MEASURING VOCABULARY GAINS THROUGH CLIL: EVIDENCE FROM PICTURE-BASED ASSESSMENT IN MONGOLIAN–KAZAKH BILINGUAL SCHOOLS

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Abstract:

In secondary schools providing bilingual education, the CLIL (Content and Language Integrated Learning) approach was implemented and evaluated. Baseline and post-intervention data were collected through questionnaires, interviews, and standardized tests, including the Peabody Picture Vocabulary Test, which was used to assess the vocabulary development of fourth-grade students. At the baseline stage, the performance levels of the experimental and control groups were comparable, with mean scores of 58.2% and 52.9%, respectively. Following the implementation of the CLIL methodology, results from the post-intervention assessment showed that students in the experimental group demonstrated a 12.4% improvement in vocabulary performance across the two assessment points. This article reports the findings of the study on bilingual students' vocabulary development as measured by the Peabody Picture Vocabulary Test. The research results have been formally presented to the Ministry of Education and Science, the General Authority for Education, the Mongolian National Institute for Educational Research, and the World Bank.

Keywords: bilingualism, Mongolian language, target language, vocabulary

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1. Introduction

Content and Language Integrated Learning (CLIL) is an instructional approach developed within the field of multilingual education and widely implemented across Europe and beyond (Coyle, Hood, & Marsh, 2010; Dalton-Puffer, 2011). Evidence from the European Union and several Central Asian countries indicates that CLIL effectively supports the development of students' bilingual competencies by integrating language learning with subject content instruction (Heugh, 2013; Marsh, 2002). In the Mongolian context, CLIL is understood as an approach that uses Mongolian and students' mother tongues simultaneously to support subject-content mastery, organize instruction, assess learning outcomes, and promote second-language development. In this model, learning Mongolian is embedded within the process of mastering subject content, while subject content provides meaningful communicative conditions for language learning. This reciprocal relationship between language and content aligns with sociocultural and constructivist theories of bilingual education (Cummins, 2000; Vygotsky, 1978).

Importantly, CLIL does not replace or modify the national curriculum; rather, it functions as a methodological approach that supports its effective implementation for learners from diverse linguistic backgrounds (Coyle et al., 2010). In European educational discourse, CLIL is commonly conceptualized through the "4Cs Framework"—Content, Communication, Cognition, and Culture—which emphasizes the integrated development of subject knowledge, language use, higher-order thinking skills, and intercultural awareness (Coyle, 2007; Coyle et al., 2010). Vocabulary development is a central component of bilingual education and a strong predictor of later academic achievement (Nation, 2001; Snow, Burns, & Griffin, 1998). Accordingly, this study assessed students' vocabulary development using a picture-based vocabulary test, a method widely recognized for evaluating receptive vocabulary in children (Dunn & Dunn, 2007). Within the research framework, a picture test was administered to examine changes in Mongolian vocabulary acquisition among fourth-grade students. A total of 36 students, randomly selected from experimental and control groups in participating schools, took part in the assessment. Six test forms were developed based on the first 100 high-frequency words identified in the Mongolian language curriculum for Grades II–III, consistent with vocabulary assessment practices in bilingual education research (Nation, 2013).

To improve educational quality for children from diverse ethnic backgrounds—particularly Kazakh and Tuvan communities—the Mongolian National Institute for Educational Research (MNIER) has conducted a series of monitoring and evaluation studies (UNESCO, 2020). For example, a national monitoring study on *the outcomes of mother-tongue education in primary grades of bilingual general education schools* was conducted in 2013. This was followed by an evaluation of Mongolian language learning outcomes in bilingual primary classes during 2013–2014. In 2015, the study *"Monitoring the outcomes of mother tongue (Kazakh, Tuvan) and Mongolian language curricula in secondary grades of bilingual general education schools"* was implemented with financial and technical

support from UNICEF. These studies, supported by UNICEF and the World Bank, aimed to strengthen methodological approaches, teacher training, and instructional quality in bilingual education settings (UNESCO, 2020; World Bank, 2021). Between 2021 and 2023, MNIER, drawing on CLIL theory, international research, and best practices, integrated the CLIL approach into the curricula of two secondary schools in Bayan-Ölgii Province. This initiative targeted the improvement of educational outcomes for Kazakh and Tuvan students, aligning bilingual education reforms with global evidence-based practices (World Bank Group, *Loud and Clear*, 2021). The research was conducted in three phases: baseline research, experimental implementation, and results analysis. Three comprehensive research reports were produced. A central component of the study was the picture-based vocabulary test used to assess Mongolian language proficiency among fourth-grade students. This article focuses specifically on the outcomes of the picture test administered during Mongolian language lessons to Kazakh elementary school students, contributing empirical evidence to the growing body of research on CLIL and bilingual education in minority-language contexts.

2. Methodology

As part of the CLIL implementation study, a picture-based vocabulary test was administered at both the beginning and the end of the study to evaluate changes in students' vocabulary development and to assess the impact of the CLIL approach on linguistic proficiency. Prior to test development, document analysis and frequency analysis were conducted using Mongolian language textbooks for Grades II, III, and IV. Based on this analysis, a list of high-frequency vocabulary items was compiled and used to design the picture test. The experimental phase lasted 16 weeks (equivalent to two academic terms), allowing sufficient time to examine students' comprehension and retention of the selected vocabulary within the CLIL instructional context. The objective of the study was to identify the core vocabulary resources encountered in Mongolian language instruction from Grade II through Grade IV and to examine students' ability to recognize and understand this vocabulary.

The specific objectives were to:
- assess students' ability to listen to and identify the names and attributes of objects in the target language;
- assess students' ability to listen to and identify verbs and verb tenses in the target language;
- analyze students' performance on the picture-based vocabulary test before and after the CLIL intervention.

A total of 36 students participated in the study. The participants were drawn from six classes, including both experimental and control groups, in the 3rd and 5th secondary schools in Bayan-Ölgii Province, where the CLIL methodology was implemented. In Bayan-Ölgii Province, students begin formal instruction in the Mongolian language from Grade II. To assess vocabulary development, a picture test was designed using the first

100 high-frequency words identified from Mongolian language textbooks for Grades II–IV. The test consisted of 100 pages, each displaying four pictures. The first three pages (labeled A, B, and C) served as practice items. Each page was sequentially numbered, and each picture on a page was labeled with the numbers 1, 2, 3, and 4. During the assessment, students were asked to respond orally by stating the number corresponding to the correct picture in response to questions posed by the researcher. Students were given 15 minutes to complete the test. The questioning procedure followed consistent guidelines:

- Nouns: "Which picture shows a spoon?"
- Verbs (present tense): "Which picture shows a person walking?" "Which picture shows a person washing?"
- Location-related terms: "Which picture shows the lark on the back of the box?"
- Time-related terms: "Which picture shows the autumn season?"
- Adjectives: "Which picture shows the color black?" "Which picture shows a tall person?"
- Numbers: "Which picture shows the number sixty?"

Each correct response received 1 point, and each incorrect response received 0 points. Students' answers were recorded on a standardized scoring sheet. All 36 students completed the pre-test, while 34 students participated in the post-test (although all students were required to participate). The collected data were organized and analyzed according to the following vocabulary categories:

- terms identifying objects and household items,
- terms related to school supplies,
- terms identifying family members and professions,
- animal-related vocabulary,
- food-related vocabulary,
- mathematical terms,
- terms denoting time and location,
- color-related vocabulary,
- verbs,
- other vocabulary items.

This categorization enabled a detailed examination of students' vocabulary development across different semantic and grammatical domains.
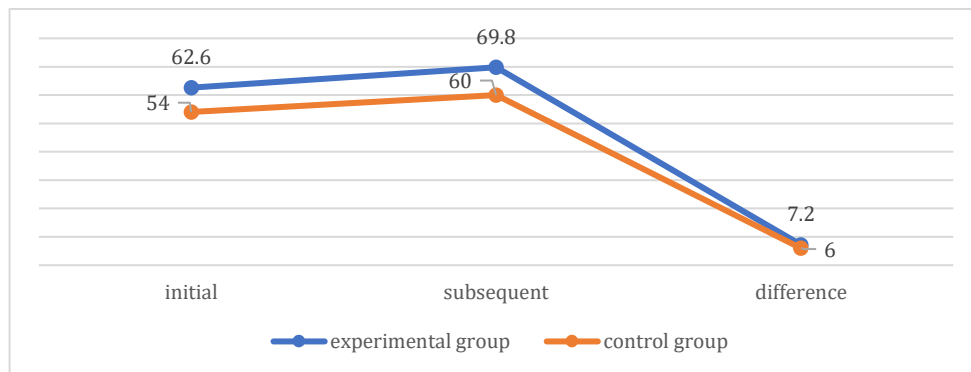

3. Results and Discussion

The implementation of the CLIL methodology was examined through a comparative analysis of picture test results from experimental and control groups of fourth-grade students. Baseline and post-intervention data were collected to evaluate changes in students' receptive vocabulary and overall language comprehension.

3.1 Overall Performance Trends

At the initial stage, the experimental and control groups demonstrated comparable levels of performance, with mean scores of 58.2% and 52.9%, respectively. Following the CLIL intervention, the experimental group showed a 12.4% increase in overall performance, while the control group improved by only 5.2%. This indicates a stronger vocabulary gain among students exposed to CLIL-based instruction.

Figure 1: The holistic performance in pictorial assessments (by percent)

Across the two participating schools, the experimental group's mean performance increased from 62.6% to 69.8%, representing a 7.2% improvement, whereas the control group exhibited inconsistent progress, including one group that showed a slight decline (–0.6%). In contrast, the experimental groups demonstrated consistent and even progress, suggesting the stabilizing effect of CLIL instruction

3.2 Individual and Group-Level Improvements

Analysis at the individual level revealed that 23 out of 24 students in the experimental group improved their scores, with gains ranging from 3% to 23%. Only one student showed a decline. The student with the greatest improvement (coded 54506) demonstrated exceptional progress. Interestingly, several low-performing students in the control group showed large gains (up to 36%), which appears to be associated with the individual teacher's strong instructional skills rather than programmatic effects

3.3 Vocabulary Category Analysis

Improvements were observed across nearly all vocabulary categories in both surveys. However, the magnitude of gains varied:

- Mathematical vocabulary showed the greatest improvement (up to 21% in experimental groups), highlighting the effectiveness of CLIL for teaching subject-specific academic language.
- Verbs showed the smallest increase (2.4%), indicating that action-related vocabulary and tense recognition require more systematic instructional attention.
- Words related to nature and environment (e.g., *sun, leaf, water*) improved by 10.6%, likely due to the integration of the *Human and Nature* subject within CLIL lessons

Table 1: Scores on picture tests for students who took part
in both the initial and subsequent surveys (by percentage)

Group	School No. III		School No. V		Overall performance of initial survey	Overall performance of subsequent survey	Performance Gap	General Performance Gap
	Initial Survey (Included in both surveys simultaneously)	Subsequent Survey (Included in both surveys simultaneously)	Initial Survey (Included in both surveys simultaneously)	Subsequent Survey (Included in both surveys simultaneously)				
EG	59%	74.6%	57.4%	66.7%	58.2%	70.6%	12.4%	8%
CG	56.60%	55%	49.20%	61.20%	52.90%	58.10%	5.20%	6

Despite improvements, several areas of concern remained. Students' ability to recognize basic geometric shapes (rectangle, triangle, circle) remained low, with a mean score of 43.6%, and knowledge of mathematical symbols (addition, subtraction, equality) was insufficient in both groups.

3.4 Language Transfer and Cross-Linguistic Influence
Vocabulary items that share similar pronunciation and meaning in both Kazakh and Mongolian (e.g., *botgo–bota*, *temee–tuiye*, *tsai–shay*) were correctly identified by 100% of students. This finding highlights the role of positive cross-linguistic transfer in bilingual language acquisition and suggests that phonological similarity facilitates comprehension. Conversely, students struggled with words commonly borrowed from Russian in daily use (e.g., *television*, *cookies*, *ice cream*), indicating that habitual use of loanwords may hinder acquisition of Mongolian equivalents.

3.5 Listening and Pronunciation Challenges
The study revealed persistent difficulties in listening discrimination, particularly with phonetically similar words (e.g., *uzeh* vs. *uzeg*, *chono* vs. *shunu*). Students also struggled with long and short vowel contrasts, which are phonemic in Mongolian but absent in Kazakh. These findings underscore the importance of targeted phonological instruction and listening-focused activities within CLIL lessons

3.6 Pedagogical Implications

Overall, students in the experimental group demonstrated stronger performance in vocabulary related to physical education, visual arts, school tools, food items, family members, and professions, reflecting the benefits of integrating language learning with meaningful content. However, weaknesses in verbs, temporal-spatial terms, and mathematical language suggest the need for:

- greater emphasis on verb forms and tense awareness,
- explicit teaching of time and location vocabulary, and
- reinforcement of academic language across all subject areas.

The findings confirm that CLIL, when implemented consistently and supported by active teaching strategies, contributes positively to vocabulary development and content comprehension.

4. Conclusion

The study yields the following key findings:

- As part of the evaluation of the CLIL implementation, students' ability to recognize 100 high-frequency Mongolian words (Grades II–IV) was assessed using a picture-based vocabulary test administered to fourth-grade students in both experimental and control groups. Based on post-intervention results, the overall average performance of all participating students was 65.5%.
- Approximately 35.2% of students scored below the established benchmark of 60%, indicating a substantial proportion of learners with limited receptive vocabulary. The experimental groups across two schools achieved an average performance of 74.2%, with a quality level of 38.6%, whereas the control group recorded a significantly lower performance rate of 45%, with a quality level of 29.1%.

These results suggest that students exposed to the CLIL methodology demonstrated notably stronger vocabulary recognition than those in traditional instruction settings.

4.1 Recommendations for Enhancing Vocabulary Development

To further strengthen students' vocabulary development in the target language, the following strategies are recommended:

- Systematic use of picture cards to support vocabulary acquisition through visual reinforcement;
- Cultivating independent vocabulary learning habits by encouraging the regular use of both traditional dictionaries and picture dictionaries;
- Promoting the active use of the target language in both school and family environments to increase meaningful exposure and practice (Anderson & Nagy, 1991);
- Integrating video-based resources to enhance listening comprehension, word recognition, and contextual language use.

4.1.1 Use of Visual Aids and Picture Cards

The use of picture cards and visual materials is an effective approach to vocabulary development, as it leverages students' visual memory and supports faster word recognition. Research on bilingual education indicates that two-way bilingual instruction positively affects both native-language speakers and second-language learners, fostering deeper language development than traditional foreign language instruction focused primarily on memorization (Justice, Meier, & Walpole, 2005).

Displaying picture cards on classroom walls with corresponding target-language labels provides continuous visual reinforcement. Daily exposure through reading and observation allows students to encounter and internalize new vocabulary repeatedly. Rotating picture cards weekly according to thematic units maintains student engagement and supports contextual learning. It is essential that images are age-appropriate, visually appealing, clear, and realistic to maximize learning effectiveness (Blewitt et al., 2009).

4.1.2 Cross-Linguistic Connections and Cognitive Encoding

Results from the picture test revealed that students more easily recognized words that shared similar meanings and phonological features with their mother tongue. This confirms that introducing new vocabulary by linking it to already familiar concepts facilitates stronger cognitive encoding and retention (Coyne et al., 2004).

4.1.3 Role of Dictionaries in CLIL Instruction

During the initial stages of CLIL implementation, it is particularly important to establish consistent use of Mongolian–Kazakh and Kazakh–Mongolian dictionaries, especially in subjects such as visual arts, natural sciences, and mathematics. Regular dictionary use supports vocabulary expansion in both the native and target languages and promotes learner autonomy (Rosenthal & Ehri, 2008).

4.1.4 Family-Based Vocabulary Support

With the cooperation of parents and caregivers, the following home-based activities are recommended to reinforce vocabulary learning:

- Designating one evening per week for family communication exclusively in the target language;
- Memorizing 3–5 new words daily with a family member;
- Watching children's favorite programs in the target language.

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Conflict of Interest Statement

The authors declare no conflicts of interest.

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