The language focus of Science education integrated

with English learning



Sevilla, 5 de Septiembre 2017

Valentina Piacentini (valentina.piacentini@ua.pt), Ana Raquel Simões, Rui Marques Vieira University of Aveiro, Portugal

The main objective of our work – designed as a descriptive-explanatory case study – is to

understand what teaching strategies and classroom interactions have been developed in the CLIL-

type "English Plus" (EP) project at one Portuguese state middle school, when Science education is

integrated with English use/learning. CLIL is an educational approach (Content and Language

Integrated Learning) aiming both at learners' understanding of the specific content and (additional)

language acquisition (Coyle, Hood, & Marsh, 2010).

Research on the integration of Science education and English learning as well as on the Language

Sanmartí, 2007; Wellington & Osborne, 2001) is highly relevant, scientific literacy and language proficiency being learning priorities.

Characterization of teachers and students – through interviewing, questionnaire and observation –

shows the importance of developing a language-aware teaching approach to improve the subject

itself and student learning (Piacentini, Simões, & Vieira, 2016). The context-derived instrument

shown below has thus been constructed for investigating and supervising teacher planning and

classroom practices.

A. Referential framework for Science classroom discourse (Mortimer & Scott, 2003)

B. Science genresand language-based approach(Polias, 2006)

C. Science and English co-teaching in CLIL classes (Valdés-Sánchez & Espinet, 2016)

D. Language demands in

Science performance of ESL

(Bunch, Shaw, & Geaney, 2010)



E. Teacher scaffolding strategies (Escobar Urmeneta & Evnitskaya, 2014; Morton, 2012)

F. Language-focused Science education (Wellington & Osborne, 2001)

> **G.** 5E instructional model in Science education (Bybee, 2015)

B./D.	 Describing and organising the world scientifically Explaining events scientifically Arguing and challenging aspects of science 		E. F. <u>Teacher scaffolding strategies</u> (interactional resources and science languages)		
	 Adknowledging scientists Narrating 		VERBAL and prosodic elements	PRACTICES	RESOURCES and other interventions
	G		Paraphrasing/Explanations	Use of routines	Graphs, diagrams and tables
55	Student behaviour		Using first plural person	Activating prior knowledge	Visuals and imaginery
5E			Reinforcing definitions	Personalising information	Manipulatives
ENGAGE	Attentive in listening Ask questions Demonstrate interest in the lesson Respond to questions demonstrating their own entry point of understanding		Writing prompts / Giving clues	Explicit teach-model-practice-apply	Dictogloss
	 Conduct activities, predict and form hypothesis or make generalizations Become a good listener Share ideas and suspend judgment Record observations/generalizations Discuss tentative alternatives 		Use of cognates, synon.and anton.	Heterogeneous peer and group works	Dictionary, Thesaurus, etc.
EXPLORE			Waiting for the answer	Cooperative group techniques	Word wall; Labeled visuals
EXPLAIN	Explain, listen, define and question Use previous observations and findings Provide reasonable responses to questions • Interact in positive, supportive manner		Student response: elabor. + expans.	Variation of activity and exercise	Videos, animations and simulations
			Corrective feedback techniques	Role play and simulations	Concept maps
ELABORATE	 Apply new terms and definitions Uses previous information to probe, ask questions and make reasonable judgments Provide reasonable conclusions and solutions Record observ, explan and solut 		Use of songs, rhythm and rhymes	Cycle from oral-informal to written-formal	Equations and mathematics
EVALUATE	Demonstrate an understanding or knowledge of concepts and skills Evaluate her/his own progress Answer open-ended questions Provide reasonable responses to explanations or phenomena		Teaching familiar chunks	Process writing	Gestures and hand movements
			Accepting L1 and translating into L2	Use of rubrics for participation/discussion	Modulating gazes
			Developing questions gradually	Teaching proficiency through	Moving through the space

H. Relevant episode
 occurrence; classroom
 Representation; etc.
 (researcher contributions)

The tool enables the recording of and reflection on EP-classes in which English is learnt while used as a language of/for Science. Students may actually find difficulties in modalities of

(re)presenting Science knowledge and L2-learners have to confront, as any learner does, language demands in disciplines, all this requiring teacher awareness. Also through our instrument, the

CLIL approach in the EP project opens a possibility for Content teachers to understand and face the "weight" of language(s) in curricular topics, in favour of a quality Science understanding as well as authentic English practice.

This research requires a better comprehension of the suitability of English as a language and method for scaffolding Science learning and the refinement of the tool itself. Further collaboration

with participant teachers will be sought to identify, using our emerging framework, aspects pivotal for this educational integration.

Bunch, G. C., Shaw, J. M., & Geaney, E. R. (2010). Documenting the language demands of mainstream content-area assessment for English learners: participant structures, communicative modes and genre in science performance assessments. *Language and Education*, 24(3), 185–214.

Bybee, R. (2015). The BSCS 5E Instructional Model: Creating Teachable Moments. Arlington: National Science Teachers Association.

Coyle, D., Hood, P., & Marsh, D. (2010). CLIL Content and Language Integrated Learning. Cambridge: Cambridge University Press.

Escobar Urmeneta, C., & Evnitskaya, N. (2014). "Do you know Actimel?" The adaptive nature of dialogic teacher-led discussions in the CLIL science classroom: a case study. The Language Learning Journal, 42(2), 165–180.

Mortimer, E. F., & Scott, P. H. (2003). *Meaning Making in Secondary Science Classrooms*. Maidenhead: Open University Press.

Morton, T. (2012). Classroom talk, conceptual change and teacher reflection in bilingual science teaching. *Teaching and Teacher Education*, 28, 101–110.

Piacentini, V., Simões, A. R., & Vieira, R. M. (2016). Abordagem holística no sistema educativo português para desenvolver a(s) Literacia(s) das Ciências integradas com o Inglês. Indagatio Didactica, 8(1), 1975–1992.

Polias, J. (2006). Assessing learning: a language-based approach. *Symposium*, 40–65.

Sanmartí, N. (2007). Hablar, leer y escribir para aprender ciencia. In P. Fernández (Ed.), La competencia en comunicación lingüística en las áreas del currículo (pp. 103–128). Madrid: MEC.

Valdés-Sánchez, L., & Espinet, M. (2016). Una herramienta para el análisis de la colaboración docente en la integración de las ciencias y el inglés en el aula de primaria: la docencia compartida como herramienta innovadora de integración disciplinar. Badajoz.

Wellington, J., & Osborne, J. (2001). Language and Literacy in Science Education. Buckingam/Philadephia: Open University Press.





