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THE MWSWEB PROJECT
Accessing medical discourse in video-hosting websites

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Abstract – Video corpora are one form of specialised corpora that can be used to promote the use of video-hosting sites, such as YouTube and Dailymotion, in domain specific university language learning courses. The article reports the experiences of a group of researchers, working in a variety of roles and from different perspectives, to promote the use of videos hosted on such sites in English for Medical Purposes (EMP) courses. The article describes how the MWSWEB platform modifies access to such sites in ways compatible with corpus-based exploration of domain-specific videos thereby encouraging university students to build their own video corpora under the guidance of their teachers.

Keywords: video corpora, annotation and transcription; OpenMWS; House Corpus; EMP (English for Medical Purposes).

1. Introduction

This chapter[1] describes three English for Medical Purposes (henceforth EMP) case studies that illustrate the goals of the MWSWeb Project undertaken in the light of the growing engagement with online videos characterising many aspects of university research, teaching and training. The existence of online

[1] The chapter brings together four papers presented at the International Conference on *Specialised Discourse and Multimedia: Linguistic features and translation issues* held in Lecce (Italy), 14-16 February 2019. Section attributions are as follows: Sections 3 and 7 were written by Davide Taibi; 4 by Anna Loiacono; 5 by Ivana Marenzi; 6 by Francesca Tursi; 8 by Deirdre Kantz; 1, 2, 9 and 10 by Anthony Baldry. The MWSWeb platform is the work of one of the authors, Davide Taibi, and is accessible to authorized users at: http://mws.itd.cnr.it. A few weeks after submitting this chapter for publication in February 2019, we learned that Francesca Tursi, who for many years worked as a CEL specialising in Medical English at the University of Foggia's Language Centre, had passed away. We miss her very much and dedicate this chapter to her memory.

video-sharing sites like Vimeo.com (November 2004), YouTube.com (February 2005), Dailymotion (March 2005) and TedTalks on Ted.com (June 2006) has removed some of the previous impediments to the construction and use of video collections in Higher Education. For example, video annotation projects are no longer dependent on the constant need to convert video tapes into digital files hosted locally on University servers (Baldry 2004, 2005; Coccetta 2004, 2008, 2011). In their turn, however, video-hosting sites have generated other hurdles which need to be overcome. Not least of these are the difficulties in meeting and catering for undergraduates' expectations about training in video analysis in a society which encourages them, as a means of career promotion, to make their own video CVs and video demonstrations (Hafner 2014). Alas, all too often these 'encouragements' come without the appropriate skills or awareness of the complexity of video genres (Coccetta 2020; Taibi *et al.* 2015) and hardly ever with the provision of *what-if* functionalities that allow videos to be broken up and re-assembled in different ways. This is, instead, a key aspect of the case studies presented in this chapter which illustrate the potential of the MWSWeb platform, the cornerstone of the MWSWeb Project.

The cases studies describe the step-by-step construction of collections of online videos in the context of EMP teaching and learning, each of which constitutes a multimedia corpus that helps users identify different types of video sequences thanks to the MWSWeb platform's various search mechanisms that retrieve data from the tagged corpus. While the design and implementation of the MWSWeb platform was undertaken by the research team (Taibi, Marenzi, Ahmad 2019; Baldry 2019), various aspects of corpus construction, including the manual annotation process, have been entrusted in the MWSWeb Project to students enrolled in language-related degree courses (LANG students). Their successful engagement with various transcription and annotation tasks and the ease with which they have carried them out is a demonstration that undergraduate students are capable of, and derive benefit from, the construction of online multimedia corpora (Ackerley, Coccetta 2007a, 2007b; Baldry 2005, 2012; Coccetta 2004, 2008, 2011; Baldry, Kantz 2009; Loiacono, Tursi 2019; Taibi, Marenzi, Ahmad 2019). As documented below, the case studies illustrate how LANG students' efforts have helped to provide teachers with access to online multimedia corpora which have proved to be particularly useful when engaging with undergraduate students enrolled in medical degrees (MED students) and with postgraduate students entrusted with healthcare worker duties in hospitals (HCW students).

So far in the MWSWeb Project, the online MWSWeb platform has undoubtedly assisted all the University students involved, regardless of the category to which they belong, by making available tools that stimulate the critical reflection required in all forms of university training but which have not so far emerged in the context of video-sharing websites. A good example

is the playlist. Previously the preserve of disk jockeys, the playlist is now used to provide structured online video pathways, a first step towards sharing experiences of videos on a common theme. The Khan Academy's successful implementation of structured film sequences on medical themes (www.khanacademy.org) is an impressive example. However, despite their successful use for the delivery of stepped sequences of lessons (Snelson 2010), playlists seem unlikely to undergo further development in ways that correspond to the level of critical reflection on videos that students require when facing up to the digital age's demands. The same may be said of other ways of structuring and guiding user interactions in video-hosting sites. The *channels* found in the video-sharing sites listed at the start of this chapter are little more than an index to collections of videos produced or promoted by specific individuals or organisations while viewers' *comments* unsystematically mix significant critical insights with less illuminating observations.

Although the case studies presented below illustrate the use of tools that adapt video-hosting sites to EMP needs, the MWSWeb Project is, in principle, concerned with the needs of all Higher Education students. Online multimedia corpus tools that allow videos to be broken up and recombined are important in promoting any student's capacity to incorporate different perspectives in their thinking about videos regardless of whether they are LANG, MED or HCW students or whether they belong to any other student category. LANG students, in particular, lack the facilities for hands-on corpus-based exploration which underpin the task of learning how to make comparative critical observations on a video's semiotic organisation and how this might be affected by changes to soundtracks (as happens with dubbing changes), videotracks (such as when overlays, captions and subtitles are added or modified) or when supporting texts (multilingual transcripts, video overlays) are introduced (Baldry *et al*. 2007).

In its demonstration of how the MWSWeb Project is attempting to address these shortcomings, the chapter is organised in the following way. After an introductory section (Section 2) explaining the background and early stages in the development of the MWSWeb Project, the chapter describes three case studies assigned to LANG students whose completion was essential in the development of EMP courses. Specifically, Section 3 describes the role LANG students played in tagging the multimedia House Corpus, the first corpus interface to be constructed in the MWSWeb platform, while Section 4 explains how their work has supported the first stages in the construction of an EMP multimedia corpus concerned with MED students' encounters with colour-based medical grading systems. Likewise, Section 5 describes LANG students' roles in creating scene typologies in the House Corpus, while Section 6 illustrates how these were used in EMP lessons for MED students concerned with the expression of pain. Section 7 instead

describes LANG students' engagement with the transcriptions and annotations that need to accompany YouTube videos when the latter are accessed through the OpenMWS interface, a second corpus interface that has now been added to the MWSWeb platform. Section 8 instead describes HCW students' engagements with online tools incorporated in this second interface and also recounts the part LANG students have already played and are expected to play to this end. A brief discussion of the results so far achieved and the conclusions about the MWSWeb Project are given in Sections 9 and 10.

2. An overview of the MWSWeb Project

Before presenting the three cases studies mentioned above, a brief summary of the main facts and stages of the MWSWeb Project is in order. As will be apparent from what has been stated above, so far two stages have characterised the development of the MWSWeb platform, the cornerstone of this undertaking. The first, now completed, stage was concerned with the development of a specific multimedia corpus, the House Corpus (Baldry 2019, Coccetta 2019; Loiacono, Tursi 2019; Taibi, Marenzi, Ahmad 2019), which provided scene-based access to the House M.D. series hosted on the Dailymotion site. This was followed by a second stage of development that introduced the OpenMWS interface. As its name suggests, the latter has broadened the possibilities for student-centered projects by providing access to specific sequences in the videos hosted on the YouTube site. The first two case studies presented below mainly concern LANG students' transcription and annotation of scenes in videos in relation to the House Corpus and the House M.D. TV series (Sections 3-7), while the third case study (Sections 7-8) details their work using OpenMWS to transcribe and annotate sequences in YouTube videos.[2]

In ways detailed below, the MWSWeb Project promotes the active and voluntary participation of university LANG students to master and test out the viability of the methods used for the transcription and manual annotation of online videos. All the case studies described below involved LANG students' engagement in the construction of corpora to be used in EMP teaching for the benefit of MED and HCW students. In this respect, the MWSWeb Project also constitutes a test of the students' ability to complete multimedia corpus construction tasks. In other words, besides exercising

[2] In passing we may mention that the project is a successor to the MCA and MCAWeb projects that successfully performed some of the multimedia corpus-construction tasks described below (Ackerley, Coccetta 2007a, 2007b; Baldry 2005, 2011; Coccetta 2004, 2008, 2011) but did not specifically address the issue of access to video-hosting sites. In this respect, as with any software platform, there is a need for constant road-testing through case studies and the subsequent introduction of improvements (Baldry *et al*. 2020; Marenzi, Kantz 2013).

LANG students' discourse analysis skills, their direct participation in the construction of specialised multimedia corpora ensured their greater awareness of the nature and functions of multimedia corpora (Baldry 2012). 'Video annotation' and 'video analysis' are, of course, key terms in the design of many computer systems. Most of these, however, relate to projects undertaken in a research laboratory environment requiring the participants to have advanced IT skills. This chapter, on the contrary, is concerned with video analysis that can be handled by LANG students whose digital skills roughly correspond to ECDL Base Modules (http://ecdl.org/about-ecdl/base-modules). As such, the MWSWeb Project is ultimately concerned with assessing LANG students' individual and collective perception of the value of video annotation and transcription and, above all, whether they feel that such tasks lead to better understanding and critical appreciation of videos in the specialised domain of medical and healthcare science.[3]

In the MWSWeb Project promoting students' annotation and transcription skills and developing new video analysis tools go hand in hand. As described below, without the LANG students' participation, it would not have been possible to complete the various stages in the project, which effectively would have led to the project's termination. The ultimate measurement of success for the MWSWeb Project does not lie in responses to anonymous questionnaires but rather in the students' ability and desire to complete the tasks assigned and to provide feedback that are inputs for new tools. In this respect, at the very outset of the MWSWeb Project and before initiating the participating students' online engagements with specialised corpora, an initial offline task was undertaken that identified all the medical acronyms in the House M.D. TV series. This task required the students to read through all the episode transcripts and annotate each acronym. As well as providing encouragement to proceed with the online aspects of the MWSWeb Project, the successful completion of this task also made it possible to improve the House Corpus interface by incorporating specific acronym search tools and adding the scene-by-scene highlighting for acronyms exemplified in the top-left hand corner of Figure 1. Both these resources have proved particularly useful in EMP teaching to medical undergraduates (Loiacono, Tursi 2019). This preliminary stage also experimented the use of online 'message boards' (i.e. shared documents in a Google Drive) as a point of contact between the participating students and the research and development (R&D) team.

[3] The student annotators are Italian undergraduate students studying for a 'Language Mediation' degree (*Scienza e Tecnica della Mediazione Linguistica*). Their annotation activity started in October 2017 and, at the time of writing, some 50 students have participated in the project, as part of the fulfillment of their first-cycle degree requirements. Francesca Bianchi is thanked for her recruiting assistance.

3. Scene-based multimedia corpora

Before presenting the first EMP case study (Section 4), it is appropriate to outline some of the key features of the House Corpus which had to be completed before any road-testing case studies could be undertaken. In this respect, a crucial aspect to the functioning of the House Corpus is the division of episodes into scenes, defined as the point in an episode where the camera cuts to a different location and/or group of interactants. Breaking up episodes into scenes and episode transcripts into scene transcripts allowed each occurrence of a word or word combination in a search result to be presented in relation to the scene in which it occurred, as illustrated on the right-hand side of Figure 1.

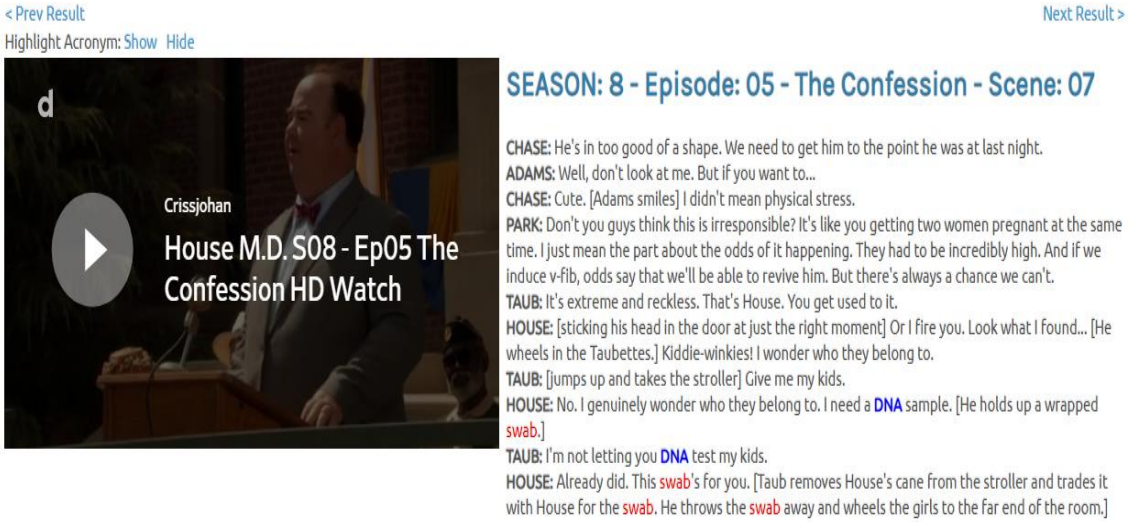


Figure 1
Scene-based contextualisation of a medical term: *swab*.

Searches of the 6300 scenes that make up the House Corpus identify occurrences of specific words. For instance, the searched-for word *swab*, which appears four times in the example shown in Figure 1, is in red. In addition, a further highlighting possibility relates to medical acronyms, which are shown in blue when, that is, the end-user activates the Highlight Acronym functionality shown in the top left-hand corner of Figure 1. Overall, Figure 1 illustrates the synchronisation that a multimedia corpus requires between a written transcript and scene viewings. Various types of utterance-by utterance transcript and video synchronisation are increasingly found in video-hosting sites, often as a response to crowdsourcing requests for translations to be uploaded so as to increase the number of potential viewers. As Figure 1 shows, rather than utterance by utterance, the synchronisation in the House Corpus is undertaken on a scene-by-scene basis in keeping with the characteristics of TV soaps in general, medical dramas included.

However, in its original form the House Corpus was not a multimedia corpus and was not able to support corpus searches for specific words, nor did it have the further possibility of viewing specific scenes in which these words occur. The first task given to the LANG student annotators was thus to help convert the transcript-based House Corpus into a multimedia corpus. In order for this task to be completed, it was essential to provide intuitive tools. In this respect, Figure 2 shows the Video Bar in the Transcript Annotation interface corresponding to the scene shown in Figure 1. The Video Bar is an online form providing an easy way to fill in and/or modify the data required to make scene viewings possible. The annotations that the students had to provide were: the point in a specific scene where the dialogue starts (Time Point); the duration of the scene calculated with reference to the point in time where the dialogue ends (Time Span); the link (Video) to the episode in the Dailymotion site. Initially, the data needed for the online insertion of data into the Video Bar was collected offline in a Microsoft Word table but the level of accuracy shown by the students soon persuaded the R&D team to switch to an online procedure.

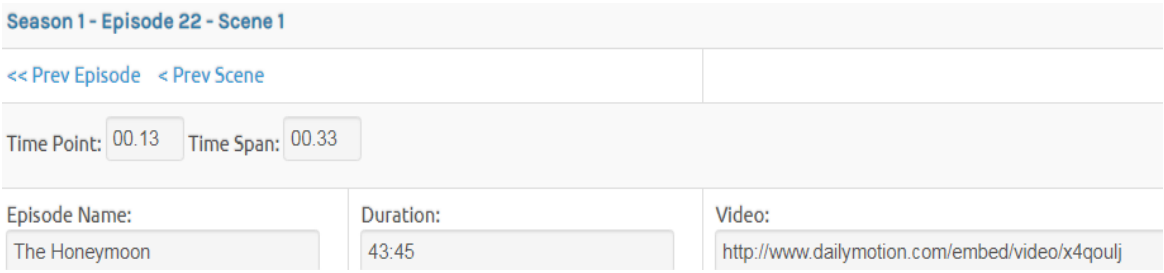


Figure 2
Video Bar: online insertion of data needed
to ensure synchronised transcript and scene viewings.

As Figure 2 also shows, each episode's overall duration was included as an optional item in the information to be inserted in the Video Bar. Even though this information is not used by the MWSWeb platform in the execution of its tasks, it was nevertheless included to make it easier to spot cases where the original link was no longer supported by the Dailymotion website. In fact, a subsequent recheck undertaken by a second group of LANG students revealed, somewhat discouragingly, a considerable number of such cases. More encouragingly, the recheck highlighted the students' quality assurance skills: the students spotted and applied the changes made necessary by the longer duration of the replacement videos, which included modifying all the time points and time spans in the episodes in question. The successful completion of this first stage in the MWSWeb project in the second quarter of 2018 and subsequent rechecking a year later by a different team of students, suggests that students' continued participation is associated with the positive

experience of being in the 'driving seat' and knowing that a concrete outcome will be the result of the efforts they have put in. Scene-based multimedia corpora work well with TV medical dramas, so much so that the next step undertaken by LANG students as regards the tools made available in the House Corpus interface of the MWSWeb platform related to the issue of annotating recurrent *types* of scene (see Section 5).

4. Colour systems in medical tools

This Section looks at colour systems as they relate to EMP teaching to MED students. The use of the House Corpus has been essential to this end and has provided inputs for subsequent developments, specifically an online module, *Reflections on colour-based grading systems in the English-for-medical-students syllabus*, designed to encourage learning about the functions of colour in medical grading systems. Ultimately, the goal and design of such a module has been dependent on providing answers to the following questions: Are there any differences with general English? Are there any special forms to be learnt? What L1 interferences, if any, undermine the proficient use of colour terminology? How can access to videos via the House Corpus and OpenMWS assist in this? How aware are students of the functions of colour in healthcare?

We may take the last question first as it is all too easy to reach the conclusion that medical students are colour blind, not in the sense that they are unable to distinguish between the various colours of the rainbow and name them in English but rather because of their need for greater awareness of the role colour plays in healthcare in different settings. Take, for example, the photo in Figure 3 which illustrates an oxygen mask with Venturi valve adaptors, a system designed to deliver high-oxygen flows with each valve delivering different but constant oxygen concentrations. Based on the Venturi effect discovered by the Italian physicist, Giovanni Battista Venturi (1746-1822), whereby air flow is attenuated by being sucked back when passing through a tight nozzle, the valves regulate the percentage of oxygen that hospital systems (100% pure oxygen) deliver.

In the 2017-18 academic year, the photo and table shown in Figure 3 were presented by the author of this Section to students in the second year of their six-year degree course in Medicine with the explanation that the valves are arranged stepwise with colours indicating specific combinations of oxygen flow rates and oxygen concentrations. When asked in a written exam to describe the functions of Venturi masks, only two of the twenty candidates made any mention of the use of colour as a grading system. None of them explained that each colour indicates the valve's control over oxygen flow and oxygen concentration or that, as a further safety precaution, this information is also indicated numerically on the valves in the manner shown on the right-

hand side of Figure 3. Nor did they indicate that numerical systems and colour coding systems often go hand-in-hand in medical systems, reflecting the frequent convertibility between the two.

COLOUR	OXYGEN FLOW (LITRES/MIN)	PERCENTAGE OF OXYGEN
Blue	2	24%
White	4	28%
Orange	6	31%
Yellow	8	35%
Red	8	40%
Pink	12	50%
Green	15	60%

Figure 3
Venturi valves (left-hand side) and the colour grading system with numerical correlates (right-hand side).

So why did this happen? There are various possible answers. One could very well lie in the assumption that describing colour systems requires no special EMP skills – *i.e.* once you can name a colour in English, there is nothing else to be learnt. In other words, knowledge acquired at school about inflected forms such as *redder, reddest* and *reddish* already goes beyond what will be needed in a hospital clinic. This assumption is certainly borne out by the House Corpus' search facilities which, for example, pinpoint the single example of *blackened* in the entire corpus. In other words, a miniscule role is played by inflected colour-related forms in this TV series. In fact, as Table 1 shows, there is a 1:38 ratio between inflected and non-inflected forms.

ASE FORM		ADJECTIVAL STRUCTURES				VERBS	NOUNS	TOTAL
		-ish	-{e)y	-er	-est	-/(en)+ (s/ed/ing)	Plural Nouns	
1. Black	255	0	0	0	0	1	2	258
2. Blue	121	1	0	0	0	2	1	125
3. Brown	67	1	0	0	0	2	1	71
4. Green	89	1	0	0	0	0	1	91
5. Gray/grey	43	1	0	0	0	0	1	45
6. Orange	47	1	1	0	0	0	0	49
7. Pink	38	0	4	1	0	0	0	43
8. Purple	31	2	0	0	0	1	0	34
9. Red	223	4	0	0	0	1	0	228
10. White	336	0	0	1	1	1	2	341
11. Yellow	65	0	0	0	0	0	0	65
TOTAL	1315	11	5	2	1	8	8	1350

Table 1
Ratio of inflected to non-inflected colour terms in the House Corpus.

The House Corpus thus provides very clear answers to the first two EMP questions asked above: there are no substantial differences with general English and few special forms to be learnt. We may also mention in passing that, in our experience, little L1 interference is detectable when MED students' describe colours, with only a few examples of a spurious definite article placed before a base form (as in **The red is a warning colour*).

So clearly, the answer to the question raised above had to lie in a lack of experience in the use of face masks and colour systems in medicine and healthcare. So, in the following academic year (2018-19), the author's courses to MED students included a focus on these aspects with the support provided by: a) the author's course book with its many references to colour systems (Loiacono 2018); b) the possibility, thanks to efforts of the student annotators described above in Section 2, of undertaking classroom viewings of some of the 86 scenes which use the term *mask*. These illustrate the many different types of mask that exist and the functions to which they are put.

As shown in Figure 4, the distribution of these scenes in the House Corpus is revealed by the Scene Summary tool which identifies and counts the number of *scenes* in which words and word combinations occur. Unlike this tool, a second tool, the Word Summary tool, identifies and counts the number of *tokens*. Intriguingly, comparison of the occurrences that these tools retrieve allows experienced users to make hunches about scene characteristics. For example, in the case of a search for *oxygen mask*, the fact that the Scene Summary count (40) almost coincides with Word Summary count (41) leads, correctly, to the conclusion that there must be just one scene in the entire series in which *oxygen mask* is part of the dialogue (S07E23, Scene 5) and that otherwise this expression is almost always part of the metatextual commentary on the actions carried out by doctors in these scenes.

Web | Word Summary | Scene Summary | Dialogue Summary

Search term: mask

Seasons	Episodes																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
Season 1	1	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	-	-	5
Season 2	0	0	2	0	1	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	7
Season 3	1	0	0	2	0	0	3	1	1	0	3	0	1	2	0	0	1	3	0	1	5	0	1	1	26
Season 4	1	3	0	0	0	0	0	0	4	0	1	1	0	0	1	1	-	-	-	-	-	-	-	-	12
Season 5	0	0	0	2	1	0	0	0	0	0	0	1	2	0	0	2	0	0	0	1	0	0	0	0	9
Season 6	1	0	1	1	0	1	1	0	1	1	0	0	1	0	0	0	1	0	0	0	1	0	-	-	10
Season 7	1	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	2	-	9
Season 8	0	0	0	2	0	1	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	1	-	-	8
																							Grand Total		86

Figure 4
The *Scene Summary* tool indicates the number of scenes
per episode in which the searched-for word occurs.

While this in itself is a useful indication of the typical differences between written and spoken forms of medical discourse in English, it also points to the need, in future, to rely more on videotrack annotations to clarify what type of mask is involved. Even so, further investigation using the House Corpus search tools (combinations of acronyms, single words, multiwords) made it possible to illustrate the differences between oxygen masks, protective masks and other non-medical masks such as cucumber masks (S03E19, Scene 31). It also made it possible to identify scenes showing patients, rather than doctors, wearing masks (13 scenes contain both references to *mask* and *patient*) and vice-versa scenes showing doctors wearing masks, rather than patients, (16 scenes contain both references to *mask* and *doctor*). So, when the 2018-19 course began with a reminder that masks and colour systems are closely related to issues of HCW and patient safety, it became much easier to find scenes that help characterise medically relevant colour systems in terms of various intersecting verbal/visual events. For example, the scene illustrated in Figure 5 shows a nasal cannula rather than a mask worn by a patient, while a protective white mask (that looks slightly bluish in the theatre's lighting conditions) is worn by the doctors. In the same scene, the patient's responses to questions about flashcards with coloured objects are used to stimulate and monitor brain impulses which are shown in different colours on a computer screen and different colours are also used to represent different body functions on life-support monitors.

SEASON: 5 - Episode: 13 - Big Baby - Scene: 28

HOUSE: Not only will this allow us to clock your brain's processing speed, you'll also get free cable for the first three months. [Sarah laughs slightly. House sits in front of her, wearing a mask but no gloves. He shows her a flash card.] What's this?
SARAH: A blue car. Is that part of the test?
HOUSE: Nope, my lease is up next month. You like? [She smiles wanly.] I'm gonna ask you a series of questions designed to stimulate left-brain function - logic, reasoning, problem-solving. Or as my mentor, Old Ben, liked to call it, "The dark side." If we find slow areas, we know we found damage. We treat. You go home. Ready?
SARAH: I'd nod yes, but I can't move my head.
HOUSE: [showing another flash card] This pen is red. Its ink is red. Is all ink red?
SARAH: No.
CAMERON: Nerve conduction's 12. 8 meters per second. Right within range.

Figure 5
A scene illustrating medical tests in which colours come into play.

The scene shown in Figure 5 is one of numerous examples in this TV series illustrating a clinical test on an individual patient in a clinical setting. However, among the colour-based medical systems with which MED students

first come into contact are those used in Emergency Medicine to triage patients into different treatment groups (Loiacono 2016, pp. 12-17, pp. 32-33) which engender patient flows in hospitals that use further classification systems, some colour-based, but all of which need to be mastered by MED students (Loiacono 2012, pp. 52-72; 2013, pp. 216-231). Yet, unlike other TV series focusing on the ER room where triage takes place, in the House M.D. series, triage is not foregrounded. Of the seven instances of the word *triage* in the entire series, four occur in one episode (S06E22, Scene 3) dealing with an extra-hospital mass disaster emergency where triage systems based on different colours and principles from those used in hospitals are used. This, in other words, constitutes a shift in the intra/extra hospital cline with which MED students need to become familiar but which, alas, is only partly satisfied by this TV series, as, in general, many other examples of the differences between hospital and non-hospital settings which make use of colour in relation to patient safety need to be taken into consideration.

A good example are diabetic pens which are coloured in order to distinguish between those that inject short vs. long-lasting insulin, both of which are usually needed by insulin-dependent diabetics but at different times of the day. A study to this end (Lefkowitz 2011) established that, compared with the standard approach of using a differently coloured label or a different injection button colour, 'full pen body colour' (i.e. pens incorporating a specific colour throughout their structure) enhanced a patient's ability to differentiate between the two types. This is a medically significant feature because in non-hospital settings, where diabetics have to fend for themselves, errors arise owing to their often poor visual acuity and impaired colour vision as a result of diabetic retinopathy. Ultimately, and although not designed for this purpose, the diabetic pen example neatly summarises a basic dilemma facing EMP teachers (and, of course, students) of how to resolve the paradox whereby colour is firmly rooted in visual semiosis but also at the very same time comes to be described in oral and written discourse through language.

Many types of medical equipment and supplies from epi pens to sharps bins raise the issue of the need for healthcare workers (future doctors included) to cope with medical colour codings and to describe them. A further complication is where colour systems are integrated with other medically relevant semiotic systems such as numerical systems and sound systems, a requirement that the House Corpus partly satisfies. As Figure 6 shows, a classic example relates to the ability of medical students to describe hospital monitors where sounds, colours, numbers and even acronyms are interlinked.

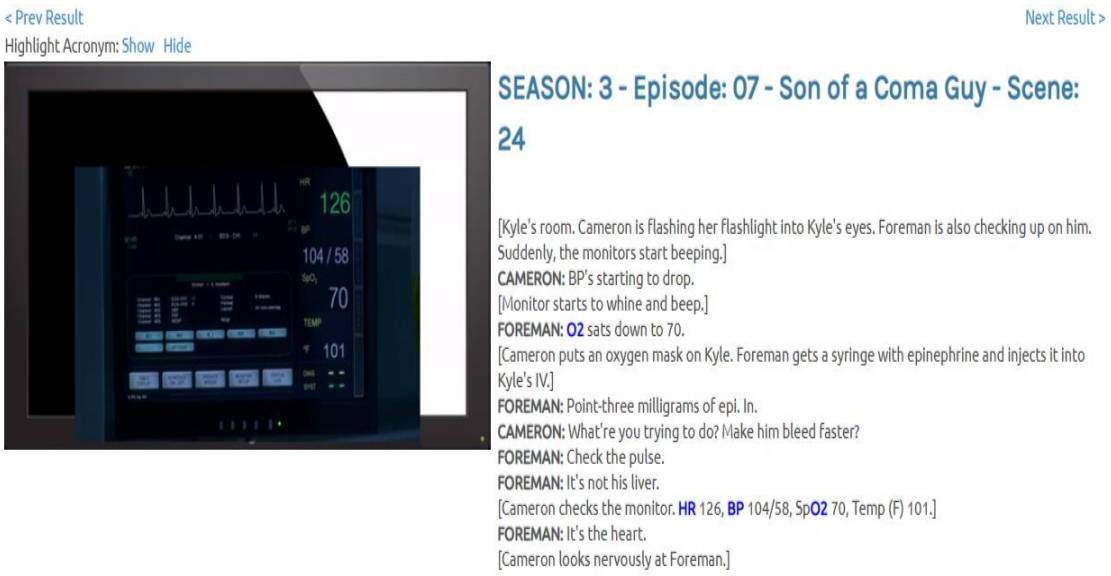


Figure 6
A scene showing hospital monitors' acoustic and visual warning systems.

As well as a useful example of the need to stimulate greater awareness of colour systems in different healthcare contexts, this illustration can be used to exercise the considerable skills needed to describe monitor functions in English, a task which includes the rather complex linkage between the warning beeps of monitors and their visual warnings such as colour changes and flashing regarding which space restrictions preclude further discussion. In its efforts to construct an analytical framework that ensures that medical students are not, as it were, fazed or dazzled by colour, there is a need to go beyond the affordances of the House Corpus interface and to extend the illustrations of colour-based medical grading systems available to EMP teachers by including (as indicated in Loiacono 2018) videos hosted on YouTube. As further described below, this can now be undertaken through OpenMWS. This further step will facilitate EMP teachers in the complex task of adapting the theoretical insights about the semiotic potential of colour put forward in various publications (Kress, van Leeuwen 2002; van Leeuwen 2011) to the training needs of MED students.

5. Classifying Scenes into types

In preparation for further road-testing (see the second case study presented in Section 6), the demands placed on the student annotators' video analysis skills were increased in the subsequent stage of MWSWeb experimentation. This highlighted the "value of specialized corpora in the process of encouraging students to advance their critical discourse analysis (CDA) skills" (Taibi, Marenzi, Ahmad 2019, p. 151) by exploring the subordination of lexicogrammatical selections to textual and intertextual forces in the

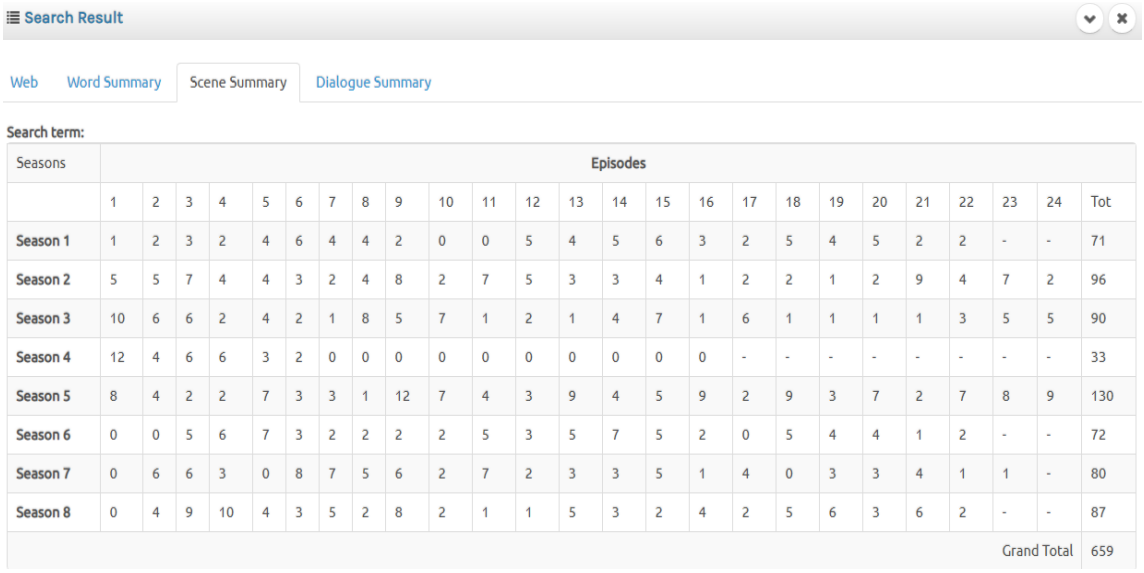
production of discourse. In this stage, two additional Annotation menus – Voice Annotation and Hands Annotation – were added to the original Transcription Annotation menu. The LANG students were asked to apply annotation labels associated with the first of these menus to the entire corpus. This task explored and mapped out the role of voice prosodies in the construction of meanings and identities in the often emotionally-charged dialogues that characterise the House M.D. series. By ticking a series of check boxes, the students also annotated each scene in terms of character types, making it possible to ascertain how these dialogues are distributed across different social and professional groups: doctors, patients, caregivers, non-medical professionals and other social categories. However, the value of specialised corpora, and the role of the MWSWeb project in providing hands-on experience of such corpora, can best be exemplified with a single example: the annotation of the corpus in terms of Scene Location types, a submenu of the Transcription Annotation menu.

This task required students to select an appropriate label for each scene from one of three lists provided. As Figure 7 suggests, the first list related to hospital scenes, the second to scenes shot outside the hospital, the third to scenes that were difficult to classify. In the latter case, students were asked to make message board suggestions and to re-annotate the scene once an annotation they had suggested had been incorporated.

Figure 7
A partial view of Scene Location annotation options.

Though at first carried out by the R&D team, the task of incorporating annotation options into the inventory shown in Figure 7 was subsequently entrusted to the students, a step that entailed making the password to the Settings tool visible (see Figure 19 in Section 7). In this way, a final set of just over 100 Location labels was constructed from the initial set of twenty, the final result indicating a hospital/non-hospital ratio of 3 to 2. The annotations undertaken in this stage of the research were an important step in

making it possible to carry out corpus searches capable of producing scene maps which help determine the overall structure of each episode (Taibi, Marenzi, Ahmad 2019). Figure 8 shows one such map, relating to the distribution of M.D. Office scenes in this TV series.



Search Result

Web | Word Summary | Scene Summary | Dialogue Summary

Search term:

Seasons	Episodes																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
Season 1	1	2	3	2	4	6	4	4	2	0	0	5	4	5	6	3	2	5	4	5	2	2	-	-	71
Season 2	5	5	7	4	4	3	2	4	8	2	7	5	3	3	4	1	2	2	1	2	9	4	7	2	96
Season 3	10	6	6	2	4	2	1	8	5	7	1	2	1	4	7	1	6	1	1	1	1	3	5	5	90
Season 4	12	4	6	6	3	2	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	33
Season 5	8	4	2	2	7	3	3	1	12	7	4	3	9	4	5	9	2	9	3	7	2	7	8	9	130
Season 6	0	0	5	6	7	3	2	2	2	2	5	3	5	7	5	2	0	5	4	4	1	2	-	-	72
Season 7	0	6	6	3	0	8	7	5	6	2	7	2	3	3	5	1	4	0	3	3	4	1	1	-	80
Season 8	0	4	9	10	4	3	5	2	8	2	1	1	5	3	2	4	2	5	6	3	6	2	-	-	87
																							Grand Total		659

Figure 8
Distribution of M.D. Office scenes
per episode in the House M.D. series.

The overall tally indicates that just over 1 in 10 scenes in this series take place in this context. Likewise, some 500 scenes were shot in the Conference/Diagnostics Room where Dr. House, using his famous whiteboard, carries out brainstorming sessions with his team. Comparison with the ten times smaller number of scenes located in the Emergency Room throws light on the core features of this medical drama series, whose focus on the difficulties associated with differential diagnosis emerges as a defining feature. It distinguishes this series, for example, from other TV series, such as the US ER series or the UK Casualty series, where interaction with patients and healthcare workers in emergency situations predominates.

Student annotations have ensured that such characterisations of TV series are supported by the precise quantifications that corpus techniques supply. However, as part of the quest to provide specialised corpus awareness and training for all the participating students, annotation of the House Corpus was designed to encourage all students to explore the distributional aspects of specialised corpora and to reflect on the corpus construction requirements needed to map out such distributions. Awareness of these aspects was constantly 'plugged' in this stage of development of the MWSWeb Project. A third annotation interface, Hands Annotation, was created adopting a questionnaire-like approach to scene type annotation. This records annotation

selections for hand movements separately for each student. It also allows consistency checking to be carried out, as the different decisions made by each student can be compared and assessed. Where there is overall agreement, the annotation is accepted, but where this is not the case further analysis is requested. This is especially significant in those cases where decision making is subjective in nature and thus likely to engender greater variation in annotations. This is clearly the case with the interpretation of functions of hand movements where uncertainty and differing interpretations are far more likely than in the case of location annotations (Arizzi 2019a, 2019b).

6. Using Scenes typologies in EMP teaching

It is hardly surprising that for many years now, the author of this Section has incorporated scene-by-scene analysis into her classroom teaching of episodes in the House M.D. series that highlight pain and pain management. This is clearly a major area of investigation in EMP courses for medical students that includes analysing oral and written discourse relating to: diagnosis (doctors discussion); history taking (patient/caregiver interviews); analysis of lab and other tests, and, in general, presenting the phraseology typically used in English to express and describe the suffering that pain causes.

Web | Word Summary | Scene Summary | Dialogue Summary

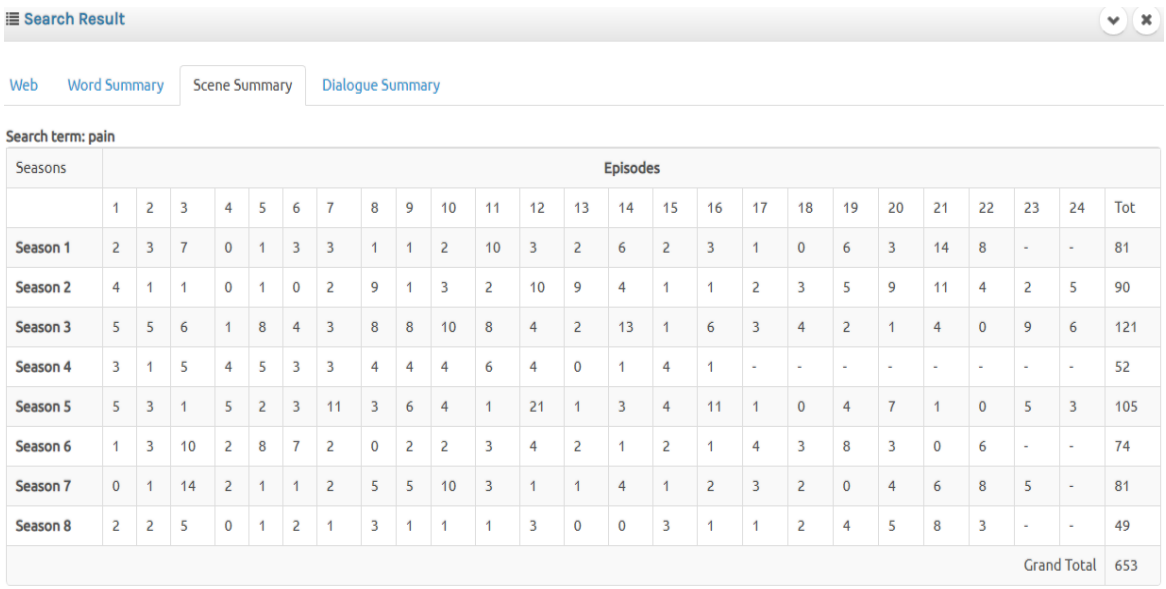
Search term: pain

Seasons	Episodes																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
Season 1	2	5	14	0	1	4	3	2	1	2	15	3	2	8	2	3	1	0	12	5	27	8	-	-	120
Season 2	7	1	1	0	1	0	2	15	1	7	2	26	16	5	2	1	2	3	6	15	18	6	5	7	149
Season 3	13	13	13	2	15	6	4	11	15	15	14	7	2	26	3	8	3	7	2	2	7	0	20	11	219
Season 4	3	1	7	6	6	6	3	4	5	4	6	6	0	1	5	1	-	-	-	-	-	-	-	-	64
Season 5	10	4	1	6	2	3	23	3	11	6	1	87	1	4	6	18	1	0	5	9	2	0	5	4	212
Season 6	1	6	14	4	9	10	2	0	3	3	4	7	3	1	2	1	8	5	14	3	0	8	-	-	108
Season 7	0	1	17	3	1	1	3	6	12	10	3	1	1	4	4	3	3	3	0	4	7	12	12	-	111
Season 8	2	3	8	0	1	2	1	4	1	1	1	8	0	0	3	1	2	2	7	5	12	6	-	-	70
																								Grand Total	1053

Figure 9
Distributions for *pain* using the *Word Summary* tool.

The MWSWeb Project assists this task. With a few key strokes, the *House Corpus* presents the results of searches for the word *pain.* As Figure 9 shows, the Word Summary tool establishes the overall frequency of *pain* at 1053

occurrences – roughly one token per thousand words in the House Corpus. More useful for the EMP teacher, however, is the *Scene Summary* tool (Figure 10). Besides identifying the 653 scenes out of a total of 6310 (almost a 1-in-10 ratio) in which *pain* appears, it provides a scenes-per-episode count for this word, and thus guides EMP teachers as to which episodes to investigate and which to discard.


Search Result

Web | Word Summary | Scene Summary | Dialogue Summary

Search term: pain

Seasons	Episodes																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
Season 1	2	3	7	0	1	3	3	1	1	2	10	3	2	6	2	3	1	0	6	3	14	8	-	-	81
Season 2	4	1	1	0	1	0	2	9	1	3	2	10	9	4	1	1	2	3	5	9	11	4	2	5	90
Season 3	5	5	6	1	8	4	3	8	8	10	8	4	2	13	1	6	3	4	2	1	4	0	9	6	121
Season 4	3	1	5	4	5	3	3	4	4	4	6	4	0	1	4	1	-	-	-	-	-	-	-	-	52
Season 5	5	3	1	5	2	3	11	3	6	4	1	21	1	3	4	11	1	0	4	7	1	0	5	3	105
Season 6	1	3	10	2	8	7	2	0	2	2	3	4	2	1	2	1	4	3	8	3	0	6	-	-	74
Season 7	0	1	14	2	1	1	2	5	5	10	3	1	1	4	1	2	3	2	0	4	6	8	5	-	81
Season 8	2	2	5	0	1	2	1	3	1	1	1	3	0	0	3	1	1	2	4	5	8	3	-	-	49
																								Grand Total	653

Figure 10
Distributions for *pain* using the *Scene Summary* tool.

While all this confirms convictions about the centrality of pain in EMP teaching, of far greater practical value for the EMP teacher is the combined 'word plus annotation' search illustrated in Figure 11.
Having typed in the word *pain* in the Word section of the Search Panel, an EMP teacher can select one of the options in the Voice Intensity and Modulation subsection of the Voice menu. As shown in Figure 11, in this example, the *2.5 Intensity changes (e.g. whispering, yelling, shouting)* filter was chosen because the expression of pain is often accompanied by disruptions to expected voice qualities.

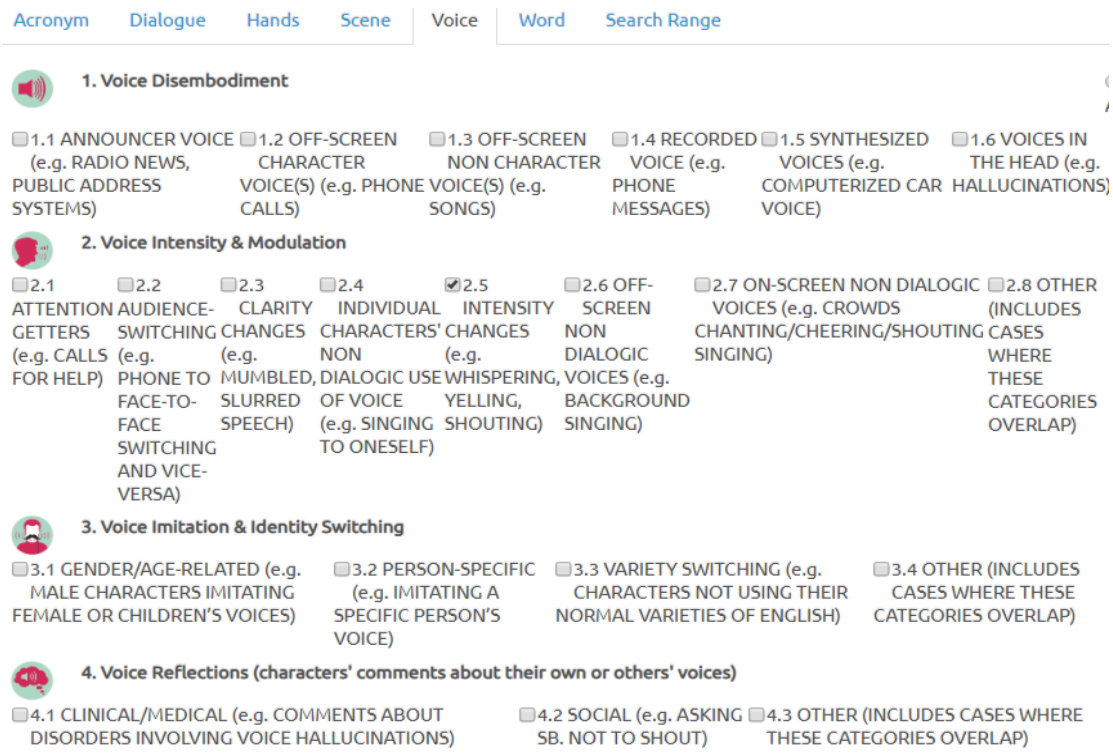


Figure 11
The Voice menu used as part of a joint word + annotation search.

This type of search helps pinpoint the most relevant scenes. Significantly, it reduces the number of scenes identified by the search tools, from the 653 shown in Figure 8 to just 96, thus simplifying the EMP teacher's task of selecting significant scenes. Many of these scenes highlight conflicts, partly signalled by changes in voice characteristics. These include those scenes in which Dr. House's *own* pain, and hence his Vicodin addiction, is foregrounded. Indeed face-offs between Dr. House and his female boss, Cuddy, on this issue are a salient feature in this medical drama series. One such example is highlighted in Scene 5 in *Finding Judas* (S03E09):

> CUDDY: You forged prescriptions!
> HOUSE: Allegedly.
> CUDDY: *Your pain has become my pain*. From now on, you get reasonable doses at reasonable times.
> HOUSE: But I hurt in an unreasonable way.
> CUDDY: Then dip into your secret stash.
> HOUSE: Tritter took it.
> CUDDY: Then move on to your secret-secret stash.
> HOUSE: I ran out.
> CUDDY: [*annoyed, whispering*] Then move on to your secret-secret-secret stash!

Such scenes can be detected by adding the filters available in the Dialogue menu to those already selected and described above, thus further restricting

the number of scenes the EMP teacher needs to take into consideration. The Dialogue menu allows scenes to be selected in terms of characters groups, specific characters and/or the number of interactants participating in a scene. In other words, combined word plus annotation searches provide EMP teachers with small but useful sets of examples. Given the added possibility of scene viewings, this allows EMP teachers to explore the physical and mental pain of both patients and doctors, and naturally doctor-patients, in terms of how mutual understanding and participation in pain is expressed.

Selecting which scenes to present is a further consideration for EMP teachers when using a multimedia corpus. As Figure 12 shows, once episodes with the highest number of 'hits' for *pain* have been identified, using the Word Summary and Scene Summary tools illustrated above in Figure 9, a further search can be made which produces a useful and easily manageable scene list.

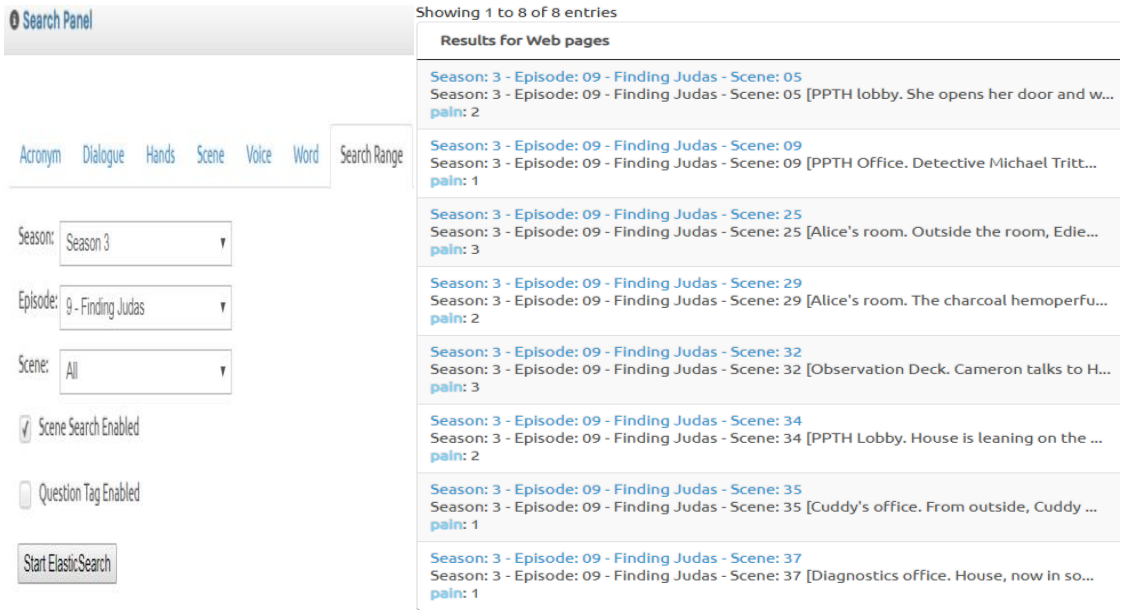


Figure 12
The Search Range filter (left) produces a 'playlist' of relevant scenes (right).

As may be appreciated from the 'Prev Result' and 'Next Result' buttons in the top-left hand and right-hand corners of Figure 13, the scene list allows an EMP teacher to browse efficiently through the scene transcripts and play each scene in a constant and comparative flow.

Figure 13
The EMP teacher can browse quickly through the list of scenes.

As well as illustrating expressions such as 'cope with (the) pain', 'muscle pain', and 'dismiss pain', the scene list helps EMP teachers to illustrate supposedly 'simple' constructions such as 'to be *in* pain' also exemplified in Figure 13. In reality, this is quite different from the formula used in the medical students' L1 (usually Italian) and is further characterised subsequently in the scene list by related expressions such as 'cry (out) *in* pain' and '*in* serious pain'.

Significantly, Voice menu annotations frequently link voice quality to pain not on the basis of the scene transcripts but on the basis of the LANG student annotators' viewings of the scenes. This aspect highlights the significance of the multisemiotic approach undertaken in the MWSWeb project which assists the EMP teacher in convincing medical students that it is one thing to be able to read medical English but quite another matter to master oral discourse in English – regardless of the variety of English used or type of oral discourse (written-to-be-spoken in the case of a TV series).

The examples shown above illustrate the significance of combined word plus annotation searches. They also illustrate the value of the manual annotations undertaken by student annotators. This may be further appreciated when alternative search strategies are taken into consideration. There are many verbs in English often associated with the expression of pain, such verbs as 'cry', 'holler', 'howl', 'screech', 'scream', 'shout', 'shriek', 'wail' and 'yell', all of which are used in House M.D., for which word searches (as opposed to word plus annotation searches) in the House Corpus are a possible but time-consuming and tedious task. At best, such searches

would miss out the many expressions in English that express voice intensity other than through the use of verbs, which include expressions like ‘at the top of his/her voice’ or more simply, as House’s closing turn in Figure 14 illustrates, through words like ‘loud’.

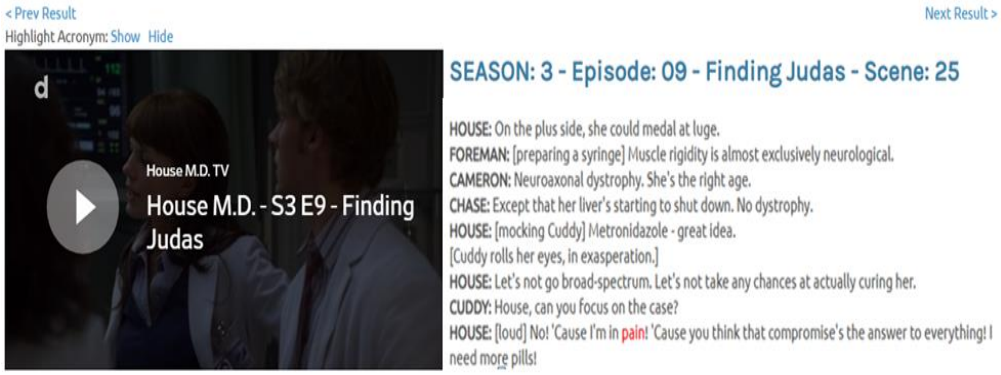


Figure 14
The EMP teacher can identify scenes illustrating voice features.

On the contrary, as illustrated above, a multisemiotic approach that links word searches to annotation searches for features such as voice quality provides a convincing alternative. As mentioned above in Section 5, all the scenes were annotated by LANG students for their voice characteristics, the result of their reading through the scene transcripts and listening and watching the individual scenes. We can be grateful to them for this, because combined word and annotation searches contribute considerably to facilitating video-based EMP Teaching.

7. OpenMWS

The OpenMWS stage in the development of the MWSWeb platform marks the transition from a ‘closed’ version of the platform, concerned with the annotation of a single medical genre (all the episodes in the House M.D. TV series) to an ‘open’ version that extends the range of medical and healthcare genres that can be accessed. Still in its initial stages, the current version of OpenMWS allows all videos on the YouTube site to be accessed, transcribed and annotated. One advantage is to allow students to play a more significant role in the various stages of video analysis including decisions on which videos to select, transcribe and annotate in the process of corpus construction. As detailed below, this is particularly the case with the annotation phase. Whereas in the House Corpus stage of the MWSWeb Project, students were essentially asked to add annotations to a pre-existing corpus, OpenMWS requires greater creativity in the formulation and application of annotations and is thus a test of the participating students’ digital readiness to transcribe

and annotate online medical and healthcare videos. It entails a transition from familiar word processing to less familiar spreadsheet tools and to separate procedures for transcription and annotation. As Figure 15 shows, before annotation can be carried out, students must upload the Overview, Resources and Composition files to the OpenMWS system via the Annotation Project window.

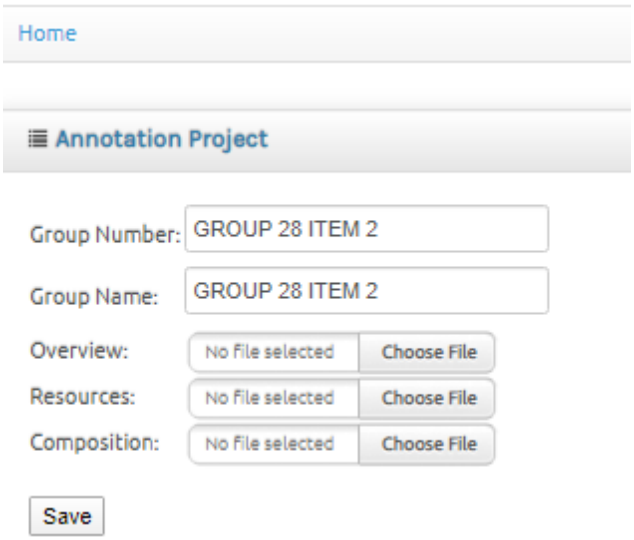


Figure 15
The Annotation Project upload page of OpenMWS.

The first of these Excel files, the Overview file, is a metadata file which includes the YouTube video link plus basic information about the video (e.g. video title, target audience, and video producer). Once uploaded to OpenMWS, the latter takes the form shown in Figure 16.

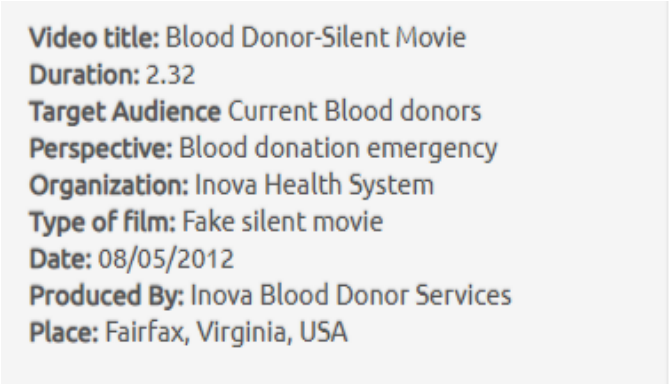


Figure 16
Presentation of Overview file data in the OpenMWS interface.

Introduced as a result of the need to extend the information previously recorded in the House Corpus as part of the Video Bar, the Overview file is

divided into three parts. Like the Video Bar described above, the first part relates to the film's credentials as a video and thus includes the video's YouTube link, its title and duration. The second part, instead, provides some basic aspects of the video's features, specifically what type of video it is – for example a whiteboard animation, mini-lecture, simulation or, for the example shown in Figure 16, a fake silent movie called 'Blood donor silent movie'. It also includes information about its intended target audience – junior doctors, hospital staff, patients or, in this case, blood donors. The third part collates data about when and where the video was created and by whom.

As such, the Overview file functions somewhat like a library catalogue card bringing together basic information about each video. All this data constitutes a useful pointer to a video's cultural identity and the variety of English that, in all probability, it uses. Unlike the Video Bar in the House Corpus, the Overview file does not relate to individual scenes in an episode but to the entire video. This has meant that Time Point and Time Span data (see Figure 2 in Section 3), which define the way a video is split up into smaller units, have been transferred to the Resources and Composition files. For reasons of space, Figures 17 and 18 show just the first five sequences of a student's transcription of these files, again relating to the video indexed in the Overview file shown above in Figure 16. For the record, the student's original transcription broke the film up into twenty-seven sequences.

	A	B	C	D	E	F	G	H
1	GROUP 8	SEQUENCE	TIMEPOINT	TIMESPAN	ORAL DISCOURSE	SOUNDS	WRITTEN DISCOURSE	VISUAL IMAGES
2	ITEM 1	SEQUENCE 1	00.00	00.01	NONE	MUSIC: SUNFLOWER	TITLE: INOVA FAIRFAX HOSPITAL "ANY GIVEN DAY"	*FRAME 1*: FRAMED TEXT (TITLE)
3	ITEM 1	SEQUENCE 2	00.02	00.02	NONE	MUSIC: SUNFLOWER	NONE	*FRAME 2*: AERIAL SHOT OF THE HOSPITAL
4	ITEM 1	SEQUENCE 3	00.05	00.03	NONE	MUSIC: SUNFLOWER RAG (THE	DR. SESE: THE PATIENT IS GOING TO NEED BLOOD.	*FRAME 3*: DOCTOR (DR. SESE) WITH CLIPBOARD IN FRONT OF PATIENT'S BED *FRAME 4*: INTERTITLES (DR. SESE'S WORDS)
5	ITEM 1	SEQUENCE 4	00.09	00.14	NONE	MUSIC: SUNFLOWER RAG (THE ROARING TWENTIES)	DR. SESE: OH NURSE! NURSE: YES? DR. SESE: PLEASE CALL DOWN TO THE BLOOD BANK. OUR PATIENT NEED O-. NURSE: OK!	*FRAME 5*: DOCTOR (DR. SESE) WITH CLIPBOARD IN FRONT OF PATIENT'S BED *FRAME 6*: INTERTITLES (DR. SESE'S WORDS) *FRAME 7*: NURSE FROM BEHIND THE WALL *FRAME 8*: INTERTITLES (NURSE'S WORDS) *FRAME 9*: DOCTOR (DR. SESE) WITH CLIPBOARD IN FRONT OF PATIENT'S BED *FRAME 10*: INTERTITLES (DR. SESE'S WORDS) *FRAME 11*: NURSE FROM BEHIND THE WALL *FRAME 12*: INTERTITLES (NURSE'S WORDS)
6	ITEM 1	SEQUENCE 5	00.24	00.06	NONE	MUSIC: SUNFLOWER	NURSE: DR. SESE NEEDS BLOOD RIGHT AWAY. O NEGATIVE.	*FRAME 13*: NURSE AT DESK *FRAME 14*: INTERTITLES (NURSE'S WORDS)

Figure 17
Resources: visual and verbal transcription for a blood donation film.

Figure 17 shows that in its current form the Resources file is a record of four types of resources: a) the video's oral discourse; b) its sounds, including music; c) its written discourse and d) its visual images, characterised in this and many other cases in terms of frames corresponding to shots of different people and places, and, intriguingly, in this case, intertitles like those found in silent movies. While the Resources file relates to a video's material form, the Composition file requires a video to be described in more abstract terms.

	A	B	C	D	E	F
1	GROUP 8	SEQUENCE	TIMEPOINT	TIMESPAN	SUBPHASES	PHASES
2	ITEM 1	SEQUENCE 1	00.00	00.01	**1.** PRESENTATION	**1.** PRESENTING THE HOSPITAL AND ITS DAILY ROUTINE
3	ITEM 1	SEQUENCE 2	00.02	00.02	**2.** AERIAL VIEW OF THE HOSPITAL BUILDING	**1.** PRESENTING THE HOSPITAL AND ITS DAILY ROUTINE
4	ITEM 1	SEQUENCE 3	00.05	00.03	**3.** DOCTOR CHECKING PATIENT'S RECORDS	**2.** PATIENT'S PARAMETERS UNDER THE REFERENCE RANGES
5	ITEM 1	SEQUENCE 4	00.09	00.14	**4.** REQUEST FOR BLOOD TRANSFUSION	**2/3** PATIENT'S PARAMETERS UNDER THE REFERENCE RANGES + START OF THE EMERGENCY
6	ITEM 1	SEQUENCE 5	00.24	00.06	**5.** FIRST FORWARDING OF THE REQUEST	**3.** EMERGENCY IN PROGRESS

Figure 18
Excel Composition file showing some Subphase and Phase divisions.

As the part of the Composition file shown in Figure 18 indicates, this entails spelling out its basic division into phases and subphases and thus interpreting the functions that these sequences play in the video's meaning making (Baldry and Thibault 2006a). The examples shown relating to the Overview, Resources and Composition files point to the shift from the substantial certainties associated with the scene-based annotation of the House Corpus to the greater uncertainties of transcription and annotation in OpenMWS. The generic label Sequence, illustrated in Figures 17 and 18, shows that the participating students had to decide for themselves how to divide up a video into its component parts. However, although no explicit instructions were given to the students, the sample Excel templates, given to the students as a guide, characterised videos in terms of transcription models that have been developed over the years (Baldry 2000; Thibault 2000; Norris, 2004), in particular those with a special focus on textual units such as *transitivity frames*, *subphases*, *phases* and *macrophases* (Baldry, Thibault 2006a, 2006b; Baldry *et al*. 2020).

Finally, in this Section we need to consider the second-level annotations that OpenMWS permits. Figure 19 compares part of the Settings functionality in MWSWeb (left) and in OpenMWS (right). The settings for the House Corpus on the left relate to work undertaken by LANG student

annotators to classify scenes in the House M.D. series in terms of the types of event they enact (see Section 5 above). Instead, those on the right relate to the further annotation of a video's soundtrack with OpenMWS in terms of voice prosodies on a par with those used for the House Corpus (see Figure 11 in Section 6), though with a more complex model which includes, for example, clearer gender and age-related annotations that reflect the far more generalizing nature of the OpenMWS settings. Thus, while some of the events shown in the left-hand column are general hospital events such as Discharge from Hospital and, as such, could be applied to all videos concerned with this type of event, many other annotation labels are specific to characters in the House Corpus, such as the various face-off labels, which have limited currency.

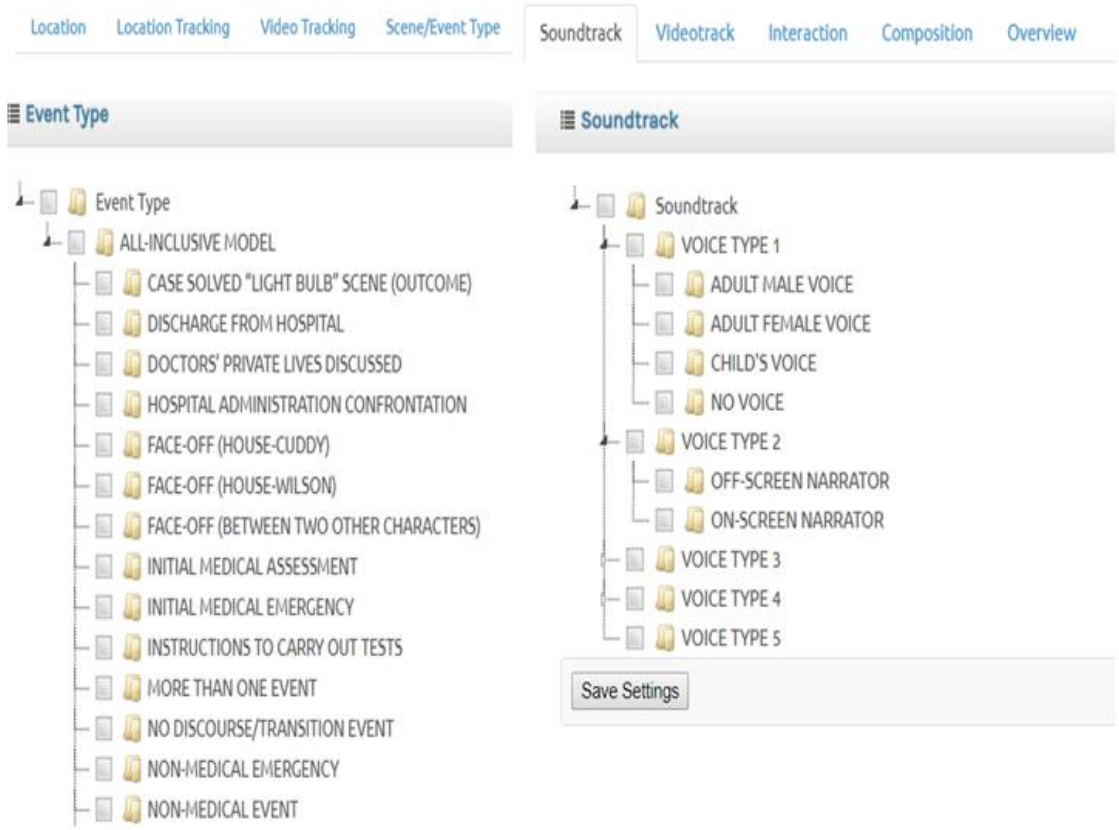


Figure 19
Settings for the House Corpus (left) and OpenMWS (right) compared.

The OpenMWS settings, on the contrary, are designed to be usable across a very large number of videos, as are the five main menu categories to which each set of annotation labels is associated, as shown in the menu bar in the top of the right-hand part of Figure 19. For example, the Interaction category is home to sets of annotation (not shown) relating to gaze and gesture. How well the redefined categories work in practice and how well they will support the subsequent stages in the project remains to be seen.

8. OpenMWS and its role in EMP for HCW students

Even though still in its initial stages, the OpenMWS platform is providing solutions for some of the complex demands of EMP teaching to HCW students. This final case study thus describes the development of a module entitled *Risk Management and Specialised Multisemiotic Discourse in Medical Training: Examining ethical, scientific and procedural principles* and the support role that OpenMWS is providing. The module in question is designed to meet the EMP needs of postgraduate students, most of whom are doctors seeking qualifications and hospital experience predominantly in a clinical specialty.[4] While they are required to attend an EMP course in order to pass an EMP exam and acquire credits, there is considerable discretion over the formalities that need to be met, arising partly from the complex logistics and course organisation which include: a) taking into consideration the students' busy work schedule which often requires them to be absent from the campus where the courses are held; b) squaring the different organisational needs and timetables of the dozens of specialties involved; c) the requirements of individual students who need to be able to write about their *personal* clinical experiences, but with clear reference to their specialty.

All of these characteristics may be viewed as encouragement to use online methods of assessment. This, however, is something which cannot be successfully achieved overnight as the conversion from an entirely classroom approach to a fully online approach takes many years. A first step towards online methods of assessment in the first two years of application (starting in September 2017 and September 2018) was the requirement for students to complete an online summative test, which, alongside the two remaining four-hour frontal lessons, was extended to two online tests in the third year of application (September 2019), the first a preliminary contact and formative test, the second a mainly summative test.

[4] The postgraduate training courses in question allow graduate doctors to become either hospital specialists or GPs. On average, such courses last four or five years. They involve partnerships between universities and teaching hospitals. In some cases, specialties are open to non-medical graduates, for example in the Microbiology specialty. EMP is usually part of the five credits awarded as *Ulteriori conoscenze linguistiche, abilità informatiche e relazionali, i.e.* further linguistic, IT and relational skills. For further details, see https://www.miur.gov.it/scuole-di-specializzazione. The 2017 *bando* advertising the teaching position for the EMP course for residents at the University of Pavia, where the author teaches, indicated that the acquisition of linguistic skills was directed towards acquiring a level of English sufficient to allow the understanding of texts and participation in scientific and clinical conferences, an objective that needs to be considered in relation to what may best be described as the heterogeneous nature of these students' previously acquired skills in written and spoken discourse in the medical and clinical domain. This arises, in part, from their prior training in universities and hospitals in Italy other than the one where they are undertaking their specialty training.

All of this requires considerable effort as regards obtaining a constant supply of materials meeting the standards expected in EMP teaching. As detailed below, the support of the OpenMWS project is essential to this end. However, towering above all other needs is the requirement to find a single subject matter that in some way applies to all the HCW students but which is also clearly medically, clinically, scientifically, socially and ethically stimulating. In the belief that the issue of the human body as a source of multimodal meaning-making is a perspective that every EMP teacher in the medical area can and must communicate with the required authority (Kantz and Marenzi 2016), a decision to explore hospital risk management was made for the first few years of experimentation. A further decision to foreground the relationship between anaesthetics and the human body in its conscious, semi-conscious and unconscious states was also made. This highly specialist field has considerable relevance for HCW students in specialties other than anaesthesiology, some of which were not immediately apparent, but which emerged thanks to the interactive nature of the online module design.

In this respect, a very practical solution when evaluating large numbers of HCW students – typically averaging two hundred per year in the university where the author works – is to use Google Forms which record all the answers and the students' credentials in Google Spreadsheets. These forms, accessible in a Google Drive, give teacher-testers the opportunity to create online tests made up of different types of questions including: short and longer answers to open questions; true or false questions; multiple choice and check box questions. They also allow the teacher-tester to import images and to create links to YouTube videos, which can be viewed directly from the Google Form, albeit not with the possibilities for the selection of specific sequences that OpenMWS provides. The forms can be divided into various sections making it possible to present an online test in a page-by-page format in which a specific question about an image, film or specific sequence in a video can be asked. As the test is essentially concerned with a HCW student's ability to reflect carefully on the issue of risk management in hospitals and to demonstrate a capacity to comment on the overall contents of the test in the form of written summaries, it is important to avoid a blocking procedure, often present in online tests, whereby an answer to a question has to be given before moving on to the next.

Since the priority is to provide a setting in which these students can express their *personal* beliefs about risk management, including scientific, ethical and procedural aspects in a proficient and compelling way in English, no arrangements to conduct the online test at a specific time on a specific day have so far been required. Instead, the students are informed that there is a two-week time span within which to undertake the test. This has proved to be a major source of encouragement to students as it provides an opportunity for them to view the test at leisure and to carry out careful reflection in preliminary sessions before submitting the final version of their test answers.

Overall this solution has been much appreciated by students as it introduces the necessary flexibility in management of their studies. Table 2 reproduces a small selection of the original (uncorrected) answers given for one of the online questions reproduced at the top of the table. As the added underlining shows, all the answers reveal the students' concern with patient safety and, minor lexico-grammatical slip-ups apart, indicate an ability to express these concerns fluently.

Q5.5. In what way do such risks relate to your specialty?
1. Being a Public Health resident, my job is to provide safe and efficient treatments to patients, by monitoring the activity of surgeons, nurses and anaesthetists. Thanks to the development of specific checklists, we provide a useful tool to minimise the risk of human errors in the theatre, making sure surgeons and anaesthetists follow all the recommended steps to guarantee patient safety. (Student 1 Hygiene and Preventive Medicine)
2. We should explain better risk and benefit from every treatment, medical or surgical, because none of them are completely safe. (Student 1 Internal Medicine)
3. The Public Health Specialist is responsible for the organization and control of all health activities in order to provide safe and efficient treatments. Paediatric surgery represents a critical area where an optimal organization and a careful control are fundamental to minimize risks and where empathy and the ability to manage the patient's fears play a key role. (Student 2 Hygiene and Preventive Medicine)
4. There are no orthodontic procedures that require general anesthesia in a child. However, in general dentistry, sedation or general anesthesia may be appropriate to ensure the safe, efficient and competent delivery of dental procedures in children that experience high anxiety due to fear or low tolerance to pain, that require complex or invasive dental procedures, that are medically compromised, or simply that are unable to remain still during the dental treatment. In these cases, the patient is usually treated in the hospital, where all of the parameters can be monitored. (Student 1 Orthodontics)
5. In Orthodontics there are not procedures that require general anesthesia. However, in general dentistry, it is quite common to sedate the patients using nitrous oxide in order to be able to perform different dental procedures. This type of sedation, which is used when patient is particularly nervous or not collaborative and especially in children to ensure a safe and efficient outcome, does not have any kind of risks. Other times, when the patient requires more invasive treatment or when he is not in good health conditions, dentists choose to treat him under general anesthesia in hospital, to be able to monitor all vital parameters. (Student 2 Orthodontics)
6. Children are vulnerable and often unaware. You need to be able to making them feel safe. They must not feel pain; they must have their mother next door and feel this experience like a game. This reduces the risk of causing a psychological trauma. (Student 1 ENT)

Table 2
Answers indicating the relevance of risk management to all the students.

In addition to general questions about risk management, students were asked to compare two very similar NHS videos (1. https://youtu.be/_iaJ4rXaRek; 2. https://youtu.be/868vvyZ_8jk) on General Anaesthetics produced to reassure and educate children on what would happen before their operation. One film was addressed to children under the age of eight (under eights), the other for children over eight (over eights). The task was to check the differences from various perspectives: the nature of the off-screen oral discourse used was one such perspective, as was the social perspective on attitudes shown towards children of different ages such as the assumption that only children over eight will have a mobile.

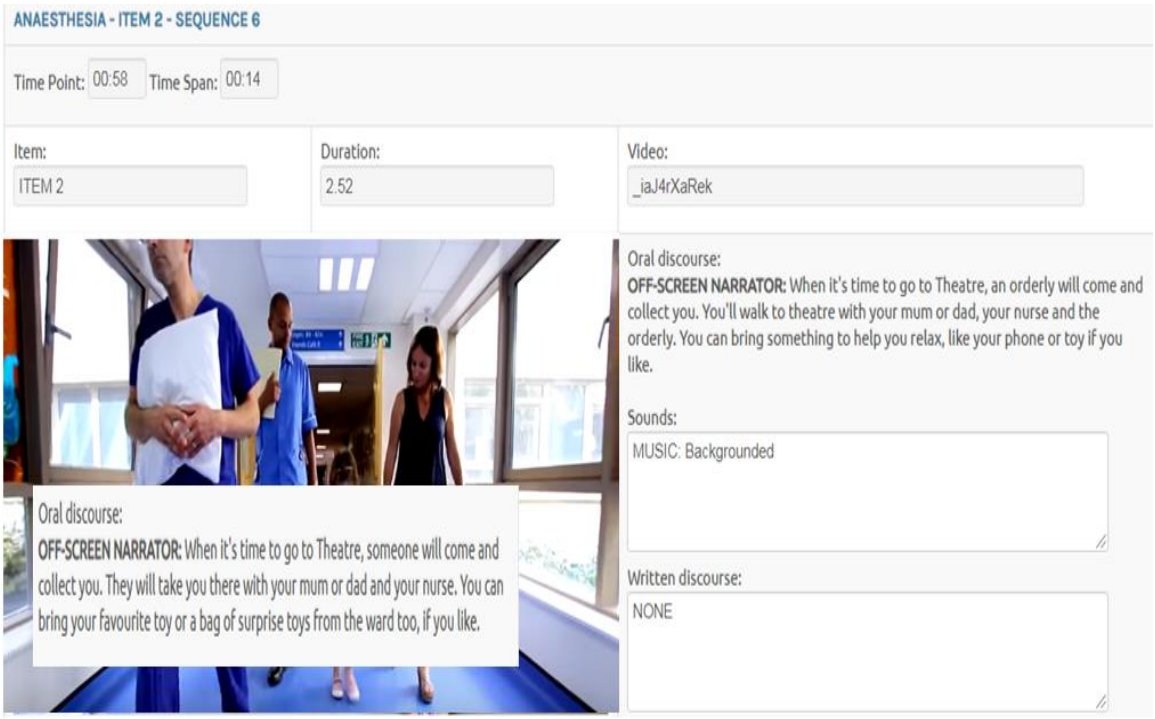


Figure 20
Screenshot indicating a test of students' ability to detect discrepancies.

In the current stage of research, it is not possible to access Google forms from OpenMWS, but this is sidestepped by providing online instructions requiring students to access specific OpenMWS video projects. As Figure 20 also suggests, the upload procedures of OpenMWS are such that the Overview file for the first film (under eights) and the Resources file for the second (over eights) can be deliberately 'mixed up' so that the students heard the soundtrack for the first film, but read the oral discourse transcript for the second film. In this way, as illustrated in Figure 20, they were required to spot, compare and comment on specific sequences containing discrepancies. In other words, they had to engage with the point where the over-eights' soundtrack and transcript refer to an *orderly* while the under-eights' soundtrack and transcript (shown in the overlay) replace this with the generic term *someone*. The latter is a lexical item that is more comprehensible to the 4-year old child represented in the film and by implication to other children of the same age.

Table 3 provides a selection of answers given to three questions about these two NHS videos.

Q3.3. What fears are addressed visually and verbally?
Young children usually are accompanied by parents and they can take their puppet with them to avoid feeling alone and unsafe (Student 1 Emergency Medicine)
Q4.1. The films do not explicitly explain the divide between the over 8s and under 8s. Can YOU?
[…] the procedure is in fact the same and the focus of both illustrational videos is to make the child feel safe and under good care, the medical staff acts in a different way with the older patient in order to make him feel regarded more like "young adult" and less like a child. (Student 1 Orthodontics)
Q4.2. The films look the same: apart from the difference between age and sex, what other differences are there?
Young children require the help of parents to be taken to the theatre and need familiar items to feel safe. Contrariwise, older children still have their parents next door, but they seem more independent of their parenthood and objects. The latter are also more smiling and interactive with the medical staff. (Student 1 Diseases of the Cardiovascular System)

Table 3
Answers relating to videos about children's fears regarding anaesthetics.

Analysis of the students' answers serves two functions. The first relates to the grading of each answer. The development of a grading system that provides each student with feedback about the level of achievement reached and the gaps in their proficiency will be the subject of a separate publication. The second is to learn about the experiences of risk management that all the students come up against, which is relevant to the current purposes as it shows how the video corpus services provided by OpenMWS can underpin and perfect further online interventions on this theme. Systematic analysis of the answers clearly indicates the need for the MWSWeb team to further engage undergraduate LANG students in the selection, transcription and annotation of videos relating to patient safety. They also indicate the need to extend the nascent corpus to the relationship between risk management and the avoidance of pain (see the highlighted words in Table 2 above), given that the purpose of anaesthesia is after all to control pain as well as muscle movement. This is an important ethical principle, which Italy has recognised with the introduction in 2010 of legislation relating to pain and pain management centres.[5] Associating videos about pain management is an important step as regards enriching the overall value of this online course, in particular as teaching and (formative) testing components can be further brought together in this way, even though with the current configuration this is only possible, as mentioned above, by incorporating instructions in the Google Form for the OpenMWS system to be opened in a separate browser window.

In conclusion, the experience acquired in this case study can be summarised as follows: the interplay between data acquired from HCW students as regards their hospital experiences and the construction of video corpora has allowed the various aspects of a general, overarching issue, such

[5] www.domedica.com/en/law-on-chronic-pain-management-existent-in-italy-but-not-very-well-known/ (20/07/2019).

as risk management in hospitals, to be underpinned by the development of a specialist corpus that already assists the task of catering for each of the dozens of medical specialties involved, but which, with further development, will address even more precisely each HCW student's specific interests and EMP requirements.

9. Discussion and Future Research

Three case studies of the use made by EMP University teachers of online video corpora have been presented in Sections 4, 6 and 8 of this chapter. They have illustrated the implementation of the principles that underpin the MWSWeb Project and the value of the involvement of LANG students outlined in Sections 1 to 3. Many of the examples given in this chapter highlight the fact that the meaning potential (Halliday 1978) of an online video is a focal point in critical video analysis (Baldry 2016), an aspect which lays bare another need, which the chapter has attempted to address, namely the positive interdisciplinary focus and stimulus that online video annotation promotes. The case studies are also a clear demonstration that, in the medical area, EMP teaching is part of a wider framework and that the MWSWeb platform has contributed to developing EMP activities that work within this framework. Further stages of development using the OpenMWS version of the MWSWeb platform will allow the validity of the transcriptions and annotations constructed by LANG students to be compared through corpus searches. This, and the provision of access to video-hosting sites other than YouTube, will depend entirely on the outcome of the current stage of development. The chapter has thus demonstrated how written and oral discourse constantly engage with other semiotic resources such as voice prosodies (Section 6) and indeed how, in the construction of meanings, other semiotic resources such as colour and numerical systems interact with each other as well as with discourse (Section 4).

In addition to the description of the corpora based on scenes (Section 3), scene types (Section 5) and video sequences (Section 7), the chapter has also touched on other aspects of research currently being undertaken in the MWSWeb Project such as the correlations between the events that typically take place in hospitals (see Figure 19 in Section 7) and other medically relevant semiotic systems such as body movements and postures (Section 8), which thanks to the Hands Annotation interface (Section 5) help explore the functions of hand movements, in terms of their general deictic functions, specific textual functions, and even specialised surgical functions (Arizzi 2019a, 2019b). Equally, provision has been made in the OpenMWS interface for annotations to be carried out in relation to other meaning-making resources such as gesture and gaze (Section 7).

In this respect, the chapter is a celebration of multimodal transcription (Baldry 2000, 2016; Baldry, Thibault 2006a, 2006b; Thibault 2000) which has come of age. Section 8 has reconstructed the research pathway that has led to the construction of the various versions of the MWSWeb online system as a video annotation system capable of carrying out multimodal transcriptions in an online form. The intersemiotic nature of many contemporary genres (Kress, van Leeuwen 2001) dictates the need for such online tools. Multimodal transcriptions are unquestionably an important tool for both scholars and students in the analysis of multisemiotic texts, films and, in particular, videos (Taylor 2004) so that their online implementation is clearly a welcome step.

Alongside the three case studies presented, there are others in the initial stages of development that are part of the ongoing engagement of LANG students some of which have not yet road-tested the capabilities of the MWSWeb platform.[6] However, this should not overshadow other aspects of the project. As indicated in Section 2, a test of the project's viability in promoting sustained interest has been the transition to increasingly higher levels of achievement which, step-by-step, have been placed on the LANG students' shoulders. Thus, during these first three stages, the annotation tasks were gradually but successfully shifted from an offline to an online format. This corresponded to an increase in the digital and discourse analysis skills that the students were required to demonstrate. It also corresponded to a concomitant increase in the MWSWeb platform's ability to turn the students' labour into results that could be immediately perceived by them.

A comparison between the Transcript annotation interfaces used for the House Corpus and OpenMWS (Figure 21) illustrates that, despite the differences described in Section 7 and Section 8 above, there is considerable continuity in the overall design and in the immediate satisfaction that students derive. This is attested by the number of videos that each participating student completes in the course of their apprenticeship as well as the overall accuracy and consistency of their work.

[6] Following the completion of the case studies and their road-testing, many more videos relating to blood donation, patient safety and discharge, risk management in hospitals have so far been transcribed and annotated by LANG students as well as others on non-EMP themes.

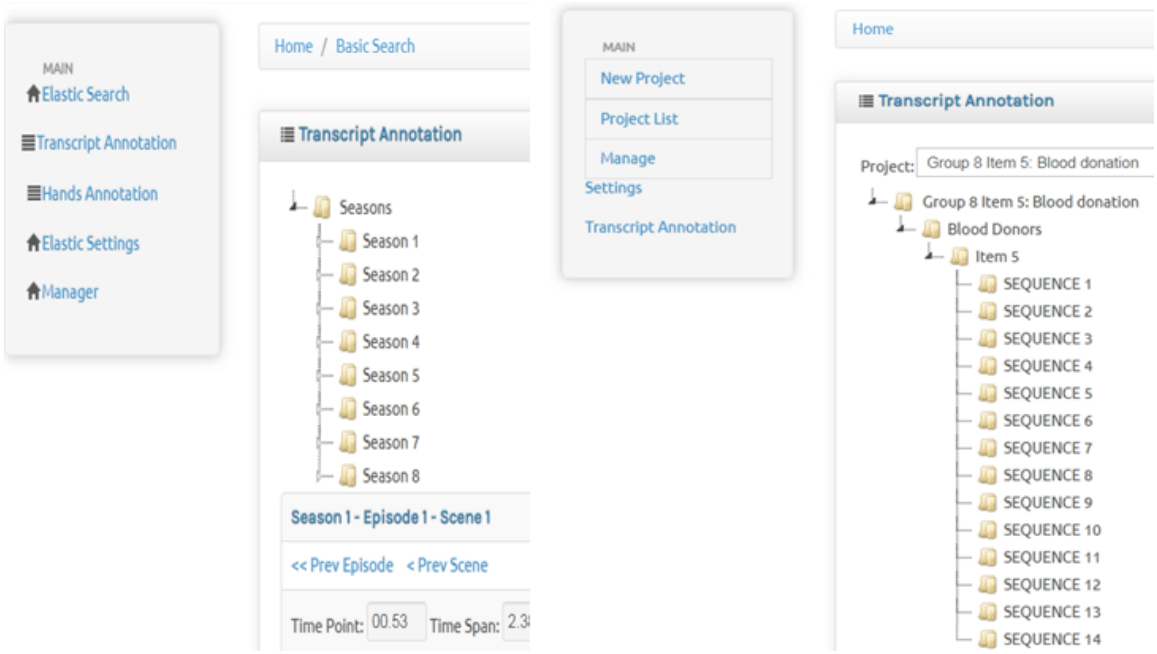


Figure 21
Comparison of the House Corpus (left) and
OpenMWS Transcript (right) annotation interfaces.

We can briefly exemplify how this need for consistency is currently being met and explained to student annotators as a critical factor by examining Figure 22, a fragment of an OpenMWS Resources file relating to a video promoting blood donation in India (https://youtu.be/rIxe0q2GEdM). This takes the form of a performance text in which the characters are represented visually by matchstick figures and verbally by male off-screen speakers.

	A	B	C	D	E
6	ITEM 5	SEQUENCE 5	00.41	00.15	**HOSPITAL CLERK (ON PHONE) [MALE OFF SCREEN NARRATOR]:** HELLO, SIR. WE ARE CALLING FROM GIVE LIFE HOSPITAL. YOUR UNCLE RAJARAM MET WITH AN ACCIDENT. PLEASE COME IMMEDIATELY. **ASHOK [MALE OFF SCREEN NARRATOR]:** ACCIDENT?
7	ITEM 5	SEQUENCE 6	00.57	00.05	NONE
8	ITEM 5	SEQUENCE 7	01.02	00.41	**ASHOK: [MALE OFF SCREEN NARRATOR]:** I AM ASHOK. MY UNCLE RAJARAM JOINED IN THIS HOSPITAL. PLEASE, TELL ME THE CONDITION OF MY UNCLE. **HOSPITAL CLERK [MALE OFF SCREEN NARRATOR]:** RAJARAM? OH, TREATMENT IS GOING ON, BUT WE NEED 0+ BLOOD FOR HIM. AT PRESENT WE DON'T HAVE IT. PLEASE, GET IT FROM YOUR SIDE OR ELSE ASK DONORS. **ASHOK [MALE OFF SCREEN NARRATOR]:** ONE SECOND. THIS IS VERY BIG HOSPITAL IN THIS CITY. HERE ALSO BLOOD IS NOT AVAILABLE? SO STRANGE! **HOSPITAL CLERK:[MALE OFF SCREEN NARRATOR]** IN INDIA SCORES OF PEOPLE ARE THERE, BUT VERY FEW PEOPLE ARE DONATING BLOOD VOLUNTARILY. **ASHOK [MALE OFF SCREEN NARRATOR]:** THIS IS ALSO SO STRANGE! SORRY, GIVE ME YOUR PHONE, PLEASE. **HOSPITAL CLERK [MALE OFF SCREEN NARRATOR]:** SURE

Figure 22
Student transcription showing two types of transcript tags.

In the House Corpus, 'transcript tags' were restricted to metatextual labels embedded in the transcript relating to the names of the characters in the series which, as illustrated in Figure 1 in Section 3, are placed at the beginning of each line and provide a cue for the actor playing the character in question. In other words, in the House M.D. series, 'transcript tags' are a closed and predetermined set, as is typical of performance genres, whose further role as searchable items in the House Corpus is illustrated in Section 6 in relation to the search filters available in the Dialogue menu. However, in the case of OpenMWS not all 'transcript tags' are predetermined. As Figure 21 shows, there is a need to distinguish between performance genre transcript tags such as 'Hospital clerk, 'Ashok' and 'Man n.1' which belong to a specific video and more general transcript tags which are relevant to a much larger number of videos and hence far more suitable for wider-ranging corpus searches. Figure 21 shows how the label 'off-screen male speaker' has been added as a tag that correlates with the textual functions of the characters. This tag allows this scene to be linked in corpus searches to similar functions in other videos. Instructing students to embed both types of transcript tags in the Oral Discourse column of the Resources file has thus been a first step in building a blood donor video corpus, for which the initial corpus search transcript tag set is:

1. OFF-SCREEN vs ON-SCREEN;
2. MALE vs FEMALE;
3. CHILD vs. ADULT [the latter need not be specified];
4. NARRATOR vs SPEAKER;
5. UNDECIDED = detectable in searches but to be discussed and adjusted.

The items in this set can be combined (*e.g.* ON-SCREEN, FEMALE CHILD, SPEAKER) and are used even where no specific name is attributed for a speaker or narrator. UNDECIDED is a very important label in corpus construction as it allows student annotators to express doubts and trains them to consult others when in doubt. In relation to the ambiguous use of matchstick figures in the Indian blood donation film that the student annotator transcribed (Figure 21), a student wrote: "I don't know if I missed it in the film, but I can see no distinction between men and women. For this reason, I don't know if I should assume only men are represented or not". Indeed, the small collection of blood donation videos that has so far been collected, transcribed and annotated, suggests that, as compared with the first videos on this subject, dating back over at least eighty years, considerable changes have occurred in the social and medical categories represented. It may well be that a recheck phase such as the one mentioned in Section 3 will be needed to decide whether it is appropriate to embed further indications of social and medical groupings in the transcription phase as transcript tags or in the annotation phase illustrated in Figures 19 and 21.

However, we may conclude this Section by briefly describing some of the tools in the MWSWeb interface that allow students doubts and misgivings to be collected and analysed. One of these is the House Corpus Location Tracking tool which requires the student annotator to indicate whether the choice of a location annotation was made on the basis of reading a transcript or watching and listening to the scene or whether no choice could be made. Since it is possible to carry out searches of these annotations, a picture of scenes that were difficult or impossible to annotate can be quickly built up. Likewise, the incorporation of an UNDECIDED category in the Voice menu of the House Corpus has made it possible to quantify the proportion of cases where it was not possible to determine the voice prosodies in specific scenes because of overlaps between categories or where the students felt they belonged to other unspecified categories. The figures for the four categories are reported in Table 4.

Voice annotation	**Nos.**
1. Voice Disembodiment	
1.1 Announcer voice (e.g. radio news, public address systems)	101
1.2 Off-screen character voice(s) (e.g. phone calls)	140
1.3 Off-screen non character voice(s) (e.g. songs)	641
1.4 Recorded voice (e.g. phone messages)	26
1.5 Synthesized voices (e.g. computerised car voice)	25
1.6 Voices in the head (e.g. hallucinations)	39
1.7 Voiceover (e.g. documentary-style description of events)	43
1.8 Other (includes cases where these categories overlap)	252
2. Voice Intensity & Modulation	
2.1 Attention getters (e.g. calls for help)	32
2.2 Audience-switching (e.g. phone to face-to-face switching and vice-versa)	289
2.3 Clarity changes (e.g. mumbled, slurred speech)	38
2.4 Individual characters' non dialogic use of voice (e.g. singing to oneself)	20
2.5 Intensity changes (e.g. whispering, yelling, shouting)	796
2.6 Off-screen non dialogic voices (e.g. background singing)	29
2.7 On-screen non dialogic voices (e.g. crowds chanting/cheering/shouting singing)	19
2.8 Other (includes cases where these categories overlap)	1678
3. Voice Imitation & Identity Switching	
3.1. Gender/age-related (e.g. male characters imitating female or children's voices)	29
3.2. Person-specific (e.g. imitating a specific person's voice)	252
3.3. Variety switching (e.g. characters not using their normal varieties of English)	442
3.4. Other (includes cases where these categories overlap)	390
4. Voice Reflections (characters' comments about their own or others' voices)	
4.1 Clinical/medical (e.g. comments about disorders involving voice hallucinations)	55
4.2 Social (e.g. asking sb. not to shout)	13
4.3 Other (includes cases these categories overlap)	7
OVERALL TOTAL	5356

Table 4
Quantification and distribution of annotated voice prosodies.

They show that the highest proportion of uncertainty occurred with the second (58%) and third categories (35%) whereas with the other categories the range was, as expected, less than 15% (12% for Category 1 and 9% for Category 4). Many of these uncertain cases are likely to be resolved when the categories are rechecked and further subcategories are included such as the possibility of associating the different voice characteristics in each scene with one of more characters. There are, indeed, many cases where multiple voice intensity changes in a specific scene have been included among the 'Other' choices. As the LANG students were allowed to express their doubts, the annotation so far carried out has been revealing, pointing to those circumstances where further research needs to be undertaken.

10. Conclusions

As with other professions, teamwork is essential for language-related careers, including those relating to EMP. This extends to the training of undergraduate students who need to keep pace with the demands and affordances of the digital age. As the role of video-hosting websites gathers pace in today's society, far more training possibilities are arising for online projects which simulate professional activities and exercise students' skills as regards the ways in which specialised discourse is accessed and used in the digital age. In this respect, the MWSWeb Project adds to the possibility of training students in the construction of specialised video corpora and provides the means to engage students in this construction in terms of a sequence of steps which include: the online dissection in the MWSWeb platform of videos hosted in video-sharing sites and their recasting as specialised but searchable collections through preliminary transcription and subsequent annotation. However, a further aspect of this training relates to the collective awareness that constitutes the basis of teamwork, an important aspect in any successful career. As discussed above, despite some significant exceptions, the MWSWeb Project has so far placed considerable emphasis on the individual performance of student annotators. However, as also discussed above, the next steps in the MWSWeb Project are designed to promote awareness of the collective responsibility that participation in any online project requires.

Bionotes Anthony Baldry**,** formerly Full Professor in English Linguistics at the University of Messina, continues to engage with discourse in English mostly within a sociolinguistic approach that explores the evolution of medical genres over time and which makes particular reference to multimedia corpora supporting both intersemiotic and metasemiotic investigations.

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