THE ROLE OF CLIL IN ENHANCING ENGLISH PROFICIENCY IN STEAM SUBJECTS AMONG UZBEK STUDENTS

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Abstract: *This study investigates the role of Content and Language Integrated Learning (CLIL) in enhancing English proficiency among secondary school students studying STEAM (Science, Technology, Engineering, the Arts, and Mathematics) subjects in Uzbekistan. As the country promotes English-medium instruction in science and technology, the effectiveness of CLIL as a dual-focused educational approach becomes increasingly relevant. A quasi-experimental research design was employed, involving Grade 9 students in two Tashkent schools over a 16-week semester. One group received CLIL-based instruction, while the control group followed a traditional content-focused approach. Pre- and post-tests, classroom observations, and questionnaires were used to assess language gains and engagement. Results showed that students in the CLIL group demonstrated statistically significant improvement in English proficiency, particularly in vocabulary and listening comprehension. Qualitative data supported these findings, revealing higher levels of motivation, confidence, and academic English use. The study concludes that CLIL has strong potential for enhancing both language and subject learning in the Uzbek educational context and recommends broader implementation supported by curriculum development and teacher training.*

Keywords: *CLIL, STEAM education, English proficiency, bilingual education, Uzbekistan, language learning, STEM, secondary education, content and language integration, educational reform*

Introduction

Content and Language Integrated Learning (CLIL) is a progressive educational

methodology in which students learn subject content through a foreign language, most commonly English. This approach aims to enhance both subject matter understanding and language acquisition, promoting a dual-focus that aligns well with the demands of a globalized world. In the context of 21st-century education, CLIL has emerged as a powerful tool, especially within STEAM (Science, Technology, Engineering, the Arts, and Mathematics) education, where both technical content and academic communication are crucial. Across Europe and parts of Asia, CLIL has been widely adopted in secondary and higher education to prepare students for international mobility, interdisciplinary learning, and multilingual work environments.

Globally, the integration of CLIL into STEAM fields is growing. Countries like Spain, Finland, and Japan have implemented CLIL in STEM-based programs to reinforce students' academic English while mastering scientific and technical concepts. These countries have reported improvements not only in language proficiency but also in classroom engagement and content comprehension. In Uzbekistan, educational reform has been moving rapidly in the direction of English-medium instruction, particularly in science and technology subjects. In recent years, national policies have encouraged the use of English as the language of instruction in higher education and some secondary schools. However, these efforts often face obstacles, including a lack of resources, insufficiently trained teachers, and students' limited English proficiency. Despite the growing emphasis on English within STEAM fields, many Uzbek students continue to face challenges in acquiring the language skills needed for full comprehension and academic success. In most schools, English and content subjects are still taught separately, resulting in limited opportunities for students to use English in meaningful, subject-relevant contexts. This disconnect underscores the need for integrated pedagogical approaches such as CLIL. However, research on the implementation and effectiveness of CLIL in Uzbekistan, particularly in the STEAM context, remains scarce. The primary objective of this study is to explore the effectiveness of CLIL in improving English proficiency among secondary school students in Uzbekistan who are studying STEAM subjects. Specifically, the research seeks to identify the degree of improvement in language skills—such as vocabulary,

reading, speaking, and listening—when science and technology content is delivered through English. This study is guided by two key research questions: (1) Does CLIL improve English proficiency in STEAM learners in Uzbekistan? (2) Which specific language skills benefit the most from CLIL-based instruction? The findings of this study aim to contribute to Uzbekistan's educational reform by providing data-driven insights into how CLIL can support English language learning in STEAM education. The results may also offer practical recommendations for curriculum developers, teacher training programs, and education policymakers interested in adopting CLIL more broadly across the national education system.

4Methods

This research employed a quasi-experimental design, comparing the outcomes of two student groups: one exposed to CLIL-based instruction and another following a traditional content-focused approach. A mixed-methods approach was used, combining quantitative test results with qualitative feedback from participants to capture a holistic picture of the impact of CLIL on language development.The study was conducted in two public secondary schools in Tashkent, Uzbekistan, during the spring semester of the academic year. Sixty students in Grade 9 participated, aged 14–15, all enrolled in science and technology streams. The students were divided into an experimental group (n = 30) and a control group (n = 30). All students had a comparable level of English proficiency (A2–B1 on the CEFR scale) based on initial placement testing. The selection of schools was based on their willingness to participate in the pilot and their use of English materials in STEAM courses.

Instruments used in the study included an adapted English proficiency test, teacher-designed observation checklists, and structured student and teacher questionnaires. The English test, based on the Cambridge English Preliminary framework, assessed reading, listening, grammar, and vocabulary. It was administered before and after the 16-week intervention. The observation checklist measured classroom interactions, student participation, and use of academic English. Questionnaires gathered participant perceptions about lesson clarity, engagement, and language confidence.

The CLIL intervention spanned one semester (16 weeks). Teachers in the experimental group received preliminary training on CLIL strategies, such as scaffolding language, using visuals and realia, and promoting group discussion in English. Physics and biology lessons were delivered primarily in English, incorporating subject-specific vocabulary and academic phrases. In contrast, the control group received instruction in Uzbek or Russian, with little emphasis on English. All other classroom conditions, such as lesson timing and classroom resources, were kept similar across both groups. Data analysis was carried out using SPSS. Paired sample t-tests were performed to compare pre- and post-test scores within each group and between the groups. Descriptive statistics summarized language skill gains. In addition, open-ended responses from the questionnaires were coded and analyzed using qualitative content analysis to identify common themes.

Results

The results revealed a significant improvement in English proficiency among students in the CLIL group compared to those in the control group. The average pre-test score for the experimental group was 64.3 which increased to 77.1 in the post-test—a gain of 12.8 points. In contrast, the control group improved from 65.1 to 68.4, a marginal increase of 3.3 points. The improvement in the experimental group was statistically significant ($p < 0.01$), while the control group's gain was not ($p > 0.05$). When analyzing language skill areas separately, the experimental group demonstrated the greatest improvement in vocabulary (+15%) and listening comprehension (+13%). Reading skills improved by 9%, while teacher evaluations of speaking and writing suggested a 7% improvement. These results suggest that CLIL's emphasis on contextualized vocabulary and auditory exposure through lectures and multimedia supported language acquisition.Qualitative feedback supported the quantitative findings. Students in the experimental group reported that learning science in English helped them understand both the language and the subject better. Many expressed increased confidence in using English in real-life situations. Teachers noted that students in CLIL lessons asked more questions in English, showed greater interest in terminology, and were more active in group discussions. Classroom observations

revealed higher engagement, peer collaboration, and the use of academic English phrases during experiments and problem-solving tasks.

Discussion

The findings confirm that CLIL has a positive impact on the English proficiency of STEAM students in Uzbekistan. Students taught through CLIL not only improved their test scores but also gained functional language skills relevant to science and technology. The results demonstrate that integrating language learning into subject teaching can bridge the gap between theoretical knowledge and practical application in multilingual contexts.

These outcomes are consistent with international literature on CLIL. Studies from Spain and Italy also found that students exposed to CLIL in STEM subjects outperformed their peers in language acquisition, especially in academic vocabulary and listening. What distinguishes the Uzbek context, however, is the relatively limited exposure students have to English outside the classroom. This makes the role of CLIL even more critical, as it becomes one of the few authentic avenues for using English meaningfully.

The implications of these findings are far-reaching. For curriculum developers, the study underscores the need to design integrated materials that address both language and content learning. For teacher educators, it highlights the importance of preparing teachers to manage dual objectives—language and subject mastery. For policymakers, the results support further investment in CLIL-friendly environments, including bilingual textbooks, training, and assessment systems. Nevertheless, the study had limitations. It was limited to two schools in an urban setting and conducted over one semester. The sample size was relatively small, and teacher experience may have influenced lesson quality. Long-term effects of CLIL and its impact on deeper content understanding were not measured.Future research should consider longitudinal studies to evaluate sustained language and content learning outcomes. Studies in rural areas and among different age groups could provide a more comprehensive view. Further exploration into the integration of CLIL in other subjects, such as art or ICT, could help diversify the application of the approach across the curriculum. Additionally,

investigating how CLIL affects teacher development and classroom dynamics would offer valuable insights for implementation at scale.

Conclusion

This study demonstrates that CLIL is an effective strategy for improving English language proficiency in STEAM subjects among Uzbek secondary school students. Through exposure to subject-specific vocabulary and content in English, students in the experimental group showed notable gains in vocabulary, listening, and overall language competence. The findings suggest that adopting CLIL could be a significant step forward in aligning Uzbekistan's education system with international standards and preparing students for global academic and professional environments. Continued investment in teacher training, curriculum development, and educational research will be essential for the successful integration of CLIL across the nation's schools.

REFERENCES

Coyle, D., Hood, P., & Marsh, D. (2010). CLIL: Content and language integrated learning. Cambridge University Press.

Mehisto, P., Marsh, D., & Frigols, M. J. (2008). Uncovering CLIL: Content and language integrated learning in bilingual and multilingual education. Macmillan Education.

Lorenzo, F., Casal, S., & Moore, P. (2010). The effects of CLIL on learners' linguistic competence: A case study. International Journal of Bilingual Education and Bilingualism, 13(5), 561–576. https://doi.org/10.1080/13670050.2010.503586

Ministry of Public Education of the Republic of Uzbekistan. (2022). National strategy for foreign language development 2021–2025. Tashkent: Ministry of Public Education.

Dalton-Puffer, C. (2011). Content-and-language integrated learning: From practice to principles? Annual Review of Applied Linguistics, 31, 182–204. https://doi.org/10.1017/S0267190511000092