CLIL science classes in a Japanese senior high school: Focusing on the increase of procedural knowledge in language use

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The purpose of this research project was to investigate the extent that science classes conducted using CLIL in Japanese senior high schools affects the students’ increase of procedural knowledge regarding L2 (English) achievement. The theoretical framework is based on the effect of frequency and formulaic sequences (FSs) (Ellis, 2012). As students increase procedural knowledge using FSs, the better they are able to create production rules by finding and generalizing repeated language experiences according to ACT-R (Anderson, 1993). However, EFL circumstances have prevented students from using FSs in an authentic way. Therefore, the authors employed a CLIL framework that made it possible for selected grammatical structures to be intertwined with cognitive thought regarding the content.

The authors conducted a CLIL science lesson on refraction in which the students developed their hypothesis and collaboratively conduct an experiment using the third conditional. It was predicted that the students would borrow and generalize the FSs (e.g., If I had –ed the X, the Y would have been –ed) from the teachers examples. The CLIL group was instructed using CLIL with FSs (CLIL, N=78), whereas, the Non-CLIL group was taught using explicit grammar instruction (Non-CLIL, N=72).

The research utilized pre-test and post-tests between groups. To measure the students’ procedural knowledge a timed grammatical, judgment test and timed essay were used. The post-test revealed significant differences between groups (t (148) =-3.687, **p=.0003, d=.77, large). It was observed that properly used VO phrases and borrowed FSs on third conditional were used in the CLIL group. In conclusion, science classes conducted in CLIL supported students in both retrieving and internalizing FSs and increased their grammatical sensitivity.


Keywords: ”CLIL”, ”formulaic sequences”, ”procedural knowledge”, ”grammatical judgement test”.