DESIGNING MULTIMODAL MATERIALS FOR CLIL-BASED INSTRUCTION

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ABSTRACT

This article examines the pedagogical foundations, design principles, and practical implications of creating multimodal instructional materials within the Content and Language Integrated Learning (CLIL) framework. With the rapid digitalization of education, multimodality has become essential for enhancing comprehension, supporting cognitive processing, and promoting both linguistic and subject-specific competence. Through a theoretical and analytical approach, the paper highlights strategies for designing multimodal resources tailored to technical education, particularly in fields such as information technology and cybersecurity. The study concludes that multimodal CLIL materials significantly enhance learner engagement, conceptual understanding, and academic language development, provided that they are designed systematically and grounded in cognitive and pedagogical theory.

Introduction

Content and Language Integrated Learning (CLIL) has become one of the most influential pedagogical approaches in modern higher education, especially in technical fields where subject knowledge and foreign language competence must develop simultaneously. As global demands on multilingual professionals increase, educators are seeking effective strategies to design multimodal materials that enhance interaction, scaffold comprehension, and support deep learning. Multimodality—involving visual, textual, auditory, and interactive elements—plays a crucial role in CLIL instruction, aligning with cognitive theories emphasizing dual coding, multimodal input, and active knowledge construction. This article examines principles, strategies, and practical guidelines for designing multimodal materials for CLIL-based instruction.

Theoretical Background

CLIL integrates content mastery with foreign language development through meaningful input, contextual practice, and task-oriented learning. According to multimodal learning theory, learners process information more effectively when concepts are presented through multiple modes-such as images, diagrams, audio explanations, simulations, and written text-because these activate different cognitive channels. In CLIL contexts, multimodal materials help reduce linguistic barriers, support comprehension of complex

concepts, and reinforce vocabulary acquisition through varied representations.

Dual Coding Theory further explains that verbal and non-verbal modalities strengthen memory retention when presented in supportive combinations. Similarly, Cognitive Load Theory highlights that multimodal materials can reduce extraneous load by distributing information across channels, providing visual scaffolds, and facilitating chunking of disciplinary concepts. Thus, multimodality is not simply an aesthetic choice but a cognitive and pedagogical necessity in CLIL classrooms.

Principles of Designing Multimodal CLIL Materials

Effective multimodal CLIL materials should follow core instructional design principles:

1. Cognitive clarity. Materials must simplify complex content through visuals, annotated diagrams, timelines, infographics, and concept maps. These help learners decode technical terminology and understand hierarchical relationships within subject matter.

2. Linguistic scaffolding. Textual explanations should include glossaries, highlighted keywords, sentence frames, and guided questions. Audio recordings and captions promote pronunciation development and reinforce comprehension.

3. Coherence and consistency. Multimodal materials must avoid unnecessary decorative elements. Consistent color coding, layout, iconography, and typography help learners create stable mental models, reducing extraneous load Interactivity and learner engagement.

Simulations, clickable diagrams, short videos, and micro-animations help students actively construct meaning. Interactive modes encourage problem-solving and content exploration, key aspects of CLIL pedagogy.

Cultural and disciplinary relevance

Examples, case studies, and datasets should reflect authentic disciplinary practices-especially for technical fields such as IT, engineering, and cybersecurity. This improves transferability of knowledge and motivates learners to apply concepts in real-world contexts.

Types of Multimodal Materials for CLIL Instruction. Depending on instructional goals, multimodal CLIL materials may include:

• Visual materials: infographics, charts, schematic diagrams, and flowcharts that simplify complex processes.

• Auditory materials: recorded lectures, podcasts, pronunciation guides, and sound-based comprehension tasks.

• Text-based materials: simplified texts, bilingual glossaries, guided reading sheets, and academic writing templates.

• Digital and interactive materials: simulations, animations, online whiteboards, interactive textbooks, and virtual labs.

• Multimodal assessment tools: digital portfolios, multimedia presentations, and scenario-based performance tasks.

For example, in a cybersecurity CLIL module, multimodal materials might include a diagram of network architecture with color-coded labels, an audio explanation of each component, a short reading passage defining key terms, and an interactive simulation that allows students to trace data packets or identify vulnerabilities. Such integration increases

comprehension by linking language and content through multiple channels.

Methodological Strategies for Implementation

To effectively integrate multimodal materials into CLIL instruction, educators should adopt the following methodological strategies:

1. Pre-task multimodal input. Introducing visuals, vocabulary lists, audio explanations, and short videos prepares learners for complex texts and tasks. This aligns with the scaffolding principle of CLIL.
2. Guided multimodal exploration. Learners analyze diagrams, interpret graphs, and complete structured note-taking activities. Teachers facilitate comprehension through guiding questions and think-aloud strategies.
3. Multimodal production tasks. Students create posters, infographics, presentations, or digital storyboards. These tasks integrate content knowledge with language production and promote higher-order thinking.
4. Multimodal assessment. Assessment should evaluate not only language accuracy but also the ability to interpret and produce multimodal disciplinary texts. Rubrics may include criteria for clarity, coherence, and appropriate use of visual elements.

Discussion

Multimodal CLIL materials enhance accessibility, comprehension, and learner engagement. They support diverse learning styles and compensate for linguistic gaps, enabling students to focus on understanding disciplinary content. However, challenges remain, including the time required to create high-quality materials, teachers' varying levels of digital literacy, and the need for institutional support. Future research should examine how AI-assisted tools, digital platforms, and automated design systems can streamline the creation of multimodal CLIL resources.

Conclusion

Designing multimodal materials is essential for effective CLIL-based instruction, especially in technical disciplines where concepts are abstract and terminology is dense. By following cognitive, linguistic, and pedagogical principles, educators can create rich learning environments that foster deeper understanding and multilingual competence. Multimodal materials not only support content learning but also empower students to interact with disciplinary knowledge through diverse communicative pathways.

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