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SCAFFOLDING SCIENCE FOR ENGLISH LANGUAGE LEARNERS: AN ACTION RESEARCH STUDY

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Introduction

In today's increasingly diverse and multilingual classrooms, students bring a wide range of cultural and linguistic backgrounds that enrich the learning environment. Among them, English Language Learners (ELLs) demonstrate remarkable resilience and determination as they navigate a curriculum that is both academically and linguistically demanding, striving to access and excel in content taught entirely in English. At the early or developing stages of their language acquisition, they rise to the dual challenge of mastering English and using it as the vehicle for understanding academic content. This article explores an action research study conducted at Hartland International School, aiming to improve ELLs' engagement, comprehension, and academic language proficiency through scaffolded instructional materials in secondary chemistry lessons.

Literature Review

Cummins (1979) offers a foundational distinction between Basic Interpersonal Communicative Skills (BICS) and Cognitive Academic Language Proficiency (CALP), noting that while ELLs may quickly develop conversational fluency (BICS), academic language proficiency (CALP), essential for success in content-heavy subjects like science, requires years of explicit instruction and targeted support. This gap between social and academic language underscores the importance of scaffolding as a pedagogical approach. Vygotsky's (1978) concept of the Zone of Proximal Development (ZPD) illustrates how learners can achieve higher levels of understanding when guided through challenging tasks by more knowledgeable others. Building on this, Gibbons (2002) emphasises the necessity of embedding language learning within authentic academic contexts, allowing students to develop disciplinary language as they engage with meaningful content.

Based on Crisfield's (2022) observations, appropriate scaffolding helps reduce ELLs' stress and frustration by building confidence and supporting learner autonomy. Therefore, teachers play a pivotal role in advancing both language and content development. Kinsella (2005) states that intentional scaffolding, through structured tasks and language support, enables students to build both linguistic competence and conceptual understanding. This includes the strategic use of sentence frames, visual representations, and tiered academic vocabulary to help learners access and articulate complex scientific concepts. Lemke (1990) and Schleppegrell (2004) further highlight that fluency in science entails more than knowing terminology; it involves learning how to "talk science", mastering the specific discourse patterns, argument structures, and modes of explanation unique to the discipline.

Methodology

This action research project was conducted in close collaboration with a Year 9 chemistry teacher to design and implement a modified chemistry booklet specifically tailored to support ELLs. The teacher initially provided the original chemistry booklet they typically used to teach the unit. This booklet served as the foundational material for the study, ensuring alignment with the existing curriculum and teaching objectives.

To better meet the linguistic needs of ELLs, the original booklet was carefully adapted to include targeted scaffolding strategies that focused on both grammar and vocabulary development. The modifications aimed to make complex scientific content more accessible through a range of guided language practise tasks, which included:

- Simplified vocabulary to reduce language barriers while maintaining key scientific concepts
- Image-label matching activities to build visual connections with terminology
- Multiple choice and true/false questions to encourage active recall and comprehension
- Cloze exercises designed to reinforce language structures within content contexts
- Sentence sequencing tasks supported by starter prompts to aid in constructing scientific explanations
- Word banks to provide ready access to essential academic vocabulary
- Text-based questions that required students to engage critically with the content and language

Qualitative data were collected through a semi-structured interview with the chemistry teacher following the implementation of the modified booklet. The interview employed open-ended questions to gather in-depth insights into the perceived impact of the scaffolding materials on student engagement, comprehension of chemistry content, and academic language development.

Methodology

The teacher interview revealed several notable positive outcomes associated with the use of the scaffolded chemistry booklet for ELLs. One of the most significant impacts observed was a marked increase in student engagement, which was reflected in greater motivation and initiative. ELLs began taking more detailed notes, both in English and in their native language and showed a growing curiosity that extended beyond the classroom, signalling a deeper investment in their learning.

In terms of academic understanding, the teacher noted that students demonstrated a stronger grasp of key chemistry concepts. They were not only better able to comprehend the material but also showed improvement in structuring responses to original exam questions, suggesting that the scaffolded tasks helped them internalise both content and academic language conventions. The booklet's explicit focus on academic vocabulary and exam expectations was instrumental in clarifying complex terms and requirements, allowing students to articulate scientific ideas with increased confidence and clarity. Importantly, students were given the choice to work from both the original booklet and the scaffolded ELL version. The chemistry teacher stated that offering this choice proved valuable, as it empowered students to engage with the material at their own level of readiness, promoting autonomy and ensuring meaningful access to learning.

Additionally, the booklet appeared to positively influence classroom dynamics. Several ELLs became more active participants in class discussions, using scientific terminology more accurately and confidently, which enriched peer interactions. The teacher also highlighted the booklet's value as an effective revision tool. Many students used it independently, allowing them to consolidate their understanding outside of formal lessons, including during ELL sessions.

However, the interview also highlighted certain limitations of the study. First, the small sample size and focus on one subject and year group reduce the generalisability of the findings. Second, time constraints in mixed-ability classrooms made it challenging to integrate scaffolded materials seamlessly into regular instruction. The detailed, language-intensive nature of the booklet occasionally caused a misalignment with the pace of mainstream instruction.

Results and Reflections

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Conclusion

This action research highlights the powerful role that scaffolded instructional materials can play in advancing English Language Learners' academic success. By integrating targeted language support into subject-specific content, the adapted chemistry booklet significantly improved students' academic language proficiency, conceptual understanding, and confidence in the classroom. Its most significant impact was observed when used as a consolidation and revision tool, effectively helping students overcome the challenging transition between language acquisition and mastery of subject content. Moving forward, it is essential to continue developing cross-curricular scaffolding strategies that support and celebrate the rich linguistic and cognitive diversity ELL students bring, turning challenge into opportunity and diversity into strength.

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