View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by WestminsterResearch

UNIVERSITY OF
FORWARD
THINKING
WESTMINSTER

WestminsterResearch
http://www.westminster.ac.uk/westminsterresearch

Understanding academic language using the science that makes the news

Paterson, R.

This is an electronic version of a paper published in the proceedings of *Teaching Foreign Languages: Present and Future,* Uzbekistan State World Languages University, 29 September to 1 October 2016, pp. 28-33.

The WestminsterResearch online digital archive at the University of Westminster aims to make the research output of the University available to a wider audience. Copyright and Moral Rights remain with the authors and/or copyright owners.

Whilst further distribution of specific materials from within this archive is forbidden, you may freely distribute the URL of WestminsterResearch: ((http://westminsterresearch.wmin.ac.uk/).

In case of abuse or copyright appearing without permission e-mail repository@westminster.ac.uk

R. J. Paterson *(UK, London)*

UNDERSTANDING ACADEMIC LANGUAGE USING THE SCIENCE THAT MAKES THE NEWS

This article reports on a study examining changes that scientific texts undergo when they are re-written for different audiences. The study tracks the language and semiotic transformations made to original texts as they travel across different spaces and times, and offers suggestions for pedagogical applications in an EAP context.

Key words – EAP pedagogy, linguistic/semiotic transformations, scientific texts,

Introduction

In the process of travelling across space and time, texts undergo a number of changes. Such transformations result from lifting a text from its original context of production and re-contextualising it in a new setting of consumption. This process usually involves refocusing the original meanings or aims to meet the real or perceived expectations of the new audiences. Using different versions of texts based on a single scientific study is useful in EAP pedagogy as we can track points on the journey where the language becomes less academic as it is adapted for audiences. By applying an academic literacies approach we can bring generic and discipline-specific approaches closer together and offer students opportunities to de-construct and co-construct discourses. In doing so, students can develop a critical approach to not only their own academic discourses but also to broader contexts. We believe that a critical analysis of textual transformations can allow us to advance our understanding of how and why changes occur. We argue that when scientific texts are re-entextualised they are not simply rephrased or simplified to make them accessible to other audiences [4], they also undergo processes that involve issues of social power, authority and access.

Background to the study

The study of how texts undergo transformations as they are reinterpreted for different audiences is by no means a new area of research [1], [2]. However, in more recent studies there has been increased focus on how the meanings of the texts themselves can transform, and these have covered a wide range of academic disciplines; e.g. media discourse [9], semiotics [6], and education [5]. Our review of the literature has revealed that there is limited research on how specifically scientific texts undergo aspects of textual transformations, and perhaps more importantly how subsequent re-contextualisation affects the dissemination of knowledge to different audiences. The audiences targeted for these texts include scientists reading peer reviewed research papers, followers of popular science in specialised magazines and the general public reading print or online newspaper stories. The present research, undertaken by the STEAM (Science, Technology, Engineering, Arts and Maths) Research Group at the University of Westminster, London, focuses on the importance of recognising knowledge creation and its dissemination as a complex mixture of interrelated social

practices; a process that involves both the producers and consumers of texts. It is not only the trajectories of knowledge creation and transformation that can be better understood; there is also call for improvement in how the scientific community interacts and communicates with non-scientists.

Key terminology and heuristics

Before detailing some preliminary findings in the research, here is an explanation of some of the terminology that is used in the project. The term *entextualisation* refers to the process of how scientific knowledge is first written or spoken in order to transmit new knowledge; *re-entextualisation* refers to how that knowledge is re-interpreted, re-organised, re-focused and re-contextualised [3]. The entextualisation and subsequent re-entextualisations can be tracked across different *episodes*, the first episode being the original entextualisation of scientific knowledge. This is typically publication in a scientific journal, with the intended audience being subject specialists, academics and educators. Subsequent episodes, of which there can be any number, involve the re-entextualisations, that is, the text in the previous episode is used as the source text in transforming the content for consumption by a different audience. This new audience could be readers of a scientific magazine such as New Scientist or visitors to a web site such as ScienceDaily. Further episodes could be produced for publications such as daily newspapers or lifestyle magazines. Key to the process of producing episodes is the further from the original entextualisation we go, the less recognisable the new knowledge intended for initial dissemination. Two related process that contribute to this are the writer's interpretation of the previous episode, and their interpretation of the expectations of new audiences. Figure 1 illustrates the various elements involved in re-entextualisation over a number of episodes involving social agents (writers and researchers) and artefacts (research articles, academic presentations, print or online media).

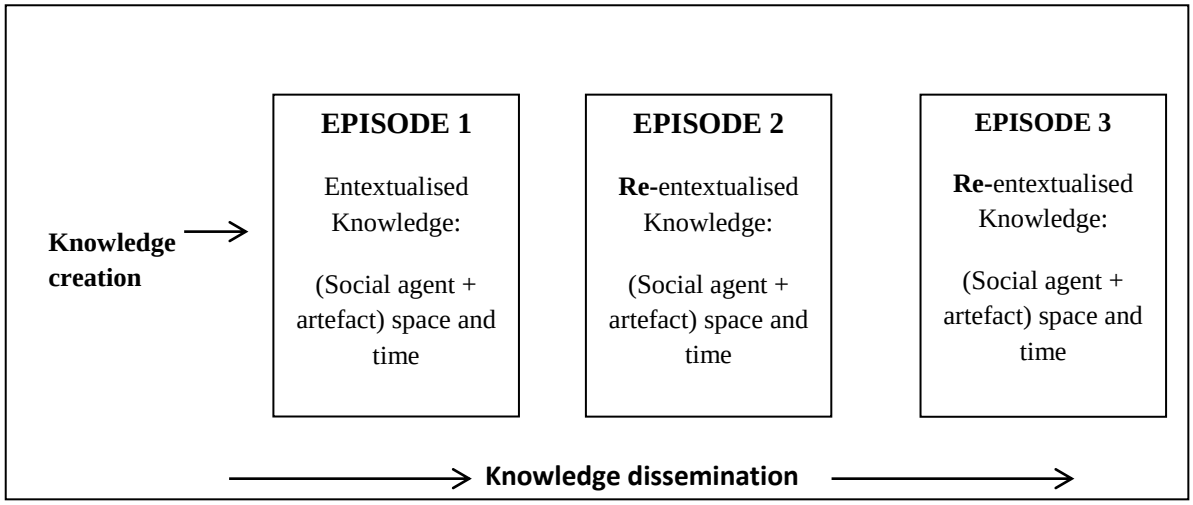

Figure 1. A heuristic for analysing trajectories of scientific knowledge (EPKOT)

We have named this heuristic EPKOT (Episodes in Trajectories of Knowledge). In each episode agents make their own interpretations of the knowledge presented to them, and have their own aims when re-entextualising it, often projecting their own forms and meanings onto re-entextualised knowledge. This process of recreating texts and their meanings becomes clearer when examining artefacts by a means of a semiotic heuristic, illustrated here in Figure 2.

	Episode 1: [artefact source]	Episode 2: [artefact source]	Episode 3: [artefact source]
Data/Evidence →	**Artefact script**	**Artefact script**	**Artefact script**
Levels of analysis ↓			
Textual: • Lexis • Structure • Voice Etc.			
Rhetorical: • Focus • Organisation • Effect Etc.			
Semiotic: • Meaning making • Indexical features • Attribution of authority Etc.			

Figure 2. A heuristic for analysing re-entextualised knowledge (TRESE)

This semiotic heuristic has been developed on the back of previous studies analysing text and rhetoric [7], [8], and semiotics [2]. The meeting of these analytical elements in a new heuristic allows us to identify Textual, Rhetorical (e.g. grammatical and structural features) and Semiotic elements (e.g. writer's positioning), which we have labelled as TRESE. Using TRESE makes it easier for us as researchers (and also students as learners) to identify any elements in the texts that that have been changed across re-entextualisations.

Preliminary findings and pedagogical applications

Here we share some preliminary findings from our on-going study. Figure 3 illustrates the trajectories of a piece of scientific knowledge from its original entextualisation in *Nature* (a scientific journal), to its first re-entextualisation in the *New Scientist* (a scientific magazine), and to its second re-entextualisation in the *Daily Mail* (a British tabloid). Figure 4 shows an analysis of some of the textual, rhetorical, and semiotic elements in the three artefacts of Figure 3.

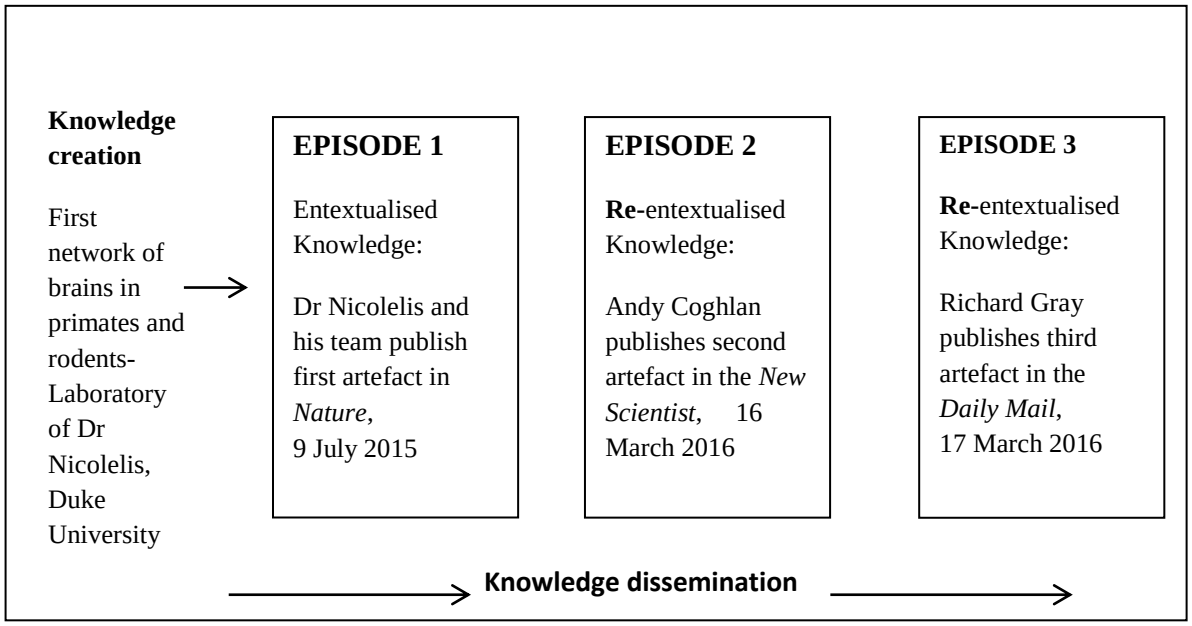

Figure 3. Application of EPKOT

	Episode 1: NATURE	Episode 2: NEW SCIENTIST	Episode 3: DAILY MAIL
Data/Evidence →	**Building an organic computing device with multiple interconnected brains** In our Brainet, all four rats were chronically implanted with multielectrode arrays, placed bilaterally in the primary somatosensory cortex	**Rats learn to sense infrared in hours thanks to brain implants** His team implanted four clusters of electrodes in the rats' **barrel cortex** – the part of the brain that handles whisker sensation	**Could we soon have superhero NIGHT VISION? Brain implants could give us a 'sixth sense' by making us see infrared** The scientists implanted four clusters of electrodes into a part of the brain responsible for whisker sensation in rats
Levels of analysis ↓			
Textual: Lexis	Scientific, formal, and precise	Informative, informal, and less precise	Evocative, informal and the least precise
Rhetorical: Focus	Experiment and processes	Participants and results	(Assumed) Implications for readers
Semiotic: Attribution of authority	Direct ("our")	Attributed ("his")	Anonymised ("the scientists")

Figure 4. Application of TRESE

As scientific knowledge is re-entextualised it tends to keep its procedural nature. Details of what was done, and how, are repeated or reported across episodes. This shows that in each episode the processes are given authority. However, as the data and evidence presented in the first episode moves across space and time it becomes less specific in its content and linguistic representation; the lexis is simplified,

subsequently rendering it less technical and more opaque but at the same time more evocative. In some instances scientific terms are rephrased to make them more accessible to non-specialist audiences, in others the phrases are explained. On occasions the technical specifications are lost altogether, in effect silencing the authority from previous episodes. Perhaps the most revealing aspect of re-entextualisation is how the rhetorical focus of the each episode changes. In the example in Figure 4, episode 1 details the scientific experiment and procedures (building an organic computing device), episode 2 focuses on the participants and main findings (rats learn to sense infrared), while episode 3 emphasises the applications or benefits (superhero night vision). These benefits are headlined in the episode; promises of today's science fiction becoming tomorrow's science fact. The acknowledgment of the creators is less evident as we pass through episodes. In episode 1 first person "our experiment" is used to show direct authority over the procedures. In episode 2 second person "his team" acknowledges the creators, but in episode 3 the authority over knowledge creation is virtually anonymous with participants referred to as "scientists". Over the course of three episodes the creators of knowledge have been reduced from real people with names to anonymous men or women in lab coats.

The main pedagogical applications of our research come in the form of awareness raising activities. Students of scientific subjects can become more aware of how knowledge travels across space and time. In light of increasing demands for interdisciplinary skills among students, we also argue that students of non-scientific subjects can benefit from this. Students can find current news stories that report some form of new knowledge or discovery, and then try to trace the knowledge back to its original creation point. In the process of doing this students can enhance their analytical skills, choosing from a range of semiotic and linguistic tools to analyse and deconstruct texts. While much work can be done on analysing the texts themselves, another approach may be to focus on the audience profiles for each episode. Acquiring the skill of writing for different audiences is a challenge that students of any academic discipline are likely to have to face. By analysing different audience profiles across episodes students can develop a more acute awareness of how to engage new audiences. Questions to be asked of audiences include who they are, what they may like to know, how knowledge may influence/impact their daily life and how they may engage with scientific knowledge differently. Students can engage in their own re-entextualisation practices, and in the process develop valuable written and spoken communication skills.

Despite much research in the field of text trajectories, very little is known about trajectories and transformations of entextualised scientific knowledge. We hope that our research will go some way to advancing our understanding of how and why scientific knowledge is re-entextualised the way it is, and as a corollary develop engaging and productive pedagogical applications to help students become more effective learners and more proficient communicators.

References

[1]. Bakhtin, M.M. (1986). The problem of speech genres. In M. M. Bakhtin, C. Emerson and M. Holquist (Eds.), *Speech Genres and Other Late Essays* (pp. 60-102). Austin, TX: University of Texas Press.

[2]. Bauman, R. and Briggs, C. L. (1990). Poetics and performance as critical perspectives on language and social life. *Annual Review of Anthropology*, 19, 59-88.

[3]. Blommaert, J. (2005). *Discourse: A critical introduction*. Cambridge: Cambridge University Press.

[4]. Cook, G., Pieri, E. and Robbins, P. T. (2004). The scientists think and the public feels: Expert perceptions of the discourse of GM food. *Discourse and Society,* 15(4), 433-449.

[5]. Gourlay, L., Lanclos, D. M., and Oliver, M. (2015). Sociomaterial texts, spaces and devices: Questioning 'digital dualism' in library and study practices. *Higher Education Quarterly*, 69(3), 263–278.

[6]. Kell, C. (2015). "Making people happen": Materiality and movement in meaning –making trajectories. *Social Semiotics*, 25(4), 423-445.

[7]. Lillis, T. (2008). Ethnography as method, methodology, and "deep theorizing": closing the gap between text and context in academic writing research. *Written Communication*, 25(3), 353–388.

[8]. Lillis, T and Curry, M. J. (2010). Academic writing in a global context. The politics and practices of publishing in English. Abingdon: Routledge.

[9]. Romaniuk, T. (2014). Text trajectories and media discourse: Tracking gendered representations in presidential politics. *Language and Gender*, 8(2), 245-267.