Engaging audiences in the digital age: A proposal for students' training in multimodal literacies using *YouTube* research dissemination videos

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ABSTRACT: Science dissemination with online videos has become an essential skill for both researchers and students. Learning the language of science dissemination videos entails more than just understanding their linguistic nature. These videos are made up of complex multimodal interactions that contribute to the engagement of their viewers. Authentic materials (*YouTube* videos) may be introduced in the English for Specific Purposes (ESP) classroom to reflect on the multimodal use of science dissemination and its role to enhance engagement. The study aims at: (1) reflecting on the multimodal characteristics of these videos to better define the genre and the use of engagement strategies; and (2) discussing on the possible implications that these engagement strategies may have for multimodal literacy training. We multimodally analysed three *YouTube* research dissemination videos. First, a number of rich points were selected. Second, these fragments were further examined using *Multimodal Analysis – Video*. Results contribute to multimodally defining this genre as a novel genre and are meaningful to comprehend its multimodal affordances. A discussion on educational implications is provided to teach multimodal engagement strategies for science dissemination and broaden students' awareness of multimodal literacy skills.
Keywords: *YouTube* science dissemination videos, engagement strategies, digital genres, multimodal literacy, multimodal discourse analysis.

La participación del público en la era digital: una propuesta para la formación de los estudiantes en alfabetizaciones multimodales a partir de vídeos de difusión de la investigación en *YouTube*

RESUMEN: La difusión de la ciencia a través de vídeos en línea se ha convertido en una habilidad esencial tanto para los investigadores como para los estudiantes. Aprender el lenguaje de los vídeos de divulgación científica implica algo más que comprender su naturaleza lingüística: estos vídeos están compuestos por complejas interacciones multimodales que contribuyen a la participación de sus espectadores. Además, se pueden introducir materiales auténticos (vídeos de *YouTube*) en el aula de inglés con fines específicos (ESP) para reflexionar sobre el uso multimodal de la divulgación científica y su papel en la mejora del compromiso del estudiantado. Este estudio pretende: (1) reflexionar sobre las características multimodales de estos vídeos para definir mejor el género y el uso de las estrategias de implicación en ellos; y (2) debatir sobre las posibles implicaciones que estas estrategias de participación pueden tener para la alfabetización multimodal. Para ello, analizamos multimodalmente tres vídeos de difusión de la investigación en *YouTube*. Se seleccionaron una

serie de fragmentos ricos multimodalmente y se examinaron estos fragmentos con el programa *Multimodal Analysis – Video*. Los resultados contribuyen a definir multimodalmente el género de videos de difusión de la investigación como un género novedoso y son significativos para comprender sus posibilidades multimodales. Se ofrece una discusión sobre las implicaciones educativas para la enseñanza de estrategias de interacción multimodal para la difusión de la ciencia y la ampliación de la conciencia de los estudiantes sobre las habilidades de alfabetización multimodal.
Palabras clave: Vídeos de divulgación científica de *YouTube*, estrategias de implicación, géneros digitales, alfabetización multimodal, análisis del discurso multimodal

1. Introduction

1.1. Cybergenres and research dissemination *YouTube* videos

The unprecedented growth of Information and Communication Technologies (ICTs) over the recent decades has made the use of digital information the most important engine for the transfer of knowledge. Because of their evident influence in many areas, some researchers (Girón-García & Boghiu-Balaur, 2021) already confirmed it is not unexpected that new digital generations would demand a transfer of knowledge from physical to digital modes in the 21st century. Luzón and Pérez-Llantada (2022) explain that this transformation has "increased the range of semiotic resources for research practices and academic communication" (p. 133). For example, the possibility of combining different modes (i.e., visual, aural, and verbal) (Kress, 2003) in order to convey meaning is one of the main traits of the virtual environment.

In modern education, the Web is an interactive and multimodal tool that is implemented in the teaching-learning environment in the form of distance learning (Querol-Julián, 2021), which might be complemented by face-to-face interactions in the classroom. The multimodal perspective in this digital age adopts a new vision of conceiving modes of oral and written communication from print to digital formats (González-Lloret, 2016). Therefore, the implementation of this new learning system in Higher Education (HE) helps students to adopt numerous skills; such as: (1) learning from a more individualistic and independent approach, (2) engaging in specific online literacy skills in the digital age (Luzón et al., 2010), and (3) developing their online reading skills through interaction with online texts that arise as a result of searching for information (oral and written) on the Internet.

This new digital reality has led to the emergence of multiple genres. The concept of 'genre' in the field of communication has been defined multiple times. However, the introduction of technologies and their evolution have been determinant towards providing a more updated definition. Some experts who address genre theory in the field of popular scientific communication (Bawarshi & Reiff, 2010, p. 3) maintain that a genre is defined in the field of scientific communication as "a way of acting in a meaningful sense by reproducing situations that are recurrent". But as the various media collections have been progressively integrated into physical and electronic formats (i.e., traditional genres vs. digital genres), the understanding of the concept of genre has also changed. These new definitions take into account a range of traits such as 'situatedness', 'community ownership', 'duality of structure', 'form and content' (Berkentotter & Huckin, 1995), and 'dynamism' (Lemke, 2005) as main elements in digital genres. At the same time, genres evolve adapting to contextual factors aligning to

changes occurring in society. Genres might, therefore, develop into digital genres, or evolve from traditional genres adjusting the affordances provided by the new medium (Shepherd & Watters, 1998). According to these authors, digital genres, also known as 'Cybergenres', are classified into two main categories: (1) '*Extant*' and (2) '*Novel*'. (1) *Extant* subgenres are based on already existing genres in other media (e.g., video, newspapers) and range from reproductions or replications (i.e., '*replicated*' cybergenres) of the original genres to significant variants (i.e., '*variant*' cybergenres).

(2) *Novel* genres have emerged and developed in the new medium and are not based on previously existing genres in another medium, since they depend on the new environment. Likewise, novel cybergenres are divided into two subgenres: '*Emergent*' cybergenres have evolved to the extent that they are now new genres, that is, following the evolution from simple replication through variant to emergent. '*Spontaneous*' cybergenres have no counterpart in other media, include the home page, the hot list, and FAQ's; and they are considered specific genres to the new medium.

Finally, when it comes to Cybergenres, multimodality also plays a fundamental role since the online medium affords a wide range of representations (either through images, texts, and videos) (Luzón, 2007). Therefore, these modes must be intertwined with each other and understood together when analysing a genre (Luzón & Pérez-Llantada, 2022).

With the evolution towards Cybergenres, traditional information formats have been transformed into digital modes. Along this line, knowledge is regarded as more motivating, engaging, clearer, and easier to understand for the 'new users' (Girón-García & Silvestre-López, 2019). Therefore, the growth of new digital platforms (Girón-García, 2013) such as wikis (Kelly & Miller, 2016), social networks, webinars (Ruiz-Madrid & Fortanet-Gómez, 2017), research pitches (Ruiz-Madrid, 2021), and online *YouTube* videos (Welbourne & Grant, 2016), among others, contributes to the better understanding of research dissemination. ICTs have to respond to a new user profile referred to as 'digital natives' (Prensky, 2001) and these users increasingly demand more personalised practices in the digital environment. Therefore, teachers and researchers are often obliged to address their needs in this scenario, so they can offer engaging and motivating knowledge, catering to their needs and objectives. Nevertheless, these users must be trained in emerging technologies from an adequate pedagogical perspective in the classroom, considering the curricula of the subject., as has been studied and demonstrated by Hernández-Ortega et al. (2021) and Zokhida (2022) Therefore, we can contribute to such learning by applying a learner-centred approach through the introduction of authentic materials, such as *YouTube* videos, as a growing source to disseminate content (Allgaier, 2020), and thus cause user engagement in the English for Specific Purposes (ESP) context in HE. Previous research on multimodal genres (Fortanet-Gómez & Edo-Marzá, 2022) have claimed that "authentic materials in real-life situations make[s] an important contribution to meaningful practice" (p. 66).

1.2. Multimodal literacy to promote engagement in the digital age

Engagement studies have been conducted in varied contexts; Bouvier et al. (2014, p. 496), for instance, focus on digital games and refer to engagement as "the willingness to have emotions, affect, and thoughts directed toward and aroused by the mediated activity in

order to achieve a specific objective". In fact, engagement seems to play a crucial role in people's interaction with technology (O'Brien & Toms, 2008) and, consequently, in digital genres. This is also the case of online science dissemination, in which the ability to engage the audience becomes one of its central elements (Hyland, 2010). Thus, engagement is of particular relevance in these types of genres, as they are commonly aimed at non-specialized audiences, and intricate processes of recontextualization are necessary to ensure the message is transmitted successfully (Bondi et al., 2015). As argued by Bernad-Mechó and Valeiras-Jurado (2023), engagement strategies are abundant and complex in digital genres and, drawing from Valeiras-Jurado et al. (2018) and Carter-Thomas and Rowley-Jolivet (2020), these authors suggest a taxonomy for engagement in science communication videos made up of five strategies:

- Emphasis: the message is reinforced and highlighted either linguistically or using intonation, visuals, etc.
- Attention getting: the attention of the audience is caught and maintained by using catchy expressions, visuals, etc.
- Dialogic involvement: the audience is referred to through direct questions, the use of inclusive pronouns, gestures, etc.
- Humour: humoristic strategies are employed such as jokes, irony, register shifting, etc. –see Bernad-Mechó and Girón-García (2023) for a full description of humour in science communication videos.
- Control of responses: the speakers anticipate potential responses and try to accommodate the audience to desirable ones. For example, a speaker might put forward a far-fetched idea, and they could do so with a face of disbelief, giving the impression that such an idea is, in fact, plausible.

Engagement strategies within digital genres are relevant in *YouTube* videos. *YouTube* is regarded as a digital platform that contributes to increasing the dissemination of science through authentic materials, triggering a rapid distribution among its users (Osterrieder, 2013). In short, the more entertaining *YouTube* videos are, the higher the amount of "likes" they obtain (Khan, 2017). In this regard, Welbourne and Grant (2016) analysed 390 of such videos in the search for strategies that would make them more engaging and attractive. These authors identified several content and genre-related factors able to increase popularity in science communication on *YouTube*. For instance, although financial resources play an important role in the production of these videos, these are not a key aspect and both professional and regular users can succeed. To do so, it is more important to create continuity through several videos featuring the same communicator to foster trust and authenticity and engage the audience. Furthermore, Welbourne and Grant identify the length of the videos and pace as two important aspects to consider. Counterintuitively, and against previous claims (Davenport & Beck, 2001), shorter videos do not seem to be necessarily more engaging than longer ones. Finally, in line with previous research (Chambers, 2001), faster speech rates increase engagement and interest even if comprehension is compromised.

Muñoz Morcillo et al. (2016), on the other hand, explore the characteristics of popular science videos with different success rates and argue that establishing a personal relationship with the audience, i.e. engaging the audience, is a recurrent technique employed by most creators. This can be achieved by offering a charismatic first-person narrative, looking

directly into the camera, including catchy introductions, and using dramatic means such as the creation of suspense, climaxes, and a positive final taste, among others. Content aside, they reflect on the importance of production aspects like montage, type of shots, cinematography, sound design, use of text in picture, previous footage, and graphics, etc. In fact, these filmic aspects –or *filmic modes*– play a central role in the effective conveyance of messages in science dissemination videos (Valeiras-Jurado & Bernad-Mechó, 2022). In this sense, science dissemination videos, like all communication (Kress, 2010), are inherently multimodal; i.e. full meaning is conveyed by combining several modes instead of using one mode only (typically regarded as the verbal mode). Luzón (2019) analysed videos created by research groups to explain their research and engage a wider public. She found out that four main strategies may be achieved through the multimodal combination of semiotic modes: building credibility, fostering persuasion, recontextualizing meaning to the potential viewers, and engaging the audience. Xia and Hafner (2021) went a step further and reflected on how digital media afforded the use of specific semiotic resources and how concrete multimodal configurations were orchestrated to foster engagement.

In this line, teaching researchers the multimodal intricacies of this genre through multimodal literacy practices seems to be necessary in training courses. Literacy should no longer be seen as a mere linguistic achievement (Jewitt, 2008), but as the ability to understand, orchestrate and employ multiple modes effectively to construct meaningful works, which are also coherent with the medium in which they are installed. Indeed, "a 'multimodal literate' student must be sensitised to the meaning potential and choices afforded in the production of the text, rendering an enhanced ability to make deliberate and effective choices in the construction and presentation of knowledge" (O'Halloran & Lim, 2011, p. 16). As argued by Callow (2013) and Kress (2010), the ways in which semiotic resources are combined to convey meaning in specific texts need to be taught explicitly. In this line, Lim and Tan (2018) stated that being able to prepare students for multimodal literacy was imperative, and it cannot be assumed that multimodal texts would be critically seen by their audiences. Furthermore, according to O'Halloran and Lim (2011), multimodal literacy occurs across two dimensions. The first one is related to multimedia texts arising as a result of new media to communicate information. Here, students need to be able to successfully interpret these manifestations. The second dimension sees the teaching and learning process as a multisemiotic experience *per se*, in which educators need to be aware of how lessons are multimodally constructed to maximise their potential.

Multimodal literacy has been explored from many perspectives such as its impact on early, primary and secondary education (Taylor & Leung, 2020), critical viewing of films (Lim & Tan, 2018), teacher training (Drajati et al., 2018), or the promotion of English language proficiency in HE (Crawford Camiciottoli & Campoy-Cubillo, 2018), among others. In the genre of science dissemination videos, Girón-García and Fortanet-Gómez (2023) explored how these videos might be used as multimodal supporting resources in ESP contexts in HE. Furthermore, as mentioned above, this genre has been analysed from a multimodal point of view to describe common engagement strategies employed by communicators (Bernad-Mechó & Valeiras-Jurado, 2023).

However, despite the abundant literature that brings to the fore the relevance of multimodal literacy, no studies have, to the best of our knowledge, looked at the ways in which multimodal engagement strategies in *YouTube* science communication videos can be taught

to communicators (Choi and Ko, 2022). As argued above, this should be a central aspect of education, especially for researchers in training.

Thus, the present study has a twofold objective. On the one hand, this paper aims at exploring the main engagement traits of *YouTube* research dissemination videos as they are used multimodally to better define this digital genre. On the other hand, the paper explores the possible pedagogical implications of these uses of engagement strategies to promote multimodal literacy. With all this in mind, and to achieve our objectives, we pose the following research questions:

RQ1: How does a multimodal analysis of engagement strategies in research dissemination *YouTube* videos contribute to defining this digital genre?
RQ2: What are the pedagogical implications of our analysis? How can multimodal literacy be included in the ESP classroom?

2. Methodology

2.1. The dataset

To answer the research questions above, we used three *YouTube* dissemination videos that were part of a wider project analysing multimodality in digital communication–see Bernad-Mechó and Girón-García (2023)- and that were also explored for this study. These videos feature Hank Green, Dr. Erika Brozovsky, and Dr. Mathew O'Dowd, all of them popular *YouTube* celebrities that discuss scientific topics regarding medicine, linguistics, and astrophysics respectively. The first video, titled *7 medicines that come from super toxic critters* is 12 minutes and 58 seconds long, was published by the *YouTube* channel SciShow in 2018 and has, as of today, over 7 million views. The second one, "The unexpected origins of the word 'monster'" is 8 minutes and 17 seconds long, was uploaded by the channel Otherwords! in 2021 and has over 300.000 views. And the last video, "Why haven't we found alien life?", lasts 12 minutes and 10 seconds, was uploaded by PBS Space Time in 2015 and has around 2.7 million views. These specific videos were selected given their popularity on the platform, because of the fact that they are presented by creators who have already established a connection with their subscribers through the creation of a series of videos (Welbourne & Grant, 2016), and because of their engagement prospective.

2.2. Analysis

Once the videos were selected, both researchers viewed them individually in order to identify their most salient *rich points* (Valeiras-Jurado, 2019), i.e. fragments that are particularly appealing to the viewer for their engagement potential. After this initial election, an agreement was reached between both researchers to choose five engaging fragments per video. The decision to choose only these fragments was made out of practical reasons: extensive fine-grained multimodal analyses are usually time-consuming and short qualitative fragments are preferred to exemplify trends in the data (Bernad-Mechó, 2021). Taking this into account, these 15 short clips were further analysed using the software Multimodal Analysis

Video (O'Halloran et al., 2012). This program allows researchers to create multiple layers of analysis, in which each of the desired modes can be annotated in relation to the video. For the analysis of engagement, the taxonomy developed by Bernad-Mechó and Valeiras-Jurado (2023) was employed. As argued above, five main strategies are commonly found in science communication videos to foster engagement according to these authors: emphasis, attention getting, dialogic involvement, humour, and control of responses. These strategies may be realised either by the presenters themselves (verbally or nonverbally) during their presentation, or with production techniques after the recording. Thus, after annotating these strategies, two types of modes were analysed following Valeiras-Jurado and Bernad-Mechó (2022): embodied and filmic modes. Although the definition of embodiment is a blurry one (Norris, 2004), in this paper we refer to embodied modes as those that are carried out using the bodies of speakers; in particular, spoken language, paralanguage, gestures, gaze, head movements and facial expression. On the other hand, as argued above, new media allow for new affordances when it comes to the use of modes. Consequently, we consider filmic modes to be highly relevant in conveying meaning in science dissemination videos. We analysed types of shot, cuts, music, visual prompts, sound effects and visual effects.

After completing this part of the analysis, the annotations for engagement strategies were explored in relation to the specific multimodal ensembles employed to orchestrate such techniques. This qualitative analysis was then followed by a reflection on the implications of these types of analysis for the definition of *YouTube* science dissemination videos as a genre, and by a further exploration of the implications to teach multimodal literacy to researchers and content creators.

3. Results and discussion

3.1 Showcasing the multimodal analysis

We start from a detailed exploration of the use of engagement strategies in the short clips. Our results are in line with the ones obtained by Bernad-Mechó and Valeiras-Jurado (2023). Five strategies are recurrently employed throughout the dataset to engage the audience (emphasis, attention getting, dialogic involvement, humour and control of responses). These strategies, in turn, are constructed through complex combinations of embodied and filmic modes that maximise their impact in the digital platform. We would like to remark that, although we analysed three videos, the examples shown in this section come from only one of them, as we believe they represent better the points that we make regarding the use of engagement strategies.

Thus, Figure 1 shows a fragment from the introduction of the video on medicine. Starting exactly at 00:00 (before the official opening of the *YouTube* channel in minute 01:05) the speaker addresses the audience through a direct question. He does so by looking straight at the camera in a frontal middle shot, with no other visual elements present currently. This type of shot brings speakers closer to the audience (as opposed to full or long shots) while allowing the viewer to focus both on their facial expressions and their gestures (Xia & Hafner, 2021). In this sense, it seems evident that the speaker is using a dialogic involvement strategy for engagement. At the same time, the verbal utterance *per se* (the question) serves as an attention getter (Neagle, 2021). Moreover, the speaker produces the words 'snake

venom' and 'insect poison' by making them more prominent over the rest of the words. Thus, by using this paralinguistic resource, the speaker also emphasises the absurdity of his utterance. Finally, the speaker slightly tilts his head to his left in an expression of disbelief. By doing so, he is performing the engagement strategy of control of responses: although he is stating something obvious (no one would willingly ingest venom or rub poison on themselves), he is also contradicting his claim with his facial expression as he utters the question tag "right?". Actually, he is leading the audience to believe that there might be cases in which, in fact, this might be the case. This serves as part of the introduction to an episode discussing common medicines that are made of toxic compounds found in nature.

Figure 1. *Use of attention getting dialogic involvement, emphasis, and control of responses*. (MED_00:00-00:05)

Similarly, figure 2 also showcases the use of several engagement strategies. In this example, the speaker is talking about a species of beetles that produce an extremely toxic substance (*cantharidin*). Although most of the explanation is conducted in formal terms, the speaker shifts his register to introduce a comical fragment. This succession of academic and humoristic fragments through register shifting is consistent with the results shown in Bernad-Mechó and Girón-García (2023). From a multimodal point of view, the speaker accompanies the words "mating" and "nuptial gift" with a gesture that simulates sexual intercourse, thus emphasising the message and contributing to the creation of humour by referring to a taboo topic. The words "nuptial gift" are also prominently pronounced for emphasis. Finally, he also finishes this fragment with an ironic expression, "Love, ain't it grand?", uttered in an exaggerated manner, to make such irony obvious. When exploring the use of filmic modes, there are a series of remarkable aspects to comment on as well. First, this short fragment is separated from their neighbouring shots by sharp cuts, which interrupts the formal explanation and draws attention to the register shift. In terms of types of shot, there is a change from a medium close-up shot during the formal explanation to a wider middle shot for the comical fragment that allows the viewer to also focus on the gestures. After the humoristic fragment, the type of shot changes to a medium close-up again. As for the use of visual prompts (the text nuptial gift), they also serve as an attention getter and a highlighter of the message.

Fun fact, they also pass some of it to females during mating, with what's called the NUPTIAL GIFT, to protect the next generations. Love, ain't it grand?

Figure 2. *Use of humour, attention getting and emphasis*. (MED_07:32-07:42)

All in all, the specific multimodal ensembles depicted in Figures 1 and 2, both made up of embodied and filmic modes, serve to carry out numerous engagement strategies condensed in short periods of time. By doing this, the producers expect to capture the attention of the audience with a powerful introduction at the very beginning (Figure 1) and maintain such attention throughout the clip (Figure 2).

3.2 Defining *YouTube* science dissemination videos as a cybergenre

In response to the first research question aiming to explore the implications for genre definition, and based on the analysis, it could be argued that there is an evident evolution in what digital research dissemination is concerned, particularly when dealing with *YouTube* videos. This evolution is made explicit in two main ways:

(1) The *virtual environment*, i.e. the *YouTube* platform, which makes *YouTube* science dissemination videos' existence as entirely dependent on the medium. This digital medium affords a wider range of semiotic resources to interact with the audience, which these videos aim to fully exploit. For example, the introduction of 'filmic modes' is an essential part of these videos, as opposed to traditional face-to-face oral research dissemination (e.g. TED talks, 3 Minute Theses, etc.) and they directly contribute to the construction of the engagement strategies in the data. In the examples shown above, filmic modes are an intrinsic part to achieve all engagement objectives. In the first case (Figure 1), for instance, dialogic involvement is encouraged by means of filmic modes that bring the speaker closer to the audience; or, in Figure 2 the medium close-up shot is necessary to fully develop the humoristic fragment, since it allows the viewer to focus on the use of comical gestures. What is more, strategies such as attention getting and emphasis may be created only through the use of filmic modes themselves, for instance, when employing visual aids such as "nuptial gift" (Figure 2).

Thus, a key aspect in the evolutionary force of the genre is the progressive exploitation of the new functionalities offered by the new medium. In this sense, although the functionality of this cybergenre has not changed in relation to its original genres (i.e., to attract the user's attention, as well as to motivate them to consume science), the ways in which this is achieved are more intense. This feature is shown in the complexity of the multimodal ensembles analysed in this paper, as well as the dense presence of engagement strategies.

(2) The *type of user* in this new context is considered to be a digital user -'digital native'- (Prensky, 2017). Despite the fact that the audience's uptake is not studied directly in this paper, the results of the multimodal analysis show a quick montage with numerous cuts, change of shots, and visual prompts, among others –see Baron (2013) for a reflection on the MTV editing style. This is also combined with a complex orchestration of multimodal ensembles using prominent paralanguage, gestures, facial expressions, head movements, etc. All this suggests that the viewers of these videos are used to interacting with fast-paced dynamic content that needs to be highly engaging to attract and maintain their attention. This is in line with the results suggested by Muñoz Morcillo et al. (2016) and Welbourne and Grant (2016).

With all the above, a reflection on the multimodal traits of *YouTube* research dissemination videos to define their use of engagement strategies is in order to shed more light on the concept of genre and its definition in the digital age. Looking at the classification of cybergenres (Shepherd & Watters, 1998) presented in the literature review, we aim at including *YouTube* research dissemination videos within this taxonomy. These videos are based on already existing genres, since the oral dissemination of science has existed in non-digital formats for decades (e.g., non-academic scientific talks, TED talks, research pitches) or even in more traditional digital genres like documentaries. Yet, although similarities may be found, as argued above, *YouTube* science dissemination videos highly differ from these traditional genres, thus entitling an evolution towards a novel genre. These videos, however, may be found on *YouTube* in different stages through their evolution, from replicated genres (for example traditional documentaries uploaded to the platform, or recorded talks with no editing process); through variant genres (e.g. slightly edited talks and semi-documentaries); to fully emergent genres (videos made *ad hoc* for the online platform which make the most out of the affordances of the medium), establishing in this manner a continuity in the genre's evolution. In this sense, the findings derived from our analysis point towards *YouTube* videos as a fully evolved digital genre (i.e., an *emergent* cybergenre). Thus, this cybergenre is entirely dependent on the new environment (i.e., *YouTube*) and has evolved so much from its traditional counterparts that it needs to be classified as a new genre.

All this strengthens the study undertaken by Valeiras-Jurado and Bernad-Mechó (2022), who argue that the Internet medium (*YouTube*) maximises the dissemination of scientific knowledge in a faster or more immediate way to an audience that is not necessarily an expert in a specific scientific field. Also, engagement strategies, as well as the use of embodied and filmic modes shown in our study, may not only facilitate the dissemination of information but also allow the audience to feel more motivated to receive that information (Xia & Hafner, 2021).

3.3 Implications for multimodal literacy training

Regarding the second research question, the analysis carried out in this study advances the understanding of how this emergent cybergenre works. For some decades now, humanity has borne witness to a technological era that is evolving at an unprecedented pace. For this reason, it is essential to remark that the mere fact that digital natives have been in contact with technology (e.g., laptops, tablets, smartphones, etc.), from a very early age and for daily activities, does not mean that they are skilled enough to use them effectively (Prensky,

2017). In fact, these users need to be aware of the multiple and varied multimodal features of present-day technological communication, and of *YouTube* science dissemination videos.

Besides, students as digital users need training and guidance on the part of teachers, not only in the use of technology, but also in the intricacies of digital communication. Then, it is paramount to raise multimodal awareness in both, educators and learners, to foster an effective multimodal literacy. At the same time, teachers need to understand the characteristics of the online environment and how to exploit the multimodal possibilities afforded by each digital genre. In this regard, a strong teacher training program that achieves these objectives becomes one of the central needs for any young teacher/researcher. Moreover, with the evolution of genres over the years, the types of modes employed in communication have also evolved, especially due to digital communication techniques, which has an impact on how communication in general is carried out.

Thus, teaching the concept of multimodal literacy, how videos work, types of tasks, etc. provides users with the ability to communicate effectively in a digital environment with multimodal characteristics. In other words, being aware of the multiple modes that make up a multimodal text in the online world will help users construct meaning (Kress, 2010). In this sense, the *YouTube* platform may serve as a source that really contributes to this training, since this medium offers authentic materials that are motivating and engaging to the user. In this respect, the dissemination of scientific knowledge is even more quickly distributed among students, and research dissemination videos may become functional assets in the ESP and English as a Medium of Instruction (EMI) classrooms.

It is therefore necessary to initiate a discussion on how multimodality can be introduced in both the HE classroom and teacher training programs. As argued above, multimodal literacy is central to modern classrooms. The students will develop or learn literacy skills to help them organise their thoughts, comprehend and respond to a particular mode appropriately. In the classroom, learning in an environment that integrates digital resources involves completing a series of tasks that have been designed by an instructor in advance. Teachers can therefore contribute to this learning by introducing authentic materials such as the videos analysed in this paper through the Task-Based Language Teaching ("TBLT") approach (Long, 2016). This would provide a more dynamic and motivating scenario, contrasting with regular teaching practices. Specific proposals for this could include: "WebQuests" (Dodge, 1997), "TalenQuests" (Koenraad, 2002), "Cybertasks" (Girón-García, 2013), and "Lesson" –a most recent online task based on the Cybertask model and integrated into the Moodle platform (Silvestre-López & Girón-García, 2023). Specifically, what we propose is to integrate such videos into online tasks that serve an academic purpose for students. For example, the integration of *YouTube* videos in an online task such as a Cybertask-based Lesson (integrated into the Moodle platform) that offers students a series of activities that demand the use of multimodal resources can be very beneficial to them. We believe that students' interaction with semiotic modes in a multimodal ensemble (i.e., the combination of embodied and filmic modes) together with their use of *YouTube* videos embedded in an online task is a training approach that can enhance their multimodal literacy, helping them to better understand specialized content, new vocabulary, and even specific terminology, such as in the fields of law, medicine, or even engineering, among other fields of specialization in English. In essence, being able to understand the multimodal nature of digital genres will

help students replicate these genres successfully. Still, much work needs to be done and further research is necessary to fully develop an applicable approach to foster multimodal learning and teaching.

4. Conclusion

This study has investigated the multimodal use of engagement strategies in scientific research dissemination videos on *YouTube*, which contributes to defining this cybergenre as an emerging genre. We have explored the multimodal affordances featured in three videos disseminating medicine, linguistics and astrophysics using the software MAV for their annotation. We also followed Valeiras-Jurado and Bernad-Mechó's (2022) and Bernad-Mechó and Valeiras-Jurado's (2023) frameworks for the exploration of engagement strategies, embodied and filmic modes. Based on our multimodal analysis, our findings provide some insights into how the different engagement strategies are used in these types of dissemination videos, as well as their relevance in creating successful content. The incorporation of filmic modes to the ensembles of embodied modes realised by the speakers provides engaging instantiations and increases the potential of the *YouTube* platform to disseminate science. Furthermore, this multimodal analysis has helped us understand how these videos work, and it has, therefore, shed light on the redefinition of this digital genre and its evolution from traditional genres. To conclude, being involved in a digital context presupposes a new user who is digitally competent, although this is not always necessarily the reality, as argued by Prensky (2017). Thus, although digital natives may be capable of using the digital environment quite easily and effectively, they still need teacher guidance and training in terms of multimodal literacies, which may have implications in the classroom. Teachers, in turn, need to understand multimodal texts successfully to teach present-day students. In short, teachers and learners need to be aware of how multimodal communication occurs to become multimodally literate.

The scope of this study was limited in terms of sample size –only three videos were analysed. For this reason, the results derived from this study cannot be generalised. However, multimodal analyses are rarely based on big data and qualitative approaches are preferred. Be that as it may, the results shown in our paper are consistent with previous studies and point towards a clear trend in describing the intricacies of communication in this genre. Therefore, it can be argued that the concept of video has evolved beyond a single particular format transcending into a new paradigm of semiotic metacommunication within social networks. These changes, in turn, have broadened the reach and impact of the videos by providing platforms for social communication and interaction, as well as cultural exchanges across the world. Still, further research is needed to fully comprehend how these (and other formats of) videos work from a multimodal point of view.

On another line, the design of online tasks using authentic materials was not the central objective of our study. As argued in the paper, the application of this type of activities with the integration of *YouTube* science dissemination videos may be beneficial for ESP and EMI students in HE contexts. Therefore, future research should concentrate on the design of these tasks to exploit students' cognitive abilities to the fullest, on the one hand, and on the other, to investigate the possible curricular adaptations and affordances of these tasks in ESP and EMI courses in the university context.

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6. References

Allgaier, J. (2020). Science and Medicine on YouTube. In J. Husinger, M. M. Allen, & L. Klastrup (Eds.), *Second International Handbook of Internet Research* (pp. 7–27). Springer.

Baron, L. (2013). MTV and a New Style of Editing. *Close Up: Film and Media Studies*, *1*(2), 69–76.

Bawarshi, A. S., & Reiff, M. J. (2010). *Genre. An Introduction to History, Theory, Research and Pedagogy*. Parlor Press.

Berkentotter, C., & Huckin, T. (1995). *Genre Knowledge in Disciplinary Communication: Cognition/ Culture/ Power*. Lawrence Erlbaum Associates.

Bernad-Mechó, E. (2021). Combining multimodal techniques to approach the study of spoken academic lectures: A methodological reflection. *Atlantis*, *43*(1), 178-198. ISSN: 1989-6840. DOI: http://doi.org/10.28914/Atlantis-2021-43.1.10

Bernad-Mechó, E. & Girón-García, C. (2023). A Multimodal Analysis of Humour as an Engagement Strategy Ein YouTube Research Dissemination Videos. *The European Journal of Humour Research, 11*(1), 46-66. https://doi.org/10.7592/EJHR2023.11.1.760

Bernad-Mechó, E. & Valeiras-Jurado, J. (2023). Multimodal Engagement Strategies in Science Dissemination. *Discourse Studies 25*(6), 1-12. https://doi.org/10.1177/14614456231161755

Bondi, M., Cacchiani, S., & Mazzi, D. (2015). *Discourse in and through the Media: Recontextualizing and Reconceptualizing Expert Discourse*. Cambridge Scholars Publishing.

Bouvier, P., Lavoué, E., & Sehaba, K. (2014). Defining Engagement and Characterizing Engaged-Behaviors in Digital Gaming. *Simulation & Gaming*, *45*(4–5), 491–507. https://doi.org/10.1177/1046878114553571

Callow, J. (2013). *The Shape of Text to Come: How Image and Text Work*. Primary English Teaching Association of Australia.

Carter-Thomas, S., & Rowley-Jolivet, E. (2020). Three Minute Thesis Presentations: Recontextualisation Strategies in Doctoral Research. *Journal of English for Academic Purposes*, *48*, 1–14.

Chambers, H. E. (2001). *Effective Communication Skills for Scientific and Technical Professionals*. Perseus Publishing.

Choi, H. & Ko, Y. (2022). Effective fake news video detection using domain knowledge and multimodal data fusion on YouTube. *"Pattern Recognition Letters",* 154, 44-52. https://www.sciencedirect.com/science/article/pii/S0167865522000071?casa_token=w6EyAjmZE-T8AAAAA:yckkG1GHbtOQgjeGdblHXDv6p-3OwvkW3A4W228w5r1OuWSQjEEvK-1LYyOy99KgOiuuN55sfpQ

Crawford Camiciottoli, B., & Campoy-Cubillo, M. C. (2018). Introduction: The Nexus of Multimodality, Multimodal Literacy, and English Language Teaching in Research and Practice in Higher Education Settings. *System. An International Journal of Educational Technology and Applied Linguistics. Special Issue: "Multimodal Perspectives on English Language Teaching in Higher Education" 77*, 1–9. https://doi.org/10.1016/j.system.2018.03.005

Davenport, T. H., & Beck, J. C. (2001). *The Attention Economy: Understanding the New Currency of Business*. Harvard Business Review Press.

Dodge, B. (1997). *Some Thoughts about WebQuest*. San Diego State University.

Drajati, N. A., Tan, L., Haryati, S., Rochsantiningsih, D., & Zainnuri, H. (2018). Investigating English Language Teachers in Developing TPACK and Multimodal Literacy. *Indonesian Journal of Applied Linguistics*, *7*(3), 575–582. https://doi.org/10.17509/ijal.v7i3.9806

Erviti, M. C., & Stengler, E. (2016). Online Science Videos: An Exploratory Study with Major Professional Content Providers in the United Kingdom. *Journal of Science Communication*, *15*(6), 1–15.

Fortanet-Gómez, I., & Edo-Marzá, N. (2022). New Genres and New Approaches: Teaching and Assessing Product Pitches from a Multimodal Perspective in the ESP Classroom. *Porta Linguarum*, *38*, 65–81. https://doi.org/10.30827/portalin.vi38.21621

Girón-García, C. (2013). Learning styles and reading modes in the development of language learning autonomy through 'Cybertasks'. Barcelona. Ed. Universitat Jaume I. Retrieved July 6, 2023, from http://hdl.handle.net/10803/125440

Girón-García, C. & Silvestre-López, A.J. (2019). Students' self-perception of motivation regarding a Cybertask integrating different types of online resources in the ESP classroom. *International Academy of Technology, Education and Development (IATED),* 4120-4126.

Girón-García, C. & Boghiu-Balaur, S. (2021). 'A mixed-methods study of online learning in the EFL classroom'. Revista de Lingüística y Lenguas Aplicadas 16, pp. 95–122. https://doi.org/10.4995/rlyla.2021.13950

Girón-García, C., & Fortanet-Gómez, I. (2023). Science dissemination videos as multimodal supporting resources for ESP teaching in Higher Education. *English for Specific Purposes*, *70*, 164–176. https://doi.org/10.1016/j.esp.2022.12.005

González-Lloret, M. (2016). *A Practical Guide to Integrating Technology into Task-Based Language Teaching*. Georgetown University Press.

Hernández-Ortega, J., Rovira-Collado, J., & Álvarez-Herrero, J. (2021). Metodologías activas para un aprendizaje transmedia de la Lengua y la Literatura. Active methodologies for transmedia didactics of Language and Literature. *El G U I N I G U a D a*, (30), 122-134. Recuperado a partir de https://ojsspdc.ulpgc.es/ojs/index.php/ElGuiniguada/article/view/1325

Hyland, K. (2010). Constructing Proximity: Relating to Readers in Popular and Professional Science. *Journal of English for Academic Purposes*, *9*, 116–127.

Jewitt, C. (2008). Multimodality and Literacy in School Classrooms. *Review of Research in Education*, *32*, 241–267.

Kelly, A. R., & Miller, C. R. (2016). Intersections: Scientific and Parascientific Communication on the Internet. In A. G. Gross & J. Buehl (Eds.), *Science and the Internet: Communicating Knowledge in a Digital Age* (pp. 221–245). Baywood.

Khan, M. L. (2017). Social Media Engagement: What Motivates User Participation and Consumption on YouTube? *Computers in Human Behavior*, *66*, 236–247. https://doi.org/10.1016/j.chb.2016.09.024

Koenraad, T. (2002). TalenQuest: WebQuests for Modern Languages. In J. Colpaert, W. Decoo, M. Simons, & S. Bueren (Eds.), *CALL Professionals and the Future of CALL Research, CALL 2002 Proceedings* (pp. 159–168). University of Antwerp.

Kress, G. (2003). *Literacy in the New Media Age*. Routledge.

Kress, G. (2010). *Multimodality: A Social Semiotic Approach to Contemporary Communication*. Routledge.

Lemke, J. L. (2005). Multimedia Genres and Traversals. *Folia Linguistica*, *39*(1–2), 45–56.

León, B., & Bourk, M. (2018). Investigating Science-Related Online Video. In B. León & M. Bourk (Eds.), *Communicating Science and Technology Through Online Video* (pp. 1–14). Routledge.

Lim, F. V., & Tan, K. Y. S. (2018). Developing Multimodal Literacy through Teaching the Critical Viewing of Films in Singapore. *Journal of Adolescent & Adult Literacy*, *62*(3), 291–300.

Long, M. H. (2016). In Defense of Tasks and TBLT: Non Issues and Real Issues. *Annual Review of Applied Linguistics*, *36*, 5–33. https://doi.org/10.1017/S0267190515000057

Luzón, M. J. (2007). The Added Value Feature of Online Scholarly Journals. *Journal of Technical Writing and Communication*, *37*(1), 59–73.

Luzón, M. J. (2019). Bridging the Gap between Experts and Publics: The Role of Multimodality in Disseminating Research in Online Videos. *Ibérica*, *37*, 167–192.

Luzón, M. J., & Pérez-Llantada, C. (2022). *Digital Genres in Academic Knowledge Production and Communication: Perspectives and Practices*. Multilingual Matters.

Luzón, M. J., Ruiz-Madrid, M. N., & Villanueva, M. L. (2010). *Digital Genres, New Literacies and Autonomy in Language Learning*. Cambridge Scholars Publishing.

Meissner, P., Cottler, L. B., Eder, M. "Mickey," & Michener, J. L. (2020). Engagement Science: The Core of Dissemination, Implementation, and Translational Research Science. *Journal of Clinical and Translational Science*, *4*, 216–218.

Muñoz Morcillo, J., Czurda, K., & Robertson-von Trotha, C. Y. (2016). Typologies of the Popular Science Web Video. *Journal of Science Communication*, *15*(4), 1–32.

Neagle, K. M. (2021). Ten Simple Rules for Effective Presentation Slides. *PLoS Computational Biology*, *17*(12), e1009554. https://doi.org/10.1371/journal.pcbi.1009554

Norris, S. (2004). *Analyzing Multimodal Interaction. A Methodological Framework.* Routledge.

O'Brien, H. L., & Toms, E. G. (2008). What is User Engagement? A Conceptual Framework for Defining User Engagement with Technology. *Journal of the American Society for Information Science and Technology*, *59*(6), 938–955. https://doi.org/10.1002/asi.20801

O'Halloran, K., & Lim, F. V. (2011). Dimensioner af Multimodal Literacy. *Viden Om Læsning*, *10*, 14–21.

O'Halloran, K., Podlasov, A., Chua, A., & E, M. K. L. (2012). Interactive Software for Multimodal Analysis. *Visual Communication*, *11*(3), 363–381.

Osterrieder, A. (2013). The Value and Use of Social Media as Communication Tool in the Plant Sciences. *Plant Methods*, *9*(26).

Prensky, M. (2001). Digital Natives, Digital Immigrants Part 1. *On the Horizon*, *9*(5), 1–6.

Prensky, M. (2017). The Changing Ends and Paradigm for Education in the World. *WISE Education Review*, *1*, 1–3.

Querol-Julián, M. (2021). How does Digital Context Influence Interaction in Large Live Online Lectures? The Case of English-Medium Instruction. *European Journal of English Studies*, *25*(3), 299–317. https://doi.org/10.1080/13825577.2021.1988265

Ruiz-Madrid, M. N. (2021). A Multimodal Discourse Approach to Research Pitches. *Journal of English for Academic Purposes*, *52*, 101003. https://doi.org/10.1016/j.jeap.2021.101003

Ruiz-Madrid, M. N., & Fortanet-Gómez, I. (2017). An Analysis of Multimodal Interaction in a Webinar: Defining the Genre. *EPIC Series in Language and Linguistics 2*, 274–282.

Ruiz-Madrid, N., & Valeiras-Jurado, J. (2020). Developing Multimodal Communicative Competence in Emerging Academic and Professional Genres. *International Journal of English Studies*, *20*(1), 27–50. https://doi.org/10.6018/ijes.401481

Scotto di Carlo, G. (2014). Ethos in TED Talks: The Role of Credibility in Popularised Texts. *Facta Universitatis. Series: Linguistics and Literature*, *12*(2), 81–91.

Shepherd, M., & Watters, C. (1998). The Evolution of Cybergenres. *Proceeding HICSS '98. Proceedings of the Thirty-First Annual Hawaii International Conference on System Sciences - Volume 2. January 6-9, 1998.*, 97–109.

Suárez, M., & González-Argüello, M. V. (2020). Becoming a Good BookTuber. *RELC Journal*, *51*(1), 158–167. https://doi.org/10.1177/0033688220906905

Swales, J. M. (1990). *Genre Analysis: English in Academic and Research Settings*. CUP.

Taylor, S. V., & Leung, C. B. (2020). Multimodal Literacy and Social Interaction: Young Children's Literacy Learning. *Early Childhood Educaiton Journal*, *48*, 1–10. https://doi.org/10.1007/s10643-019-00974-0

Valeiras-Jurado, J. (2019). Modal Coherence in Specialised Discourse: A Case Study of Persuasive Oral Presentations in Business and Academia. *Ibérica*, *37*, 87–114.

Valeiras-Jurado, J. & Bernad-Mechó, E. (2022). Modal Density and Coherence in Science Dissemination: Orchestrating Multimodal Ensembles in Online TED Talks and YouTube Science Videos. *Journal of English for Academic Purposes*, *58*, 101118. https://doi.org/10.1016/j.jeap.2022.101118.

Valeiras-Jurado, J., Ruiz-Madrid, N., & Jacobs, G. (2018). Revisiting Persuasion in Oral Academic and Professional Genres: Towards a Methodological Framework for Multimodal Discourse Analysis of Research Dissemination Talks. *Ibérica*, *35*, 93–118.

Walsh, M. (2010). Multimodal Literacy: What does it Mean for Classroom Practice? *The Australian Journal of Language and Literacy*, *33*(3), 211–239.

Welbourne, D. J., & Grant, W. J. (2016). Science Communication on YouTube: Factors that Affect Channel and Video Popularity. *Public Understanding of Science*, *25*(6), 706–718.

Xia, S. A., & Hafner, C. A. (2021). Engaging the Online Audience in the Digital Era: A Multimodal Analysis of Engagement Strategies in TED Talk Videos. *Ibérica. Revista de la Asociación Europea de Lenguas para Fines Específicos (AELFE)*, *42*, 33–58. https://doi.org/10.17398/2340-2784.42.33

Zokhida, S. Z. qizi. (2022). INTEGRATION OF ICT IN THE PROCESS OF TEACHING ESL/EFL. *INTERNATIONAL CONFERENCES*, *1*(13), 50–53. https://researchedu.org/index.php/cf/article/view/449