



Open science notebooks: New insights, new affordances

Shirley Carter-Thomas^{a,*}, Elizabeth Rowley-Jolivet^b

^a *Institut Mines-Télécom (Télécom Ecole de Management), Evry 9 rue Charles Fourier, Evry 91011, France*

^b *Laboratoire Ligérien de Linguistique, Université d'Orléans, Université d'Orléans, UFR LLSH, 10 Rue de Tours – BP 46527, 45065 Orléans cedex 2, France*

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Abstract

New media have had a profound impact on the way scientists access, carry out and communicate their research. Driven by the impetus of the Open Science movement, some researchers have put their laboratory notebook online, providing access to this occluded and largely unexplored research genre. Drawing on the notion of the adaptability of language, this paper proposes a case-study of an online genomics notebook from two perspectives, inter-generic and intra-generic. We first investigate the considerable adaptation that takes place when the record of experimental work in the notebook is shaped into a public research claim in the downstream research article genre, focusing on utterer-interpreter relations and the immediacy of the notebook vs the decontextualized reconstruction of the article. We then investigate how migration to the web also results in adaptation by comparing the online notebook with the traditional paper notebooks used in science labs. The comparison shows that the online version places more emphasis on emotive elements and that its language and presentational features are more informal. We conclude with some comments on the metapragmatic awareness of the author of the online notebook as he navigates between these different genres and media.

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1. Introduction

With the development of computer-mediated communication, many well-established discourse genres, such as research articles, company and institutional brochures, and encyclopedias, have migrated to the web. Some have remained unchanged in this migration process, while others have undergone major transformations. The genre that we will focus on is one that has a very long history in science, the laboratory notebook. The notebook is a type of research diary in which scientists note all their raw and processed data, including failed experiments (so-called 'dark data'; Heidorn, 2008), errors, comments, speculations and interim results. It provides a continuous record of the research undertaken from the initial idea to the conclusion. The notebooks of famous scientists have been studied posthumously for the light they throw on scientific inventions and the history of science,¹ and modern notebooks by archivists responsible for the preservation of research data (Welfel, 1999; Doorn and Tjalsma, 2007) or by information scientists developing digital laboratory technologies (e.g., Shankar, 2004). More broadly, laboratory activity and lab talk were analyzed in the seminal studies by Knorr-Cetina (1981), Lynch (1984) and Latour and Woolgar (1986) in particular, which revealed the indexicality

* Corresponding author.

E-mail addresses: shirley.thomas@telecom-em.eu (S. Carter-Thomas), elizabeth.jolivet@univ-orleans.fr (E. Rowley-Jolivet).

¹ See for example: edison.rutgers.edu/papers.htm; einsteinpapers.press.princeton.edu.

and contextual contingencies of scientific research and highlighted the process of recontextualization that takes place when lab work is re-mediated in the research article. The ethnographic perspective of these field studies, however, precluded a detailed linguistic or discourse-pragmatic analysis of the text of the notebooks themselves. Such a study seems long overdue, since despite profound changes in scientific methods and technologies over the centuries, lab notebooks continue to be used by modern experimental scientists as they are an essential tool in their daily activity. The basic reason for this neglect is that it is extremely difficult for outsiders such as discourse analysts to have access to these traditional lab notebooks; they never leave the lab and are often kept under lock and key, as they have a legal function, particularly with respect to patents and intellectual property disputes. In the last two decades, however, new media have had a significant impact on the way scientists access, carry out and communicate their research. The rise of open access journals, the creation of vast online databases of scientific information, and the burgeoning of scholarly blogs are but a few examples of these developments. In addition, under the impetus of the Open Science movement, with its agenda of promoting transparency in science, data-sharing, and discussion outside the confines of the research article, a few researchers have begun to place their lab notebooks online,² thus opening a window onto this unexplored side of scientific research and to previously confidential or 'private' data.³

The present study has a twofold aim. As the notebook is the first written record of the research, far upstream from the research article, it offers a unique opportunity to compare these two genres in order to measure the considerable adaptation that takes place as this initial record is shaped into a public research claim. A pragmatic and linguistic characterization of the open notebook's main features will provide us with interesting insights into the adaptation processes at work as we move along the genre chain. Adaptation also takes place, however, when a given genre is transferred to a different medium, as in the case of the laboratory notebook studied here, which has migrated from the lab to the web. To explore this intragenetic process, we also compared the online notebook with the traditional paper notebook commonly used in labs. We were particularly interested in discovering to what extent the open notebook exploits the affordances of the web medium and their impact on linguistic features.

A key notion in conducting these types of inter- and intra-genre comparisons is that of language use as the continuous making of choices, or the *adaptability* of language, defined by Verschuere (1999: 69) as "the property of language which enables human beings to make negotiable linguistic choices from a variable range of options in such a way as to approach points of satisfaction for communicative needs". He further defines four angles from which language adaptability can be investigated in a pragmatic perspective: the contextual correlates of adaptability, its structural objects, its dynamics, and the salience of adaptation processes.

Among the contextual correlates, two important issues are the language users involved and the utterer/interpreter relations, which differ according to the communicative context. The mental, social and physical worlds in which the language is used also vary, triggering different language choices related to cognitive and emotive elements, norms and rules, interpersonal distance or temporal and spatial deixis. Language is also adaptable at all levels of structure, from the phoneme to the discourse genre, with few fixed form-function relationships. This can lead to different lexicogrammatical choices ranging from style (informal/formal) to the expression of modality. Accounting for the dynamics, or processes, of adaptability is seen by Verschuere as the central task of pragmatic investigations, since "what pragmatics adds is the specifically dynamic perspective on the interadaptability of context and structure in actual language use" (Verschuere, 1999: 147). Lastly, the salience of these adaptation processes depends on language users' metapragmatic awareness (or capacity for reflexivity) in their language choices: while some choices are automatic or unconscious, many are deliberate and conscious.

These four angles have guided our choice of features to be analyzed. The different utterer/interpreter relations, and the marked differences in the mental, social and physical worlds of conducting laboratory work on the one hand and writing for publication on the other will be explored through analysis of the use of subject pronouns and author roles, while the change in the spatial and temporal correlates of each genre leads us to analyze the immediacy of the lab record vs the decontextualized reconstruction of events in the article. Migration of the lab notebook genre from paper to the web induces a profound change in the participation framework, changing utterer/interpreter relations, as the addressee mode is now one-to-many rather than one-to-few, while the shift to a medium characterized by its exploitation of emotive elements and informality of language and typography impacts the style and presentational features of the open notebook. Lastly, we inquire into the degree of metapragmatic awareness of the author of the open notebook selected for the study as he navigates between these different genres and media. The study concludes with some reflections on the insights gained into the adaptation induced by changes in genre and medium, and the contribution of the present study to the ongoing debate about genre repurposing in new media.

² Open Notebook Science: onsnetwork.org.

³ According to the science researchers we consulted, this trend is unlikely to become widespread because of the confidentiality and sensitivity of many research projects.

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