

Content and language integrated learning adaptation in teaching geography in higher education: evidence from Kazakhstan

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ABSTRACT

Content and language integrated learning (CLIL) is essential for internationalizing higher education. However, its adaptation in Central Asia's trilingual context, specifically in geography teaching, remains under-researched. As one of the first empirical studies on CLIL in Kazakhstani higher education geography, this paper analyzes how instructors adapt CLIL, focusing on the gap between their theoretical awareness and actual practice. The study employed a mixed-methods design. A survey of 150 instructors was followed by 20 in-depth semi-structured interviews to explain the quantitative results. A distinct "knowledge-practice gap" was identified: while instructors show high conceptual awareness ($M=4.18$), actual implementation is moderate ($M=3.76$). The primary barriers are institutional and methodological rather than linguistic. Furthermore, translanguaging strategies emerged not as a deficit, but as a vital cognitive resource for decoding complex concepts. Challenging traditional monoglossic models, this study validates the use of plurilingual pedagogies in post-Soviet higher education. Sustainable CLIL adaptation requires systemic support, specifically the establishment of methodological hubs and translanguaging-friendly curricula. Future research implies longitudinal studies, classroom observations, and comparative analyses with other Central Asian contexts.

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1. INTRODUCTION

Content and language integrated learning (CLIL) is a dual-focused educational approach in which an additional language is used for the learning and teaching of both content and language. Over the last couple of decades, this approach has become one of the most prominent strategies for internationalization [1], [2]. Higher education institutions worldwide have been actively introducing bilingual and multilingual instructional formats. At the same time, interest in CLIL has grown well beyond linguistics and pedagogy to encompass disciplines with significant conceptual and methodological specificity.

The theoretical underpinning of this research draws on a modern conceptualization of CLIL, which views learning as the integration of four interrelated elements: content, communication, cognition, and culture (4Cs) [3]. This 4Cs framework supports the emphasis that the successful mastery of subject knowledge is inseparable from the development of linguistic and cognitive abilities. On a global scale, CLIL and English-medium instructional formats are conceptualized within dynamic models, such as English-medium education in multilingual university settings (EMEMUS), which establish standards for quality

implementation [4]. In these multilingual settings, particular attention is turned to translanguaging, the use of multiple languages as complementary learning resources rather than as barriers. This flexible strategy supports comprehension and the articulation of meaning across languages [5].

Among these disciplines, geography occupies a significant place, as it requires the simultaneous mastery of cognitive, linguistic, and spatial-visual competences. Complex terminology, spatial descriptions, and analytical interpretations of data make geography an ideal domain for implementing CLIL, where language is a prerequisite for understanding socio-economic processes. A growing number of studies reveal that hybrid and practice-oriented formats, such as field excursions and urban “treasure hunts”, facilitate deeper conceptual understanding and enhance both linguistic and subject-related competencies [6], [7]. While global models provide a framework, the effectiveness of CLIL is shaped by local contexts. At the national level, Kazakhstan’s institutional trilingual policy (Kazakh, Russian, and English) requires instructors to implement deliberate pedagogical adaptations [8].

Despite the formal adoption of CLIL within Kazakhstan’s trilingual education policy [8], [9], its implementation in geography remains largely nominal due to the lack of context-sensitive methodological frameworks suited to multilingual university settings [10], [11]. The study aims to fill this gap by employing a mixed-methods design to analyze geography-specific CLIL adaptation. The research specifically focuses on quantifying the awareness, practice gap, examining the role of translanguaging strategies, and identifying structural barriers in the country’s specific trilingual environment.

The study addresses its key aim, the exploration of the adaptation of the CLIL methodology by geography instructors in Kazakhstani universities through the following research questions:

- How do university geography instructors in Kazakhstan adapt CLIL to the conditions of a trilingual educational environment? (RQ1)
- Which pedagogical strategies and forms of translanguaging do they use during lessons? (RQ2)
- What methodological, linguistic, and institutional challenges do they face in CLIL implementation? (RQ3)
- What are instructors’ perceptions of their professional role and identity in the context of trilingual higher education? (RQ4)

2. LITERATURE REVIEW

2.1. Theoretical foundations of CLIL

CLIL is an instructional approach that teaches academic content through a foreign language, facilitating the parallel development of subject knowledge and language competence. Initially framed in the early 1990s [12], the approach was then theoretically consolidated in the 4Cs framework proposed by Coyle *et al.* [13]. As illustrated in the Figure 1, this framework encompasses four interrelated components that shape the learning process:

- Content refers to the acquisition of disciplinary knowledge; in geography, this involves learning about concepts such as spatial patterns, ecological systems, and socio-economic processes.
- Communication involves the development of academic and professional language needed to describe and analyze geographical phenomena.
- Cognition refers to the development of analytical and critical thinking, most notably through the interpretation of maps, datasets, and visual information.
- Culture emphasizes learners’ awareness of global interconnections and the cultural diversity embedded in geographical knowledge.

Overall, the CLIL approach to geography aims to create an integrative learning environment in which language serves as a cognitive tool for engaging with and understanding the world. Recent research [14], [15], further emphasizes the need for flexible coordination between language and content, along with the use of translanguaging practices that draw on students’ and instructors’ complete linguistic resources to strategically advance learning aims.

2.2. CLIL in higher education: trends and challenges

In higher education, CLIL is often regarded as a crucial tool for internationalizing academic programs and enhancing students’ academic mobility [16]. Reviews by Pérez-Cañado [2] and Lasagabaster and Doiz [14] show that CLIL enhances learner motivation, improves academic language proficiency, and increases intercultural competence. The successful implementation of CLIL, however, depends in part on instructors being prepared for this challenge and on obtaining appropriate institutional support structures. Existing studies identify at least three persistent difficulties: the scarcity of methodological resources, the linguistic under competence of instructors, and the overload of curricular requirements [14]. In non-English-speaking environments, such as Central Asia, institutional culture is particularly relevant, shaping the balance between linguistic and disciplinary objectives [4].

In Kazakhstan, as Satayev *et al.* [10] note, CLIL has primarily been investigated within the context of the national trilingual policy. Researchers highlight the following three primary lines of inquiry: instructors' attitudes toward CLIL, its perceived effects, and the issues that arise during its implementation. However, most studies still focus on linguistic outcomes, while the disciplinary content aspect has received scant attention [17].

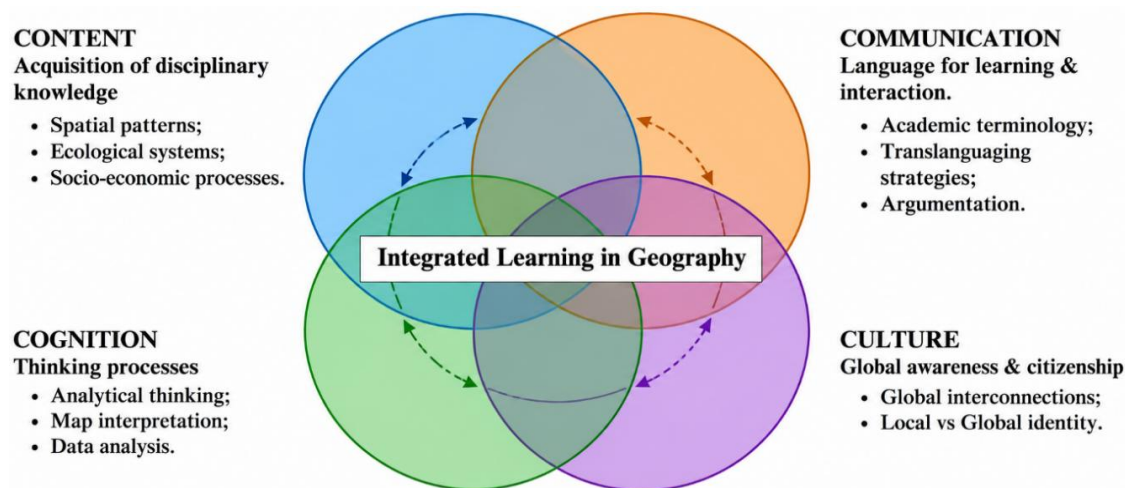


Figure 1. The 4Cs framework applied to geography education

2.3. CLIL in geography teaching: methods and outcomes

Geography is widely regarded as one of the most suitable disciplines for CLIL, as it naturally incorporates linguistic, visual, and cognitive modes of thinking. The subject requires active mastery of academic terminology, argumentation skills, and interpretation of spatial data, the latter of which renders geography particularly sensitive to the integration of language and content. A critical analysis of existing CLIL-based instruction in geography reveals several pedagogical strategies, which can be categorized into two main clusters: digital resources and field-based, out-of-class learning tasks.

In the field of digital resources, Abbate [18] proposes a CLIL model for an Italian secondary school geography course, based on the use of electronic corpora and a data-driven learning approach. This model supports the development of students' lexical competence and learner autonomy. Tarricone [19] reinforces this trend by analyzing the use of multimedia and film resources in geography teaching during the pandemic period. It is emphasized that visual and audiovisual materials strengthen interdisciplinary links and enhance learners' motivation.

The second group of strategies comprises practice-oriented activities. Ripamonti *et al.* [7] describe how urban treasure hunts and field investigations enhance learners' autonomy and their capacity to employ a foreign language in real-world situations. Similarly, Martínez-Hernández and Albaladejo-Albaladejo [6] report that bilingual field courses within the context of teacher education facilitate greater cognitive engagement and improved content learning, regardless of students' initial language proficiency. Furthermore, recent research by Graffagnino and Aberdeen [20] reinforces that integrating modern foreign language (MFL) pedagogies directly into geography curricula is essential for decoding complex spatial concepts in a non-native language.

Regarding regional contexts, Kapusi [21] notes that in Hungary, geography is one of the leading subjects in bilingual education, although teacher support for language remains fragmented. For Kazakhstan, available data are still limited. A study by Kuzembayeva *et al.* [9] confirms that CLIL is being actively promoted in schools within the trilingual policy; however, its implementation in higher education remains under-researched.

Literature synthesis and research rationale: a synthesis of the reviewed literature in Table 1 reveals several consistent patterns.

- CLIL has been found to enhance both subject-specific and linguistic competencies, in particular in practice-oriented learning formats [6], [7].
- The use of technologies, multimedia resources, and authentic materials increases student participation and supports the contextualization of learning processes [18], [19].

- A challenge that has proved consistent across contexts is the professional readiness of instructors and the limited presence of methodological support materials [11], [21].
- In Central Asia, particularly in Kazakhstan, CLIL has been implemented mainly at the school level, with university-level practices still largely underexplored [9], [10].

Overall, the literature suggests that CLIL has excellent potential in geography education. However, for its successful implementation in Kazakhstani higher education, the methodology must be adapted to a trilingual environment, with translanguaging integrated as a pedagogical resource. Addressing this identified gap, the current study investigates the ways geography instructors in Kazakhstani universities adapt and implement CLIL, the translanguaging strategies they use, and the institutional and methodological barriers they face.

Table 1. Summary of reviewed CLIL studies in geography education

Authors	Context	Method	Key findings related to geography
Abbate [18]	Italy, school, and IGCSE	Body analysis, BYOD	Development of lexical competence
Tarricone [19]	Italy, distance learning	Multimedia, video	Increased motivation and interdisciplinary engagement
Ripamonti <i>et al.</i> [7]	Italy, university	Field-based tasks	Enhanced learner autonomy and language engagement
Martínez-Hernández and Albaladejo-Albaladejo [6]	Spain, university	Bilingual learning routes	Improvement in cognitive and language outcomes
Kapusi [21]	Hungary, school	Qualitative analysis	High interest but limited language integration
Kuzembayeva <i>et al.</i> [9]	Kazakhstan, school	Data overview	Kazakhstan emphasizes trilingualism with translanguaging, unlike European bilingual models

2.4. Global context of CLIL: beyond Europe

While CLIL originated in Europe, its implementation in Asia and Latin America reveals distinct challenges related to post-colonial and multilingual legacies. Recent studies from South America, such as the comprehensive review by Zarobe and Banegas [22] and Pérez [23] analysis of the Colombian context, indicate that CLIL implementation is frequently hindered by structural resource gaps and inconsistent teacher training, mirroring challenges in Central Asia. Conversely, in the Asian context, the focus is shifting towards the legitimacy of multilingual practices. Lee [24] empirical reassessment of CLIL in Asian higher education suggests that rigid English-only policies are yielding to more flexible approaches. Specifically, research in Taiwan [25] and Hong Kong [26] emphasizes translanguaging not as a barrier, but as an inclusive pedagogical resource. Tai [26] demonstrates that in science and mathematics classrooms, strategic use of the students' first language is crucial for scaffolding complex disciplinary knowledge. These findings provide a vital comparative framework for the Kazakhstani trilingual model.

3. METHOD

3.1. Research design

The study design follows a sequential explanatory mixed-methods approach. The mixed-methods design was chosen specifically to quantify the 'awareness–practice gap' and to explore the adaptive strategies instructors employ to navigate this disparity in depth. First, a wide-ranging quantitative survey was conducted, followed by a more in-depth qualitative phase involving semi-structured interviews, as shown in Figure 2. The quantitative component maps instructors' awareness, the frequency of CLIL use, and perceived barriers on a large scale. At the same time, the qualitative counterpart provides deeper insights into pedagogical strategies and aspects of professional identity.

3.2. Participants and sampling

Quantitative phase (N=150). The quantitative sample comprised 150 geography instructors from 20 universities across Kazakhstan. Sampling combined purposive selection and snowball recruitment to ensure representative coverage across regions and institutional types (public and private). Purposive sampling was chosen to ensure the inclusion of participants with specific expertise in CLIL implementation. Since there is no centralized national registry of CLIL geography instructors, snowball sampling was employed to identify qualified respondents through professional networks. While this non-probability sampling approach enabled access to a hard-to-reach population, it acknowledges potential limitations regarding selection bias and generalizability. Inclusion criteria required a minimum of three years of teaching experience in geography, familiarity with the national trilingual education policy, and a current teaching load of at least 0.5 full-time equivalent (FTE). The respondents' demographic profile was as: 58% were women and 42% were

men, with ages ranging from 28 to 65 years ($M=45.2$, $SD=9.8$). In terms of academic qualifications, 65% held a doctoral degree and 35% a master's degree. All participants reported proficiency in both Kazakh and Russian, and 70% indicated at least intermediate proficiency in English. A sample size of 150 was deemed sufficient for quantitative analysis, providing adequate statistical power for comparative tests [27].

Qualitative phase ($N=20$). The qualitative phase consisted of 20 in-depth interviews selected through contrastive sampling. Participants were recruited from the upper and lower quartiles of CLIL usage frequency and translanguaging intensity to capture a wide range of pedagogical practices. Data saturation was achieved after 18 interviews, aligning with the guidelines of Guest *et al.* [28].

Invitations were disseminated via university geography departments and professional academic networks. To reduce administrative pressure, all correspondence with potential participants was facilitated by department secretaries. Participation was voluntary and anonymous. The overall response rate for the online survey (Google Forms) reached 75%, with 150 out of 200 invited instructors completing the questionnaire. While the sample represents a fraction of the total academic population, the stratified sampling strategy ensured the inclusion of diverse institutional types (national, public, and private universities) across all major regions of Kazakhstan, providing a representative snapshot of the current educational landscape.

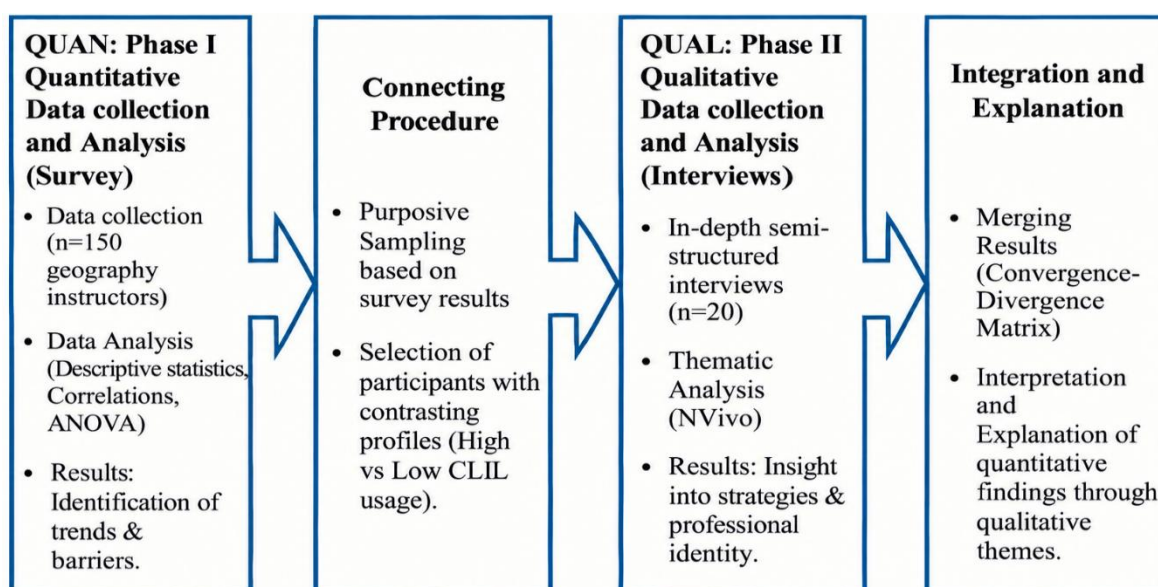


Figure 2. Visual diagram of the sequential explanatory mixed-methods research design

3.3. Quantitative instrument (survey)

The 35-item survey was adapted from validated CLIL measurement instruments originally developed by Coyle *et al.* [13] and Martínez-Hernández [6]. Modifications were made solely to reflect the specific trilingual context of Kazakhstan (adding options for Russian and Kazakh languages). The structure included four domains: i) awareness and professional preparation; ii) frequency and forms of CLIL implementation; iii) institutional, methodological, and linguistic barriers; and iv) the impact of CLIL on professional identity. The translation procedure followed a double translation with a back-translation approach [29]. Content validity was confirmed by an expert panel of three CLIL specialists.

Qualitative instrument (interviews). Individual semi-structured interviews were conducted both in person and via Zoom (AES-256 encrypted). Each interview lasted between 45 and 60 minutes. The interview protocol was developed in accordance with the research questions. It covered the following topics: strategies for adapting CLIL to geography teaching, forms of translanguaging, assessment approaches, institutional support, and professional identity. Translanguaging was operationalized not as a linguistic deficit, but as a pedagogical strategy, identified whenever participants described intentional code-switching, translation, or the use of the L1 to scaffold complex disciplinary concepts. Interviews were conducted in the participant's preferred language (Kazakh or Russian). All audio recordings were transcribed verbatim and subsequently translated into English for analysis.

3.4. Data collection instruments and procedures

Data integration followed a sequential explanatory mixed-methods design. It was implemented through the adoption of two complementary procedures: connecting at the sampling stage and merging at the analysis stage. During the connecting phase, the results of the quantitative survey were used to purposefully select participants for the qualitative interviews, ensuring the inclusion of instructors with contrasting profiles in terms of CLIL usage frequency and the intensity of translanguaging practices.

In the merging phase, quantitative and qualitative findings were brought together using convergence–divergence matrices, following the recommendations by several researchers [30]–[32]. This procedure enabled a systematic comparison of statistical indicators, such as quantitative scores for methodological barriers, with qualitative thematic codes that captured resource shortages, workload constraints, and institutional limitations. Data collection was performed between March and June 2025.

3.5. Data analysis quantitative analysis

All quantitative analyses were conducted using IBM SPSS Statistics (version 28). Descriptive statistics (means, frequencies) and inferential tests, including Pearson correlations, t-tests, and analysis of variance (ANOVA), were applied. Effect sizes were reported using Cohen's d and η^2 . The factorial structure was examined through exploratory factor analysis (EFA) followed by confirmatory factor analysis (CFA) to verify construct validity. Model fit was assessed via standard indices such as comparative fit index (CFI), Tucker–Lewis index (TLI), and root mean square error of approximation (RMSEA). All measurement scales demonstrated high internal consistency, with Cronbach's α coefficients exceeding the 0.85 threshold for all domains [33], [34], ensuring the reliability of the instrument.

Qualitative analysis. thematic analysis was conducted in NVivo (version 14) following the six-step procedure outlined by Braun and Clarke [35]. The coding process employed a hybrid approach. Deductive codes were pre-established based on the 4Cs framework and the EMEMUS model ('cognition', 'language support'), while inductive codes were generated directly from the data to capture emergent themes such as 'institutional paradoxes' and 'identity conflict'.

To ensure reliability, 25% of the data were double-coded by two independent researchers, yielding a high level of inter-coder agreement ($\kappa=0.82$). To enhance the credibility of the data, the study employed member checking, allowing participants to review interview transcripts, and data triangulation by comparing interview responses with course syllabi. While self-reported data may carry bias, this was mitigated by strict anonymity and stratified sampling.

3.6. Ethical considerations

The study adhered to the ethical guidelines of the American Psychological Association [36]. Participants were fully informed about the study objectives, and informed consent was obtained prior to data collection. Anonymity was strictly maintained through the use of pseudonyms and data de-identification procedures.

4. RESULTS AND DISCUSSION

This section presents the quantitative and qualitative findings of the study conducted among geography lecturers ($N=150$) from 20 higher education institutions in Kazakhstan. The analysis includes descriptive statistics, correlational analyses, and comparative tests (t tests and one-way ANOVA), as well as a qualitative interpretation of data obtained from semi-structured interviews ($n=20$). Together, these components provide a comprehensive examination of how CLIL is implemented within a trilingual educational environment.

4.1. Descriptive statistics and general perceptions of CLIL

The findings indicate a high level of lecturer awareness of CLIL principles ($M=4.18$, $SD=0.47$). The frequency of CLIL use in teaching practice is moderately high ($M=3.76$, $SD=0.69$), suggesting regular but not universal implementation. The most salient obstacles reported by participants are methodological barriers ($M=3.75$, $SD=0.48$) and institutional constraints ($M=3.51$, $SD=0.56$), both of which are linked to limited methodological resources and insufficient administrative support. Language-related barriers received lower mean scores ($M=3.17$, $SD=0.74$) but showed considerable variability across respondents. The use of translanguaging practices is rated at $M=3.60$, $SD=0.60$, while the perceived influence of CLIL on professional identity is generally positive ($M=4.00$, $SD=0.50$). The distribution of the variable is approximately normal, with the median and mode closely aligned with the mean, indicating stability and consistency in respondents' ratings, as shown in Table 2.

Table 2. Descriptive statistics of CLIL awareness, practice, and barriers among Kazakhstani geography instructors (N=150)

Variable	Mean (M)	SD	Median	Mode
CLIL awareness	4.18	0.47	4.20	4.00
CLIL use	3.76	0.69	3.80	4.00
Translanguaging practices	3.60	0.60	3.60	3.50
Methodological barriers	3.75	0.48	3.70	3.70
Institutional barriers	3.51	0.56	3.50	3.40
Language barriers	3.17	0.74	3.10	3.00
Impact of CLIL on professional identity	4.00	0.50	4.00	4.00

4.2. Correlation analysis

The correlation analysis revealed weak and statistically nonsignificant associations, as shown in Table 3. Awareness of CLIL was not associated with its frequency of use ($r=0.04$, $p=0.63$), suggesting a clear gap between theoretical knowledge and classroom practice. A small positive correlation was found between CLIL awareness and translanguaging ($r=0.16$, $p=0.08$), suggesting that more informed lecturers may demonstrate greater methodological flexibility. None of the barrier variables showed significant relationships with either CLIL implementation or perceptions of its impact on professional identity ($r=0.01$ – 0.11 , $p>0.05$), suggesting that lecturers employ compensatory strategies to sustain CLIL practices despite institutional and methodological constraints.

The low correlation coefficients can be explained by the fact that CLIL implementation is often institution-driven rather than individually initiated. Lecturers may possess substantial theoretical awareness of the approach, yet their opportunities for practical application remain limited due to contextual and institutional constraints. This structural mismatch weakens the link between knowing and doing, leading to minimal associations among awareness, barriers, and actual classroom use.

Table 3. Correlation matrix of the main variables (N=150)

Variables	1	2	3	4	5	6
CLIL awareness	—					
Implementation of CLIL	$r=0.04$ ($p=0.63$)	—				
Implementation of translanguaging practices	$r=0.16$ ($p=0.08$)	$r=0.09$ ($p=0.24$)	—			
Instructional barriers	$r=0.10$ ($p=0.19$)	$r=0.11$ ($p=0.16$)	$r=0.07$ ($p=0.33$)	—		
Institutional barriers	$r=0.06$ ($p=0.41$)	$r=0.08$ ($p=0.28$)	$r=0.01$ ($p=0.89$)	$r=0.33$ ($p=0.001$)	—	
Language barriers	$r=0.02$ ($p=0.75$)	$r=0.05$ ($p=0.48$)	$r=0.11$ ($p=0.17$)	$r=0.29$ ($p=0.004$)	$r=0.24$ ($p=0.01$)	—

4.3. Comparative analysis by demographic groups

Gender-based analysis: the t-test did not reveal statistically significant differences between male and female lecturers (all $p>0.05$). The mean scores were similar across groups: awareness of CLIL (female: $M=4.20$; male: $M=4.14$); frequency of CLIL use (female: $M=3.82$; male: $M=3.66$); and institutional barriers (female: $M=3.56$; male: $M=3.43$). The corresponding Cohen's d values (0.09 – 0.18) indicate small effect sizes, further confirming the absence of meaningful gender-based differences.

Analysis by academic qualification: the comparison between lecturers holding a master's degree and those holding a doctoral degree showed results that were similarly aligned (all $p>0.05$). Awareness scores were comparable across groups: $M=4.13$ for master's degree holders and $M=4.20$ for doctoral degree holders. Methodological barriers were also perceived at similar levels ($M=3.70$ vs 3.78 , respectively). The effect sizes (Cohen's $d\leq 0.15$) were small, indicating a uniform perception of CLIL across all academic statuses. These findings reinforce the conclusion that barriers to CLIL implementation are systemic rather than individual, as demographic variables (gender, qualification) did not explain the variance in practice.

4.4. Effect of English proficiency level

The results of the one-way ANOVA indicated that English proficiency level (intermediate, high, advanced) did not have a statistically significant effect on any of the variables (all $p>0.05$). A non-significant trend was observed for institutional barriers ($p=0.10$), suggesting that lecturers with an intermediate level of English rated these barriers higher ($M=3.61$) compared to those with a high level of proficiency ($M=3.39$). The effect size was small ($\eta^2=0.02$).

4.5. Qualitative findings

The thematic analysis of the interview data (n=20, $\kappa=0.82$) yielded four central themes. Methodological transformation: active CLIL users described a shift from lecture-based teaching to task- and problem-based learning.

“I no longer think of a lecture as a monologue; it is always a task structure where the language is embedded in solving a geographical problem.” (P04, female, PhD)

“Instead of translating terms for them, we ask students to find equivalents themselves, and this makes the class more dynamic.” (P10, male, MA)

Institutional paradoxes: lecturers emphasized the mismatch between policy expectations and available resources.

“We are required to teach the course in English, but we are not given time to revise the materials.” (P09, male, MA)

“Professional development is mostly formal, a couple of webinars, and then you are expected to manage everything on your own.” (P15, female, PhD)

Translanguaging as both a resource and a source of tension. Most lecturers rely on translanguaging intuitively:

“Sometimes I feel guilty for explaining in Russian, but without it, students simply cannot keep up.” (P13, female, PhD)

“Kazakh helps to explain concepts, and English is useful for examples from international cases.” (P06, male, MA)

Reframing professional identity: CLIL encourages reflective teaching practices, but also contributes to overload.

“I have started to think more about why and how I teach it is no longer just the transmission of knowledge.” (P18, male, PhD).

“You are constantly at your limit: language, methodology, documents. It feels like doing three jobs at once.” (P02, female, MA).

4.6. Integration of quantitative and qualitative data

The comparison of data across phases yielded strong alignment between the quantitative and qualitative results. The moderate level of translanguaging identified in the survey ($M=3.60$) was consistent with interview data, where participants frequently referenced its use—often unconsciously. The weak correlations between perceived barriers and actual CLIL application quantitatively mirror the institutional contradictions described by the participants.

These findings are summarized in the convergence–divergence matrix, as shown in Table 4. Convergence was observed primarily in areas related to adaptation strategies and translanguaging practices, while divergence was noted in perceptions of institutional support. The integrated analysis suggests that the interaction of three key factors shapes the effectiveness of CLIL: i) the level of methodological preparation of lecturers; ii) the availability of institutional support; and iii) the capacity for pedagogical adaptation within a trilingual educational environment.

4.7. The knowledge-practice gap in CLIL implementation

The study identifies a structural paradox in Kazakhstani geography education: while instructors are theoretically well-versed in CLIL principles ($M=4.18$), their classroom practice lags significantly behind ($M=3.76$), as shown in Figure 3. Qualitative data explains this statistical gap: interviewees explicitly described CLIL not as a pedagogical choice, but as an administrative burden. As Participant 09 noted, the lack of time for material design forces teachers to revert to traditional lectures, effectively neutralizing their theoretical knowledge. This confirms that without institutional support, high teacher awareness does not translate into effective implementation.

While the high awareness scores reflect the effectiveness of national professional development efforts, the moderate application scores indicate that theoretical knowledge alone does not easily translate into consistent teaching practice. This pattern was further supported by qualitative data: instructors often framed CLIL as an added workload rather than an integrated instructional method, citing a lack of methodological support and a misaligned system of incentives as key barriers.

Table 4. Matrix of convergence and divergence

Category/variable	Quantitative data	Qualitative data	Level of convergence	Interpretation
Awareness of CLIL	High (M=4.18; SD=0.47)	Teachers demonstrate confident knowledge of CLIL principles, though with varying depth of understanding.	Convergence	Strong awareness is confirmed across both data strands; however, a gap exists between theoretical understanding and practical application.
CLIL implementation	Moderately high (M=3.76)	Partial implementation: CLIL is applied episodically, primarily through visual and terminological elements.	Convergence	Practice reflects a transitional stage in CLIL adoption.
Translanguaging	Moderate (M=3.60)	Nearly all participants use translanguaging unconsciously; they note its pedagogical value and internal contradictions.	Convergence	Confirms spontaneous yet pedagogically beneficial use of translanguaging.
Methodological barriers	High (M=3.75; SD=0.48)	Lack of materials, insufficient methodological training, and workload overload.	Convergence	Strong alignment of data is a significant barrier to effective CLIL implementation.
Institutional barriers	Moderate (M=3.51; SD=0.56)	Reports of formal support without actual resources; excessive bureaucratic workload.	Convergence →partial divergence	Formal support is present, but not matched by practical conditions.
Language barriers	Low (M=3.17)	Varies by region and institution type; teachers often compensate through translanguaging.	Divergence	Quantitatively low, but interviews reveal heterogeneous linguistic practices and hidden obstacles.
Professional identity	Positive influence of CLIL (M=4.00)	CLIL fosters reflection but can also lead to burnout and work overload.	Convergence →complementarity	Quantitative data shows a positive trend, and qualitative data adds nuance to the dual nature of identity transformation.

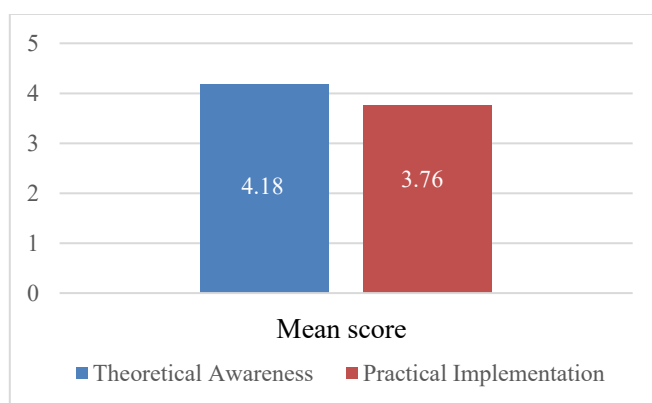


Figure 3. Visual representation of the gap between CLIL awareness and implementation (N=150)

4.8. Institutional and methodological constraints

The methodological and institutional barriers identified in this study closely align with the previous findings [7], [6], who contend that sustainable CLIL implementation is unachievable without systemic support at the university level. Instructors highlighted excessive administrative workload, limited time to adapt and redesign instructional materials, and the absence of dedicated methodological support centers. These conditions significantly elevate the risk of professional burnout among instructors, a pattern previously documented by Abbate [18] in the context of bilingual education in Italy. However, in Kazakhstan's trilingual policy environment, this risk appears to be considerably more pronounced. The simultaneous requirement to teach in Kazakh, Russian, and English, to differentiate course content based on students' varying language proficiency levels, and to manage the complex dynamics of translanguaging imposes a substantially greater cognitive and emotional burden on educators.

This context-specific pressure underscores the distinctive nature of Kazakhstan's multilingual higher education system and reveals challenges that go beyond those encountered in conventional European CLIL frameworks. These institutional barriers mirror findings from South American contexts [22], where resource scarcity similarly impedes CLIL implementation. However, unlike the European model aimed at elite bilingualism, the Kazakhstani context necessitates a more pragmatic approach reliant on state-driven policy

rather than grassroots readiness. The findings highlight the need to account for such regional particularities in designing support mechanisms and professional development strategies for instructors engaged in CLIL-based instruction.

To address these constraints, universities should consider establishing CLIL methodological hubs to support the exchange of teaching practices and the dissemination of ready-to-use instructional modules. Equally important is the need to optimize workload distribution, including the formal recognition of material preparation and translation efforts as part of instructors' contractual responsibilities. Institutions are also encouraged to introduce incentive-based grants and professional development initiatives to enhance competencies in CLIL pedagogy and to integrate CLIL-related metrics into faculty evaluation systems. Taken together, these measures would facilitate the shift of CLIL from an isolated or pilot-driven activity to a stable, institutionally embedded pedagogical model.

Despite these challenges, the transition to trilingual education presents a significant opportunity for institutional modernization. Overcoming these initial barriers can transform Kazakhstani universities into regional hubs for international education, attracting students from Central Asia and beyond. Thus, the current 'crisis' of resources should be viewed not merely as an obstacle, but as a catalyst for necessary structural reforms in higher education.

4.9. Translanguaging: from deficit to resource

One of the contributions at the core of this study concerns identifying translanguaging as a compensatory mechanism that allows instructors to accommodate disciplinary content to students' varying language proficiency levels. Unlike in many Western contexts, where translanguaging is often perceived as a deviation from academic norms, in the Kazakhstani setting, it performs a constructive cognitive and pedagogical function. From a cognitive perspective, translanguaging underpins code-switching, which activates multiple linguistic memory schemas. It reinforces linguistic flexibility, which reduces cognitive load, and fosters the co-construction of meaning through multilingual interaction between participants. These mechanisms align with the theoretical foundations proposed by García [37], and Nikula and Moore [15], who conceptualize translanguaging as a resource that expands learners' zones of proximal development. This expands the EMEMUS model by demonstrating how translanguaging functions as a core adaptation strategy in trilingual settings.

However, unlike their Spanish or Italian counterparts, Kazakhstani instructors reveal an ambivalent attitude toward translanguaging: while recognizing its pedagogical value, they simultaneously report feelings of guilt for deviating from an idealized concept of "pure English". This ambivalence reflects a broader transition from monoglossic to plurilingual pedagogical orientations, an important developmental stage in post-Soviet educational practices.

4.10. Shifting professional identities

The interview findings indicate that implementing CLIL contributes to a notable transformation in the professional identity of university instructors. Teachers increasingly begin to view themselves not merely as conveyors of disciplinary knowledge, but as active facilitators of multilingual interaction an identity shift consistent with the conceptual frameworks proposed by Coyle *et al.* [13] and Morton [38]. Participants reported increased reflexive pedagogical practice and greater confidence in their ability to adapt instructional methods across languages and contexts.

However, this shift also entails significant emotional and cognitive demands. A considerable number of respondents reported symptoms of emotional exhaustion, attributing them to the cumulative pressures of linguistic adaptation, methodological innovation, and administrative workload. This highlights the detrimental aspect of CLIL implementation, where the relentless demand to perform in a foreign language creates a sense of professional vulnerability and inadequacy, threatening the teacher's established self-concept. These findings underscore the need to develop not only academic but also psychological support mechanisms. Recommended interventions include the creation of professional learning communities, structured mentoring programs, and targeted training in emotional resilience for instructors operating within trilingual higher education systems.

4.11. Contribution of the study and comparative context

This study advances the understanding of CLIL within the context of trilingual universities in Central Asia by offering empirical insights from Kazakhstan. It foregrounds the role of translanguaging not as a departure from academic rigor, but as a legitimate cognitive and pedagogical resource that facilitates reasoning, knowledge construction, and classroom interaction. The findings underscore the decisive role of the institutional ecosystem in shaping the success of CLIL implementation, particularly through organizational culture, workload policies, and access to methodological support. In practical terms, the study

provides evidence-based recommendations for developing dedicated CLIL infrastructure in universities, including the establishment of methodological support units and structured professional development pathways.

Moreover, the research identifies key markers of professional burnout linked to multilingual instructional demands, highlighting the urgent need for institutional strategies that prioritize educator well-being. The study also emphasizes the importance of integrating CLIL-related practices into institutional quality assurance mechanisms and teaching evaluation systems. Collectively, these contributions enrich the global CLIL literature by introducing a Central Asian perspective in which CLIL is conceptualized not only as a pedagogical approach, but also as a strategic dimension of higher education policy.

5. CONCLUSION

This study offered a comprehensive examination of the adaptation and implementation of CLIL in the teaching of geography within Kazakhstani universities. By employing a sequential explanatory mixed-methods design, the research generated an integrated understanding of CLIL not merely as a method of instruction but as a multidimensional pedagogical process that reshapes disciplinary knowledge, linguistic practices, and professional identities. The findings reveal that while geography instructors possess high conceptual awareness, a persistent gap remains between theoretical knowledge and its practical enactment, hindered primarily by institutional and methodological barriers rather than linguistic deficits. Consequently, from a pedagogical perspective, the findings necessitate the establishment of disciplinary methodological hubs, while at the policy level, institutions must formally recognize translanguaging as a teaching standard to reduce instructor anxiety.

For future research, replication of this study in STEM disciplines is recommended. While the study is limited by its specific focus on geography and reliance on self-reported data and absence of classroom observation, future research should address these gaps by expanding the scope to diverse disciplines, adopting longitudinal designs to trace professional identity evolution, and incorporating student perspectives. In conclusion, advancing from this early stage requires shifting the focus from individual teacher enthusiasm to systemic institutional support, recognizing translanguaging as a legitimate resource to build a sustainable, inclusive academic environment aligned with global trends.

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C : **C**onceptualization

M : **M**ethodology

So : **S**oftware

Va : **V**alidation

Fo : **F**ormal analysis

I : **I**nvestigation

R : **R**esources

D : **D**ata Curation

O : Writing - **O**riginal Draft

E : Writing - Review & **E**ding

Vi : **V**isualization

Su : **S**upervision

P : **P**roject administration

Fu : **F**unding acquisition

CONFLICT OF INTEREST STATEMENT

The authors declare no competing financial interests or personal conflicts of interest.

DATA AVAILABILITY

The data supporting this study's findings were obtained from participating universities in Kazakhstan and are not publicly available due to institutional confidentiality agreements. These data are available under license and subject to restrictions. De-identified datasets may be made available upon reasonable request to the corresponding author, subject to permission from the participating institutions.

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