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# Understanding the inventor's mind through patent analysis: A CLIL team-teaching experience at the Technical University of Madrid

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**Abstract**

We report on a CLIL-based team teaching initiative recently accomplished at the School of Agronomic Engineering of the Technical University of Madrid (UPM). Two teachers—an agronomic engineer and an applied linguist, together with around 20 master students, analyzed a patent document by contrasting it with a 'twin' research article written by the same authors on the same technology and examining their differing contexts and textual and social outcomes. The seminar, with a total duration of seven and a half hours and a hands-on approach, not only is intended to provide disciplinary (agronomical) and know-how contents (the inner workings of patent writing), but is also to raise audience sensitivity and foster transversal skills.


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## 1. Motivation and objectives

The motivation behind this specific seminar on patent analysis has been twofold: its content not only fosters an ideal collaboration between instructors—one very close to a CLIL 'adjunct model' or team teaching (Brinton et al. 1989, Greere & Räsänen 2008)—but also provides a 'know-how' (twofold in turn, as it refers to both technological knowledge and patent writing strategies) useful to the agronomic engineers' community of practice (Wenger 1998).


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Through systematic textual comparison focused on authorship, publication date, titles, visuals, promotional and vague language, contexts of use and informational structure of research articles and patents (hereafter RAs and Ps, respectively), community members may become more aware that knowledge construction comprises content and form alike, and that the different textual forms and writing conventions adopted by science and technology shape different perceptions of the same object or phenomenon. In a sense, this awareness of difference may paradoxically contribute to dilute the traditional dichotomy between art (patentable inventions) versus science (research), two approaches to problem-solving, the raison d'être of engineering, that nonetheless diverge in their use of shared repertoires and generate disparate discourses. Such divide was reinforced during the 1990s by the advent of the Internet, thanks to which the amount of scientific and technical information available has increased exponentially and been stored separately, nowadays with over 300,000 utility patents and 35,000 scientific papers online.

Another motivating advantage of Ps and RAs analysis has been that it brings to the fore three important components in engineering education: the scientific-technological, linguistic, and didactic factors. The participants may learn the history of a certain technology or scientific discovery by examining the evolution of the patent document over time, get familiarized with its field, tenor and mode (Halliday 1985), that is, with its technolect, legal jargon, rhetorical structure, and with the socially agreed conventions related to reader-friendliness (engagement) and medium-bound format, as well as with the repercussions all of these variables may bear on intellectual vindication. Simultaneously, seminar attendants have an opportunity for exercising their creativity and lateral thinking, reflecting on what information should be openly disclosed, expressed tacitly, or merely taken for granted. In this regard, science and technology communications differ considerably because of their opposed goals: dissemination for the former and marketization for the latter, even though research is becoming increasingly sponsored by private corporations. This two-faced reality has turned science and technology into 'twin dilemmas' with distinctive communicative needs but a common risk of misinterpretation and distortion.

Together with providing engineers with practical skills, the primary objective of the course is a mind adjustment at a social and an operational level, closely intertwined. From a social standpoint, the participants hone their audience sensitivity (having to write for lay and expert readers at a time), learn to discern the utility and investment feasibility of inventions, and enjoy the pleasure of modulating linguistic vagueness/accuracy, always within a minimum of descriptive precision. Operationally, they keep up with the current technological achievements in their field, understand the motivations and writing behaviour of patentees, and practice the verbalization of visual messages and the visualization of verbal ones. Obviously, verbalization and visualization depend on the type of audience and technological surveillance requires understanding the validity of inventions and the inventor's mind. And conversely, grasping these last two aspects helps to stay informed about recent patents and detect inventive gaps.

**Nomenclature**

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| CLIL | Content and Language Integrated Learning |
| P(s) | Patent(s) |
| RA | Research article |

## 2. Seminar features

For this first seminar edition we selected a twin example (patent/research paper) related to agricultural machinery. In particular, one with a dedicated device that enables the segregation of grain and other materials (MOG) by means of a multispectral vision device, something rather new that has already been commercialized with great success and gained the recognition of technical awards.

Daily class dynamics consisted of three slots: a brief lecture (including a slide show) on all the technical and linguistic information necessary to accomplish the tasks of the corresponding worksheet of the day, workshop time, and a final discussion. Worksheets are completed during workshop time and subsequently discussed, and extra 'food for thought' and pending tasks, if any, are assigned as homework and commented on in the next session. The topical