

**APPROXIMATION TO A SCIENCE IN ENGLISH (CLIL) UNIT
TEST: STUDENTS' OUTCOMES AND GRADING**

**APROXIMACIÓN A UN TEST DE CIENCIAS EN INGLÉS
(AICLE): RESPUESTAS DE LOS ESTUDIANTES Y
CALIFICACIÓN**

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1. Theoretical framework

In an attempt at describing the relation between language and cognition, Jorba, Gómez and Prat (2000) propose a range of cognitive abilities which are activated so as to produce different text typologies. These abilities are deemed as “cognitive-linguistic”, due to them being bound to a set of text typologies. Abilities like “describing”, “defining”, “summarizing”, “explaining”, “justifying”, “arguing” or “demonstrating” can be recognized as such.

Regarding the exploration of cognitive domain, based on Bloom’s original taxonomy (1956), Krathwohl (2002) proposed a revision of the former nomenclature and definitions (with the result being, arranged from lower-order to higher-order, “remember”, “understand”, “apply”, “analyze”, “evaluate” and “create”).

Following Vygotskian ideas, Lemke (1990) proposes a model of teaching and learning science through talking science. This statement is not simply reduced to talking

about science, but refers to a broader vision centered on the fact that language is not just vocabulary and grammar, but also a system of resources for making meanings, which allows reasoning and problem solving.

Taking into account these implications, teaching science by talking science in a foreign language leads to a double tension for students: that of learning the language in which Science is taught and, simultaneously, that of learning science related content. Laplante (1997) proposes that “some of the classroom time allotted to language arts can be combined with that of science” (p.65). This vision germinates from Lemke’s vision of science as language, as students talking science need to use language to succeed using this set of processes on various cognitive skills, further drawing from the vygotskian socio-constructivist model of learning. The development of a set of specific abilities and particular knowledge are parallel and interdependent processes, taking into account the fact that cultural appropriation, or learning, constitutes the motor for a person’s development (Vygotsky, 1934, 1979).

Regarding the assessment of students’ responses, this study follows Jorba et al.’s (1998) proposal, with the following criteria to analyze texts created by students: appropriateness, completeness, precision, breadth of knowledge and organization of the text (p. 55-58).

This study is part of the larger research project “Academic discourse in a foreign language: learning and assessment of science content in the multilingual CLIL classroom (DALE-APECS)” (Ref. EDU2010-15783).

2. Objectives

This study focuses on the two following objectives:

1. to understand the rationale the teacher uses to set tasks and to grade students.
2. to describe the students’ performance in relation to the demands set by the teacher.

There is, however, a third sub-focus of interest, which is covered to a lesser extent:

3. to describe the relationship between the content knowledge displayed and linguistic tools used by the students to display that knowledge.

3. Method

The school where the sample was collected belongs to a state secondary school in the metropolitan area of Barcelona. The school is implementing a Foreign Language Educative Project based in the use of a foreign language to work on the curriculum of content-based subjects. This project includes teaching Science in English. The teacher received support from the collaborative research team CLIL-SI from the Universitat Autònoma de Barcelona. The teaching unit was implemented during the 2009-2010 course on a first year of secondary education and its materials were designed with the support of the collaborative research team CLIL-SI. The unit, titled “Life”, broadly covers the topic of the Catalan 1st year of secondary education Science curriculum “Life in Action” (Departament d’Educació, 2008: 92). Sixteen students went through the unit and took the test. The study focuses on the outcomes of the test from these students with the respective teacher’s grading and comments.

Fig.1. summarizes the methodological approach of the study, which consists in two foci:

Focus	Data	Method	Method to ensure reliability
Grading system of the test	Students’ responses of the test items, teachers’ grading of the test items, teachers’ comments.	Quantitative analysis of the students’ score.	Focused semi-structured interview between the researcher who gathered the data and the teacher. Teacher’s reflections.
Students’ discourse	Students’ responses of the test items.	Qualitative analysis of the responses. Qualitative analysis of the criteria (Jorba <i>et al.</i>).	Teacher’s comments, teacher’s reflections,

Fig.1. Methodological approach

4. Results

Fig.2. summarizes the teacher's attitude towards the language mistakes in the students' responses:

The teacher highlights the mistake and deducts score for it.	The teacher highlights the mistake but does not deduct score for it.	The teacher ignores the mistake.
<ul style="list-style-type: none"> • Mistakes which affect comprehensibility. • Mistakes related to the target language used throughout the unit. 	<ul style="list-style-type: none"> • Mistakes which do not seriously affect comprehensibility. • Language mixing (Catalan and Spanish). 	<ul style="list-style-type: none"> • Mistakes which do not seriously affect comprehensibility.

Fig.2. Teacher's attitude towards language mistakes in the test

5. Conclusions

The teacher states that she expected students to be able to extrapolate their knowledge and build interrelations within the target knowledge presented, rather than the memorization of facts and nomenclature. The test mirrors the tasks undergone in the classroom, as students are asked for written production but are also presented the chance of non-linguistic production as support (as in the task where students are asked to recognize the parts of the cells). Interestingly, even though the teacher expresses her wish to avoid percentages when assessing students, the written test features a percentage system.

In order to assess the linguistic tools used by students to display their knowledge in the test, it can be seen that the teacher focused on the precision of the students' lexical choices, providing in many cases the more appropriate alternatives in her corrections. Also, the completeness of the students' responses were key for achieving higher scores, with the teacher highlighting the parts of the question which were not answered by students and adding comments demanding explanations and justifications or adding target knowledge not mentioned as a comment. Other aspects taken into account were the breadth of knowledge displayed, closely related to the completeness of the answers, and the organization of the content displayed, as there were questions in the test which expressly asked students to order items.

Further studies within the framework of CLIL framework have been and are currently being carried out by CLIL-SI members within the area (see, for example, Canet & Evnitskaya, 2011; Eixarch, 2010; Escobar Urmeneta, 2010; Escobar Urmeneta & Nussbaum, 2011 and Evnitskaya & Morton, 2011).

6. References

- Bloom, B.S. (ed.) (1956). *Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook 1: Cognitive Domain*. New York: David McKay.
- Canet, R., & Evnitskaya, N. (2011). Rethink, rewrite, remake or learning to teach science through English. In C. Escobar Urmeneta, N. Evnitskaya, E. Moore & A. Patiño (eds.), *AICLE – CLIL – EMILE. Educació plurilingüe: Experiències, recerca & polítiques* (p.167-177). Bellaterra: Servei de Publicacions de la Universitat Autònoma de Barcelona.
- Departament d'Educació, Generalitat de Catalunya (2008). *Curriculum Educació Secundària Obligatoria*. Retrieved 28 march 2012 from: http://phobos.xtec.cat/edubib/intranet/file.php?file=docs/ESO/curriculum_eso.pdf
- Eixarch, E. (2010). *Activitats d'avaluació i ensenyament-aprenentatge en aules de secundària AICLE: un estudi de cas*. Unpublished MA thesis. Universitat Autònoma de Barcelona. Retrieved 28 march 2012 from: <http://www.recercat.cat/handle/2072/97380>.
- Escobar Urmeneta, C. (2010). *Hurdles or stepping-stones? An exploratory study into interdisciplinary discussions on CLIL pedagogy*. Paper presented at AILA CLIL Network Symposium.
- Escobar Urmeneta, C., & Nussbaum, L. (eds.) (2011). *Aprendre en una altra llengua / Learning through another language / Aprender en otra lengua*. Bellaterra: Servei de publicacions de la Universitat Autònoma de Barcelona.
- Evnitskaya, N., & Morton, T. (2011). Knowledge construction, meaning-making and interaction in CLIL science classroom communities of practice. *Language and Education*, 25(2), 109-127.
- Jorba, J., Gómez, I., & Prat, A. (2000). *Hablar y escribir para aprender*. Madrid: Síntesis.

- Krathwohl, D.R. (2002). A revision of Bloom's taxonomy: an overview. *Theory into Practice*, 41, 212-218.
- Laplante, B. (1997). Teaching science to language minority students in elementary classrooms. *NYSABE Journal*, 12, 62-83.
- Lemke, J.L. (1990). *Talking Science: Language, Learning and Values*. Norwood: Ablex Publishing Company.
- Vygotski, L.S. (1934/1979). *Aprendizaje y desarrollo intelectual en la edad escolar*. *Psicología y Pedagogía*. Madrid: Akal.
- Vygotski, L.S. (1979). *El desarrollo y los procesos psicológicos superiores*. Barcelona: Grijalbo.