherzinger and Brahm (2023) situate these tasks within broader competence involving collaboration and subject knowledge. Content and language specialists can jointly examine a lesson while retaining responsibility for distinct learning goals.

Beliefs about accent may also influence assessment. Tsunemoto et al. (2023) identify links between experience, beliefs, and speech ratings. In occupational settings outside education, Teló et al. (2022) document accent-related bias in judgments of competence. This latter evidence does not demonstrate a specific bias among Ecuadorian university teachers; it provides a reason to examine how rating decisions are made. Observable criteria and examples of diverse speech can help prevent a general impression of foreignness from absorbing judgments about content or actual understanding. Criteria should clarify the task's communicative demands rather than imply that one speaker identity is intrinsically more competent.

The distinction is particularly relevant when pronunciation work forms part of professional preparation. A future teacher is learning both to communicate and to make defensible decisions about another person's learning. These responsibilities require explicit discussion of why a correction was selected, what response it elicited, and whether comprehension changed. Gonçalves and Zárate-Sández (2024) provide a synthesis of teacher cognition research relevant to this reflective agenda. In the proposed application, reflection would use brief performance examples instead of relying only on statements of confidence. Feedback would then become an object of inquiry, not merely a teacher's spontaneous reaction to an unfamiliar accent.

The contribution of this review is to connect three levels while keeping them identifiable: CLIL-specific findings, complementary pronunciation evidence, and application inferences. Their relationship supports a sequence for teacher education without establishing its efficacy. Chamba Zambrano's (2018) antecedent can be reframed accordingly: activities would be retained for their curricular function and evidential support, their phonetic content checked,

and explicit assessment procedures added. The defensible innovation lies in the coherence between purpose, support, and evidence. Its usefulness in the institutional setting remains a question for subsequent validation rather than a conclusion about an intervention that was never evaluated.

Pedagogical implications for teacher education

A design sequence is proposed for teacher education subjects integrating disciplinary content and English. The following phases are derived recommendations, not an implemented program or validated assessment instrument. Possible use within Educational Contexts requires checking the subject's current status, learners' characteristics, and curricular objectives. The content would address relationships among family, school, and learning, with pronunciation supporting the explanation of that knowledge to an interlocutor. Transfer should remain conditional: a program's label does not guarantee that its materials, objectives, or assessment already integrate both dimensions. Table 1 summarizes the proposed alignment.

The first phase defines a disciplinary question and a communicative function. For example, "How can families and schools coordinate support for learning?" requires comparison of perspectives and justification of a proposal. Content objectives would specify the relationships to be explained; language objectives would identify resources for arguing and requesting clarification. Cognition would be expressed through comparison and justification, while culture would involve respectful examination of different experiences of family participation. This preserves CLIL integration and prevents the topic from functioning merely as a vocabulary list. The planned oral product should make the intended disciplinary reasoning visible.

The second phase is diagnostic and informs instruction. A brief explanation would establish whether interlocutors recover the main ideas and identify phonological difficulties that interfere. Content understanding and perceived ease of understanding would be recorded separately. Word and feature selection would follow observed performance rather than a generalized assumption about Spanish-speaking learners. Priorities could change when one contrast does not obstruct a message but another difficulty does. This principle connects explicit instruction with realistic goals while allowing individual needs to be addressed. It also gives teacher trainees a concrete rationale for explaining their instructional choices.

The third phase combines guided perception and focused production. The teacher could model relevant terms, invite comparison of realizations, and explain the selected feature through verbal, visual, or gestural support. Learners would then rehearse expressions needed for the disciplinary task. Phonetic transcription would have an instrumental role bounded by the selected objectives. Any material addressing regular past-tense endings needs to distinguish /t/, /d/, and /ɪd/ and select examples according to the final sound of the base. Simplification should not introduce inaccurate categories. Trainees should also check whether isolated practice is carried into the subsequent exchange.

The fourth phase involves information exchange and negotiation of meaning. In pairs, one learner would explain a family–school case while the other reconstructs the proposal, requests clarification, and justifies agreement or disagreement. Differences between the intended and recovered message would guide revision. A short recording would allow a specific segment to be revisited and an alternative rehearsed. A phone or local recorder is sufficient for this purpose. If speech recognition is used, its outputs should be compared with human understanding rather than made the sole evaluator. The listener needs a meaningful reason to use the information received.

The fifth phase elicits a new performance and evaluates it. Learners would explain a comparable but different case to examine transfer beyond a memorized script. A rubric would distinguish content accuracy, argument organization, comprehensibility, and interaction. Intelligibility could be checked through information recovery or transcription of defined segments; sound identification would remain a separate focused measure. Scale direction and listener instructions must be documented consistently. A global score without descriptors

would make improvement difficult to interpret. These are proposed assessment components: their validity and reliability would need to be investigated before high-stakes use or research claims.

The sixth phase turns the experience into professional learning. Each prospective teacher would justify the phonological target, identify the evidence motivating feedback, and propose an adjustment for another lesson. Peer microteaching can include observation of instructions, participation, and responses to correction. The purpose is to examine the relationship between a teaching decision and its intended learning function, rather than judge a teacher's linguistic identity. Reflection should be grounded in examples of performance so that practice can be compared with beliefs and previously agreed criteria. Revisions would be documented as decisions for testing rather than evidence that the sequence has already worked.

Table 1.

Proposed alignment between integrated teaching and evidence of learning

Phase	Design decision	Planned evidence
Planning	Disciplinary question and content/language objectives	Explicit relationship among concept, communicative function, and phonological support
Diagnosis	Brief explanation and peer listening	Information recovered and perceived difficulty recorded separately
Focused attention	Modeling and practice of a relevant feature	Feature identification or production in task-related expressions
Interaction	Case with complementary information	Clarification requests and reconstruction of the message
Transfer	New comparable case	Unmemorized oral performance assessed through explicit criteria
Teacher reflection	Microteaching and decision review	Documented justification of a teaching adjustment

Source: Authors' proposed design derived from the synthesis. The sequence and assessment components require piloting and validation.

Limitations and future research

Targeted selection and the narrative design limit exhaustiveness and create possible availability bias. No registered protocol, formal risk-of-bias assessment, or independent dual screening was used. Unequal full-text access restricted some checks to abstracts and original records. The cited meta-analyses may share primary studies, so their findings cannot be counted as independent cumulative confirmations. Much of the directly relevant CLIL evidence concerns European schoolchildren. Transfer to adult prospective teachers in Ecuador is a pedagogical hypothesis, not a local finding. The review therefore supports a reasoned design agenda rather than an estimate of intervention effectiveness.

Subsequent research could pilot the sequence with a university cohort while documenting starting proficiency, extracurricular exposure, and disciplinary learning. Pre-intervention, post-intervention, and delayed measures would permit examination of change and maintenance; a comparison group and raters unaware of recording time would strengthen interpretation. Interrater reliability and the suitability of assessment instruments would need to be established before drawing efficacy conclusions. Recording consent, data management, and relevant institutional requirements should be addressed before data collection. None of these prospective procedures is reported as having been conducted in the present review.

CONCLUSIONS

The review indicates that pronunciation needs explicit objectives and procedures within CLIL planning oriented toward knowledge communication. Additional exposure provides opportunities, but the selected studies do not show a uniform phonological advantage or establish expected outcomes for Ecuadorian university teacher education. Relationships among the approach, activities, and learning require measures aligned with the dimension being examined.

Intelligibility and comprehensibility offer relevant communicative goals when distinguished from accentedness and fluency and assessed through appropriate tasks. Focused instruction, interaction, and technology can be connected to disciplinary content. Resource selection needs to address an observable need and return to a meaningful communication task.

Initial teacher education should include phonological knowledge, teaching practice, and examination of assessment criteria. The article contributes a sequence making explicit the relationship among content, phonological attention, interaction, and expected evidence. Its application requires diagnosis and validation. It provides a grounded direction for future investigation without demonstrating the effectiveness of the original 2018 proposal.

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