Lingue e Linguaggi
Lingue Linguaggi 33 (2019), 7-23
ISSN 2239-0367, e-ISSN 2239-0359
DOI 10.1285/i22390359v33p7
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HOW TO DO THINGS WITH MODES
Transmodality in slides

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Abstract – Slideshows are ubiquitous in today's academic events such as university lectures. Thus, it appears imperative to investigate the evolution of the modes which are implemented in processes of knowledge communication through slideshows. In particular, this study focuses on the complex relations between texts and images and on the multifaceted functions that different modes assume.
A corpus of lecture slides drawn from the MIT OpenCourseWare site is investigated from a transmodal perspective by adopting a qualitative approach. The analysis shows that the production of slides is based on the exploitation of multiple modes which co-act for the fulfillment of different pragmatic needs (e.g. informative, persuasive, or interactional) and assume a mutually constructive function.
This paper also argues for the significance of transmodal research in academic contexts, especially in the light of the constant technological and epistemological shift which accompanies the evolution of teaching practices in higher education. Indeed, a transmodal approach can facilitate a wider understanding of the affordances and limitations of the different semiotic resources, which need to be conceived from a complementary and syncretic perspective.

Keywords: slides; PowerPoint; multimodality; transmodality; image-text

1. Introduction

New technology is now an intrinsic part of university lectures, and slideshows using programs such as Microsoft PowerPoint have become a daily companion for lecturers across all disciplines. It is not the aim of this paper to offer a comprehensive evaluation of the effectiveness of these technological affordances (cf. Marsh and Sink 2010 for an overview). Rather, given the pervasiveness of these tools, this study aims to investigate the main discursive practices lying behind the organization of the different modes which are constitutive elements of slideshows.

Any discussion of the complementarity of modal resources in academia is inescapably related to what Malinowski and Nelson (2010) define as the 'foundational dilemma of language', which is illustrated as follows:

> On the one hand, language, as a preeminent mode of signification in human society, as an object of study, and as a metaphorical lens through which nonlinguistic forms of communication continue to be understood, is certainly not about to disappear. On the other, mention can easily be made of convergences between new literacy studies and fields such as film studies, media and new media studies, and visual cultural studies, that give ample evidence of a "visual turn" in modern schooling and communication at large (Malinowski and Nelson 2010, p. 53).

Clearly, the centrality of language in academic communication is deemed to endure. However, the participants involved in academic discourse are becoming increasingly aware of the crucial importance assumed by the interrelation between different modal resources (Malinowski and Nelson 2010, p. 65), whose exploitation in communication leads to the construction of modulated and multiplied meanings. In this respect, more than twenty years ago, Lemke aptly stated:

> meanings made with each functional resource in each semiotic modality can modulate meanings of each kind in each other semiotic modality, thus multiplying the set of possible meanings that can be made (and so also the specificity of any particular meaning made against the background of this larger set of possibilities) (Lemke 1998, p. 92).

This work is fundamentally founded on a notion of text which develops from a holistic approach to the analysis of a textual product. In this regard, we can reason with Hull and Nelson (2005) that "a multimodal text can create a different system of signification, one that transcends the collective contribution of its constituent parts" (2005, p. 225). The objective is to examine the 'modesphere', intended as the complex surface of modes with their interaction and interdependence. Hence, the attention is not on a single mode *per se*, but rather on modalization, which represents a fluid process which hinges on the mutual validation of different semiotic resources. Along these lines, the analysis aims to observe how selected modes are syncretically combined in order to contribute to meaning making.

More specifically, a lecture represents an event in which different aspects of communication (especially auditory and visual ones) interact in a dynamic way. Within the lecture, the slides themselves constitute a multimodal space, which is based on (and constructed by) the interaction between different modes. Starting from this assumption, the main questions that this study addresses are: 1) How is meaning designed and created in the multimodal composite of a slideshow? 2) What functions do the different (combinations of) modes fulfill? 3) From a conceptual perspective, is it possible to posit that a paradigmatic shift towards transmodality is taking place?

In order to tackle these issues, three courses offered by Massachusetts Institute of Technology (MIT)[1] are investigated. The investigation draws loosely on the multidimensional approach to slideshows presented by Zhao, Djonov and van Leeuwen (2014) and, subsequently, delves into the qualitative analysis of the pragmatic objectives achieved by transmodality.

2. Conceptual premises

The concept of multimodality broadly embraces different research agendas which have, as their common denominator, the investigation of the vast array of relations developing between modes. However, it is important to take into account that some approaches may lead to a wrongful interpretation that multimodality simply deals with the co-occurrence of modes which exist within their own boundaries. Conversely, within the multimodal rubric, the adoption of terms such as intermodality and transmodality seems adequate to stress the need to consider different modes from an interactive and holistic perspective rather than from a purely additive one. More specifically, intermodality seems to suggest the synthesis

[1] Details about the MIT OpenCourseWare initiative can be found at: https://ocw.mit.edu/index.htm.

and harmonization between modes into a coherent whole. Similarly, transmodality focuses on modal integration, somehow transcending the boundaries between resources.

Thus, the three terms (multimodality, intermodality and transmodality) focus on the involvement of multiple modes in communication and we can reduce their differences to an additive (multi-), interactive (inter-), and holistic and mutually transformative (trans-) perspective. Although a detailed theoretical discussion around these terminological differences would go beyond the scope of this paper, the reader must be informed that the approach adopted for the analysis of modes in this work is not merely additive.

Starting from the consideration that modes do not maintain their separate structures and identities once in contact, transmodality considers resources from a synergic perspective, accounting for the agentive ability of modes to generate new meanings in interaction. The term 'transmodality' indexes an approach which transcends the autonomous structures of modes and their preconceived hierarchical power relations which has long led to the relegation of non-verbal modes to mere contextual clues (Blommaert 2013). Rather, it implies a process of mutual transformation (Canagarajah 2018). Therefore, it can be argued that modes are not closed, self-defining, territorialized structures but rather expansive, situated, and dynamic constructs. This awareness can help us to further theorize transmodality, whose critical examination needs to be taken up more comprehensively.

Transmodality adopts an ontology which does not automatically define any modes as inexorably more dominant or significant, but considers their role within a situated analysis, in the light of the consideration that the relation between modes is irreducibly dialectic. Addressing the study of modes in communication from a broad transmodal perspective has many implications for how we conceive modal resources. In this respect, it is posited that such resources are not only juxtaposed, but they are mutually construed to facilitate the creation of meanings in an adaptive and trans-representational way.

Somehow in contrast with frameworks which aim at analytically isolating different modes, transmodality hinges on modal complexity and complementarity and aims to account for the intricate ways in which modes mutually transform and influence each other (Murphy 2012). According to this paradigm, the coexistence of modes is not intended as the mere layering but as the generation of semiotic chains which have a productive value. Resources are seen as performative, thus producing effects and generating meaning in context, rather than merely representational and static. Therefore, transmodality implies that the resources employed are agentive in shaping meanings, which are not pre-established but emerge during usage.

3. Slideshows in academia

Research on the use of slideshow presentations is generally rooted in two main approaches: a descriptive one and a prescriptive one. In the latter case, the debate is highly polarized, with scholars praising the usage of slides as an irreplaceable tool in education and others who define it as counterproductive from a pedagogical standpoint. Instead of advocating for an increasing display of multimodal resources in lectures or, conversely, for their reconsideration, this work aims to explore the multiple objectives that modes (and their interrelations) can achieve, not only from an informative perspective, but also in terms of motivational appeal and student engagement.

Following Zhao, Djonov and van Leeuwen (2014), an adapted three-dimensional model for the analysis of slideshows can be applied to this investigation. It focuses specifically on the notions of software design, slide composition, and presentation, as illustrated in Table 1.

Dimension	*Main agent(s)*
Software design	Software designer/engineer
Slide composition	Slide creator
Presentation	Lecturer

Table 1
Analytic dimensions of slideshows.

Software design

The choice of the software tools involved in the creation of a slideshow has important implications for the development of the lecture as a communicative event. Their functions have evolved considerably since the launch of 'Presenter' (the precursor to PowerPoint) in 1984. Indeed, Microsoft PowerPoint is used extensively globally and continues to represent a ubiquitous tool. However, it is now accompanied by several alternatives, such as Prezi, Slidebean, Apple Keynote, Visme, Flowvella, SlideDog, Preseria, Improve Presentation, Reveal, or Impress. The application is selected according to different criteria, such as ease of use, ability to customize, graphical outcomes, etc.

The notion of 'main agent' (see Table 1) refers to the main subject(s) contributing to a specific dimension of the slideshow. The software design is primarily determined by the principal designer(s)/engineer(s). However, the agents involved in the genesis and the development of the application are multiple and include a vast range of professionals who display different technical, creative, or managerial skills.

The features of a presentation program are constantly evolving, with growing attention being devoted to the sophistication of design and to the kinestheticization of objects.[2] Tools of this type are developed in collaboration with graphic designers, whose conceptualization of the creation process is inevitably imposed on the final user. It is clear that the evolution of new technologies will continue to play a significant role in the way slides are conceived, and will bring constant changes to the normative expectations at play.

The way the program is developed is strictly linked to the use that can be made of it and the design chosen implies specific technological affordances and limitations. The resources made available by the program impact the way the slide can be constructed in terms of constraints and potentialities (Yates and Orlikowski 2007), for instance as regards languages, layouts, or animations available. Evidently, the choice of the software tool[3] is key in that it brings with it specific professional, social, and cultural values (Arola 2010). Not only is the design functional in terms of presentation delivery, but it is a constitutive element, which has technical, but also ontological, implications. A specific design may contribute to conveying information through pre-established dynamics, which inevitably impacts the way the presentation is structured and delivered. Thus, the piece of software

[2] For instance, Office 2016 has introduced PowerPoint Designer and Morph, which contribute to the automatization of the process of slide production and to the graphic quality of the outcomes.

[3] Clearly, such a choice may be imposed upon the users by practical constraints, for instance the software licenses held by an institution.

itself is a semiotic artefact (Kress and van Leeuwen 2001; van Leeuwen 2005), in that it is a material object which incorporates differing semiotic resources.

Slide composition

Beyond the technical constraints imposed by the choice of the application, the structural composition of the slide is subject to conventional restrictions which are determined by institutional, disciplinary, and cultural factors. A particular institution may, for example, impose the use of a certain template, which includes specific content and formatting features. From this perspective, the slides analyzed present a certain level of flexibility, but the general patterns tend to conform with the common expectations related to an academic slideshow (e.g. presence of introductory and closing slides, readability, correctness, and consistency, etc.).

The notion of 'slide creator' (Table 1) refers to the person/people producing the slides. In this case, it can be the lecturers themselves or other individuals (e.g. their colleagues), and it can be the result of individual or team choices. The creation of slides may be seen as one of the "distributed and collaborative forms of authorship" (Literat 2018, p. 569), and these dynamics make the clear identification of the producer more critical, in that it is part of a more circular and fluid process. In this regard, slideshows represent a "new writing" practice (van Leeuwen 2008) which involves the mastering of multimodal literacies and which is often the result of a collaborative, multi-phased process.

Presentation

The notion of presentation can be intended as an umbrella term referring to the lecture as a communicative event, which comprises the management of the discourse practices involved, but also to the specific slideshow (and possibly the accompanying talk of the lecturer). This dimension is key for the conveying and the co-construction of a given meaning. In this case, the main agent involved is the lecturer(s) (Table 1). However, according to the level of interactivity, other actors, especially the audience present at the lecture, may contribute to the development of the presentation itself through their active involvement.

4. Materials

The slides analyzed are drawn from the MIT OpenCourseWare[4] site (for more details see Crawford-Camiciottoli, 2018). The slides under investigation can be accessed remotely[5] or *in situ* by the participants, and videos of all the lectures analyzed are available online. The material is related to three publicly available courses, namely 'Introduction to Computer Science and Programming in Python'[6]; 'Foundations of Computational and Systems Biology'[7]; and 'Reducing the Danger of Nuclear Weapons and Proliferation'[8]. The courses were held in English and took place between 2014 and 2016 in order to comply with the

[4] All materials are freely available at https://ocw.mit.edu/courses/.
[5] For each course, slides are located in a specific folder called 'lecture-slides', available for a wide range of topics.
[6] Area: "Electrical Engineering and Computer Science". Level: Undergraduate.
[7] Area: "Biology". Level: Undergraduate/Graduate.
[8] Area: "Interdisciplinary Topics". Level: Graduate.

criterion of recency, as this study is clearly of a synchronic nature. The corpus details are presented in Table 2.

	Course	Number of lectures	Lecture code	No. of slides	Length of lecture	Instructor(s)	Year
A	Introduction to Computer Science and Programming in Python	12	A-L1 A-L2 A-L3 A-L4 A-L5 A-L6 A-L7 A-L8 A-L9 A-L10 A-L11 A-L12	35 24 21 35 24 58 35 21 26 39 40 38	43’05 43’30 45’01 41’08 41’27 48’21 41’32 41’43 47’27 51’25 49’12 48’31	AB AB AB AB AB EG AB AB AB EG EG EG	2016
B	Foundations of Computational and Systems Biology	20	B-L1 B-L2 B-L3 B-L4 B-L5 B-L6 B-L7 B-L8 B-L9 B-L10 B-L11 B-L12 B-L13 B-L14 B-L15 B-L16 B-L17 B-L18 B-L19 B-L20	62 26 46 44 51 85 45 44 36 32 42 72 88 118 152 150 42 58 47 61	1h06’10 1h16’47 1h20’00 1h22’37 1h20’05 1h08’13 1h21’27 1h20’27 1h22’05 1h18’25 1h22’39 1h05’50 1h04’21 1h11’37 1h19’18 45’10 1h14’14 1h20’29 1h22’12 1h17’56	CB, DG, EF CB CB CB DG DG DG DG CB CB CB EF EF EF EF EF GL DG DG DG	2014
C	Reducing the Danger of Nuclear Weapons and Proliferation	2	D-1 D-2	29 30	1h35’26 1h23’27	AB VN	2015

Table 2
Corpus details.

Of the three dimensions of slideshows (see Section 3), this study focuses in particular on slide composition, with the awareness that the three levels of analysis are profoundly intertwined and contribute to the final outcome in a synergic way.

5. Multimodal resources

Drawing a comprehensive map of the interconnections between modes remains challenging because of the dialectic dimension between them (see Section 2). The analysis of a specific mode cannot disregard the reference to its interrelated modal resources without altering the meaning that it assumes through semiotic interaction. Consequently,

looking at the nature of the multiple resources within a slide, their placement, and the dynamics through which they are appropriated, is necessary in order to explore how meaning is constructed.

5.1 Visuals

Science communication has long undergone visualization processes, and the digitalization of communication has intensified this phenomenon in recent years (Bucher and Niemann 2012). In a similar vein, we have also experienced the development of a 'visual rhetoric' (Stark and Paravel 2008, p. 50) which has become pervasive in knowledge communication.

The role of visuals is particularly salient in slideshows. Drawing on Bertin (1973, p. 6), and integrating his original typology, Rowley-Jolivet (2002) classifies visuals into graphical images (e.g. graphs, diagrams, and maps), figurative images (e.g. photographs), scriptural visuals (e.g. texts), and numerical visuals (e.g. mathematical formulas). Although Bertin's classification is often employed in the multimodal analysis of different genres, it should be kept in mind that its application may be challenging. Firstly, it was developed specifically within the fields of geography and cartography and its expansion to other disciplinary areas needs to be problematized; secondly, new technology entails a sophistication of visual production which complexifies the adoption of categories abstracted in the 1970s. Consequently, the border between different traditional categories of visuals is often blurred, both because the ontological conceptualization of visuals may be subject to different interpretations and because technological advances further contribute to the hybridization of the role of modes (cf. Anesa 2019 forth.). In particular, although apparently straightforward, the difference between graphical and figurative visuals may be uncertain and, therefore, in several cases it would be more appropriate to talk about hybrid images. For example, a graphical reproduction may be presented by adopting a visual approach which is to a large extent figurative.

5.2 Textual pictures and pictorial texts

In their analysis of conference presentations, Bucher and Niemann (2012) identify three main types of slides: text-only slides, pictorial-only slides (including figurative or graphical elements), and mixed slides. However, most slides often present a certain level of hybridity which is determined not only by the coexistence of different types of visuals, but also by the hybridity of the visual itself (Anesa 2019 forth.). Consequently, the attempt to apply Bucher and Niemann's categorizations to the lecture slides present on the MIT website may at times be problematic. Some slides present elements which can be defined as predominately textual, but, at the same time, the pictorial visualization (with or without a combination of textual elements) plays a central role in the presentation of scientific information. Slides seem to develop along a continuum ranging from textual to pictorial but displaying multiple levels of hybridity, thus rendering their automatic ascription to one specific category more complex.

Pictorial slides are particularly difficult to define from a conceptual perspective. In their basic form, they include a full-size picture or a combination of several pictures. However, some textual elements seem to be omnipresent; for instance, captions are inserted in most of the slides analyzed (with different levels of specifications) and, consequently, purely figurative slides could be said to be very rare in our corpus.

Slides tend to, therefore, display a high level of hybridization, which may make their ascription to pre-established categories less intuitive than expected. They are

constitutively based on the presence of different modes and on their dynamic development in relation to one another, which contributes to their mutual validation.

Thus, modes are not accounted for in isolation but within a complex modal ecology. In this respect, the transmodal paradigm can help us to avoid falling into the trap of modal individuality and to stress the agentive power that the orchestration of modes brings with it.

6. Modes as functional devices

Drawing on speech act theory, it can be argued that we can 'do things with modes' or, rather, with the mutually constructive dynamics developing between them. Indeed, meaning is construed by the interplay of different semiotic modes, which are employed to reach specific pragmatic objectives.

These considerations can be applied to the analysis of image-text dynamics in the corpus under investigation. These relations have long been explored, and expressions such as 'imagetext' (Mitchell 1994) or 'synergy' (Sipe 1998) have been used to describe them. Slides often represent sophisticated spaces which are intended as texts supplemented by images. While some slides can be understood without pictorial elements (as some present exclusively textual material), the audience is usually invited to create meaning through the observation of the complex coexistence (and mutual validation) of the different modes.

Visuals shape each other and collectively contribute to the creation of meaning. Even within a single slide (see Figure 1) the different resources coexist not merely as a layering of complementary elements, but as mutually shaping. It is specifically from this perspective that, rather than focusing on the single elements, a transmodal approach posits that the conveying of meaning is given by the mutual validation that different modes provide.

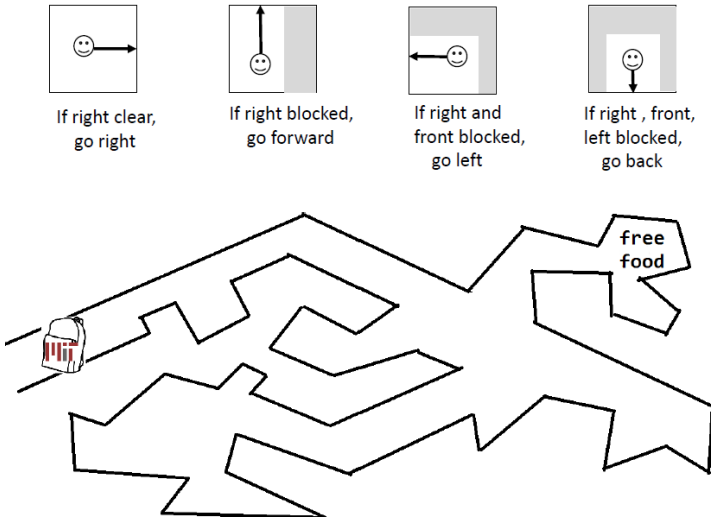


Figure 1[9]
Hybrid visual (A-L2).

[9] [AB, Ana Bell], [Introduction to Computer Science and Programming in Python], [2014]. (Massachusetts Institute of Technology: MIT OpenCourseWare), http://ocw.mit.edu (Accessed 25/06/2018). License: Creative Commons BY-NC-SA.

The visuals employed dynamically inform each other in a transformational way. Such a process inevitably stems from the different affordances borne by the different semiotic resources.

In particular, visuals allow the presenter to illustrate, articulate and, fundamentally, create a socially symbolic reality. Consequently, pictorial elements assume a function which is not merely illustrative but can be substantially argumentative. In this respect, Andrews (2014, p. 85) affirms:

> […] images can be used as evidence for claims and propositions. In this role, they go beyond illustration to providing evidence in a court of law, as incontrovertible 'fact' in support of a thesis, or as a diagram of a process to be followed and that is based on a procedure that has been expressed verbally. But images can fulfil the function of claims and propositions themselves because of their multiple signification, and especially if they are juxtaposed with other images and/or they are set in a sequence that allows logical or quasi-logical connection. Their articulation constitutes an argument rather than merely persuading.

For instance, the following image (itself constituted by an ensemble of images) does not simply display an aesthetic value but is also fundamentally argumentative (Figure 2).

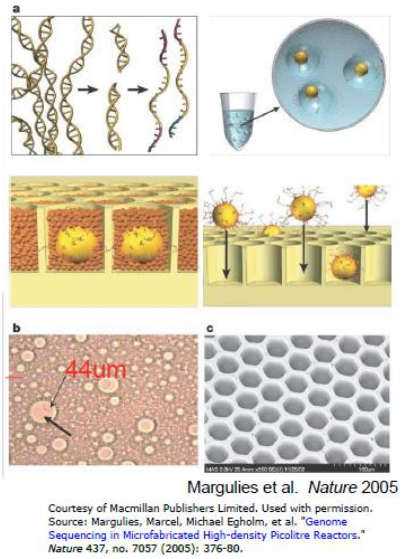


Figure 2[10]
Visual argumentation (B-L2).

The image contributes to filling an explanatory gap which cannot be completely avoided if using only the spoken word. The image (or rather the sequence of images) provides a more accessible explanation of the genome sequencing process being illustrated. Through its 'epistemological commitment' (Kress 2003) the image shows what cannot be fully described with other modes, thus assuming a strong epistemological value in the lecture.

[10] [CB, Chris Burge], [Foundations of Computational and Systems Biology], [2014]. (Massachusetts Institute of Technology: MIT OpenCourseWare), http://ocw.mit.edu (Accessed 25/06/2018). License: Creative Commons BY-NC-SA.

Similarly, the images in Figure 3 are not used to merely illustrate visually what is represented textually; instead, they allow the lecturer to express logical sequencing on which scientific theories or phenomena are based and, consequently, play a critical role within the argumentative process.

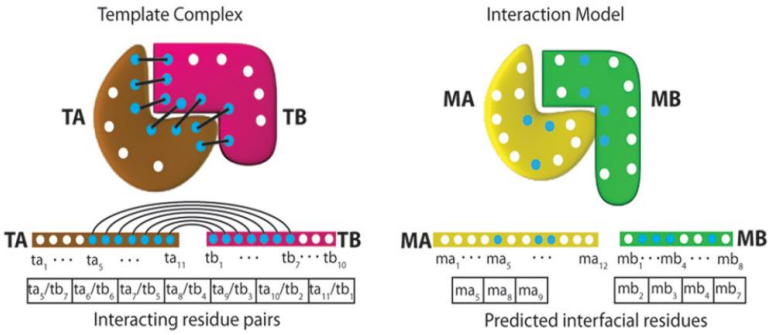
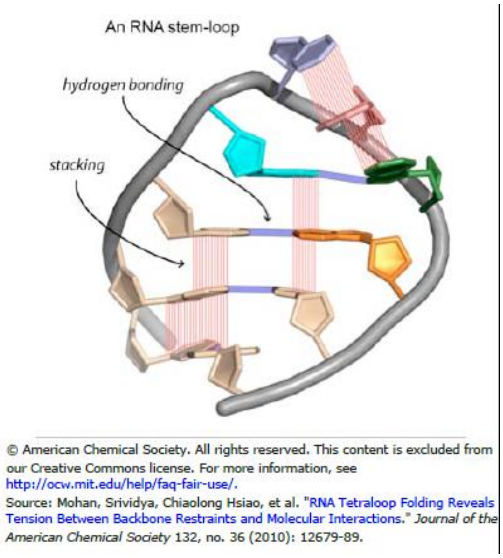


Figure 3[11]
Visual argumentation (B-L14).

The image is salient to the readers in that it draws their attention to specific aspects which constitute a vital part of the main argument. Also, when the explanation is offered in speech, there may be a loss of specificity, while the image conveys a level of clarity which is appropriate for the given didactic practice.

Pictures represent a powerful means in terms of knowledge dissemination, not only to corroborate or to repeat a given concept, but even to convey the concept itself. Accordingly, they have an epistemically constitutive, reifying value, and each representation has different affordances for communicating disciplinary knowledge (Offerdahl and Arneson 2017). It has long been demonstrated that visual representations contribute to bridging the gap between a given theory and the related (observable or unobservable) entities or phenomena and guide the viewer in the understanding of such theory (Gershon et al**.** 1998). Consequently, they can constitute an essential aid to explain complex scientific concepts, theories, and processes (Arneson and Offerdahl 2018). For instance, Figures 4 and 5 consist of different visuals which are so strictly interwoven that their analysis in isolation would be theoretically fallacious. Their mutual construction supports the speaker in the creation of the argumentative pattern and the conveying of specific information.

[11] [EF, Ernest Fraenkel], [Foundations of Computational and Systems Biology], [2014]. (Massachusetts Institute of Technology: MIT OpenCourseWare), http://ocw.mit.edu (Accessed 25/06/2018). License: Creative Commons BY-NC-SA.



Source: Mohan, Srividya, Chiaolong Hsiao, et al. "RNA Tetraloop Folding Reveals Tension Between Backbone Restraints and Molecular Interactions." *Journal of the American Chemical Society* 132, no. 36 (2010): 12679-89.

Figure 4[12]
Visualization (B-L14).

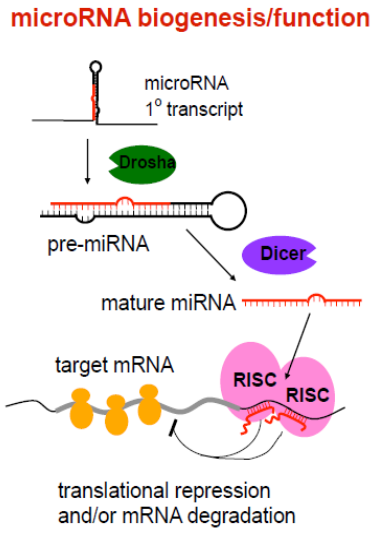


Figure 5[13]
Visualization (B-L4).

These examples also confirm that the automatic ascription of a given visual to one single category, such as graphical or figurative, would disregard the importance of scriptural elements, without which the illustrative system could not convey the meaning desired. Indeed, these lecture slides are inextricably based on the use of various resources such as art and text, and the different modes do not simply supplement each other, but are understood as a compound for the creation of meaning (see Section 5).

[12] [EF, Ernest Fraenkel], [Foundations of Computational and Systems Biology], [2014]. (Massachusetts Institute of Technology: MIT OpenCourseWare), http://ocw.mit.edu (Accessed 25/06/2018). License: Creative Commons BY-NC-SA.

[13] [CB, Chris Burge], [Foundations of Computational and Systems Biology], [2014]. (Massachusetts Institute of Technology: MIT OpenCourseWare), http://ocw.mit.edu (Accessed 25/06/2018). License: Creative Commons BY-NC-SA.

Captions also assume a key role in the process of knowledge representation, in that they help the viewer to focus on the salient aspects of an image (cf. Archer 2012) and have a significant 'semiotic load' (Simpson 2016, p. 248). They also display a constitutive force because they essentially contribute to the formation of a new composition. Therefore, they are not merely evocative but are guiding elements with a strong hermeneutic force. The strategic use of captions can also have substantial educational benefits in that they can significantly assist the construction of meaning on the part of the audience. For instance, in Figure 6 the title of the slide functions as a caption for the image.[14] The map presented is a multimodal syncretic element where both the pictorial and the textual modes are necessary for its comprehension. Thus, the title and the map synergically convey the information desired through their mutual validation. Such cooperation between the modes, which contributes to the agentive creation of meanings, represents a clear example of the transmodal paradigm posited in Section 2.

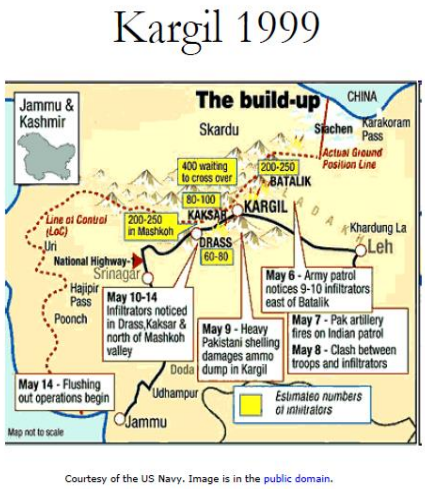


Figure 6[15]
Use of captions (C-L2/23).

Not only do visuals have an informative and argumentative purpose, but they may also respond to social and interpersonal needs. In this respect, lecture slides can also include (visual) elements which have a humoristic function. For instance, the usage of comic strips is not a rarity in lecture slides, as illustrated in Figure 7.

[14] In the images included in the slides analyzed, what appears in the typical position of a caption is a necessary element determined by legal obligations (e.g. "Courtesy of the US Navy. Image in the public domain").

[15] [VN, Vipin Narang], [Reducing the Danger of Nuclear Weapons and Proliferation], [2015]. (Massachusetts Institute of Technology: MIT OpenCourseWare), http://ocw.mit.edu (Accessed 25/06/2018). License: Creative Commons BY-NC-SA.

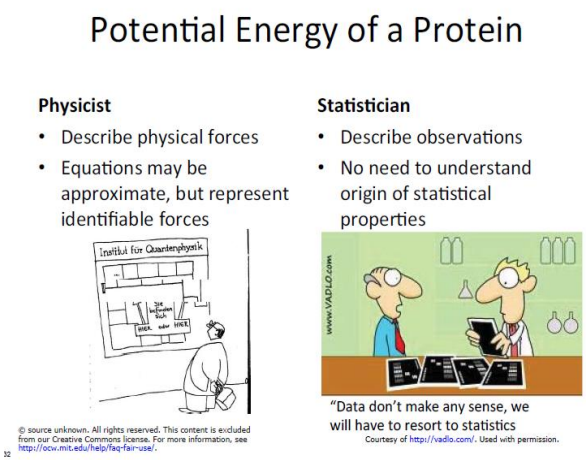


Figure 7[16]
Humor (B-L1/32).

These types of humoristic visuals in a lecture can play, *inter alia*, an entertaining, a motivational, a social, and an informative role. More specifically, the use of humorous devices (deployed through different modes) can assist lectures to achieve different objectives, namely: creating a positive atmosphere; reducing stress and monotony; improving the relationship between the lecture and the audience; humanizing the educational actor; increasing attention; contributing to conveying specific information; facilitating retention; and strengthening socialization. In this respect, Lei et al. (2010) emphasize that humor in educational contexts may have psychological, cognitive, social, and education benefits.

7. Conclusions

The challenge to the hegemony of text-based knowledge in academic dissemination practices is not a recent phenomenon, but it is constantly evolving and is intensified by newly available tools and means of expression. In particular, technical advances have changed our approach to the dissemination and representation of science (Olson 2018), and they have opened up new ways of accessing information in lectures. The specificities of slideshows require a close semiotically-sensitive analysis which complicates the abstraction of generalizable theories. Consequently, within the confines of a single paper, one cannot do justice to the intricacy of the relationships between modes and to the heterogeneity of functions which they fulfill in a slideshow. Within these operational constraints, the central questions addressed in this work concern the implications of exploring (newly acceptable) forms of teaching practices, with the awareness that their constant evolution makes the clear categorization of the different modal resources employed (and of the processes through which they are combined) particularly problematic. Not only is the definition of these practices intricate from a conceptual point of view, but it may also result in oversimplifications which clearly go against the multilayered nature of transmodal dynamics. Thus, these complexities imply a shift from absolutist notions of modes to more fluid categories.

[16] [CB, Chris Burge], [Foundations of Computational and Systems Biology], [2014]. (Massachusetts Institute of Technology: MIT OpenCourseWare), http://ocw.mit.edu (Accessed 25/06/2018). License: Creative Commons BY-NC-SA.

This study started from the assumption that slides are composite and immersive spaces with a substantial presence in academic life and lecturers make use of various modes, which provide access to multiple ways of knowing. Hence, the analysis attempts to show that multimedia and multimodal meaning-making processes, be they intended from a receptive or a productive perspective, have profoundly affected academic events such as lectures. Indeed, different and complementary resources contribute to the creation of meaning and its configuration and reconfiguration. Such resources can, therefore, be seen as reciprocally constructed and constructive.

The analysis suggests that lecture slideshows present a multiplicity of semiotic modes, which fulfill multiple functions. More specifically, the sapient combination of visuals contributes to conforming to the requirements of informativeness or simply to meeting given aesthetical expectations. At the same time, they also achieve interactional and motivational objectives (e.g. generating involvement and reducing social distance between lecturers and students).

From a theoretical perspective, this study tentatively posits that the paradigm of transmodality accounts for the interaction of different modes in an expansive and dynamic way, which transcends categorical distinctions between modes. Clearly, these considerations are not new to multimodal research. However, the time is ripe for a clearer conceptualization of the notion of transmodality and a deeper reflection of the theoretical and methodological implications that this paradigm entails. For instance, the need for single units of analysis is not ignored, but it has to be problematized within a more deeply situated analysis. Of course, the considerations offered in this paper are highly circumscribed to a very limited locus of analysis and should be discussed more profoundly in relation to other communicative activities and based on a stronger rationale, with the aim to verify how the notion of transmodality can contribute to multimodal research at large.

The epistemological shifts which have affected the educational sphere seem to render transmodal inquiry increasingly central for the understanding of contemporary educational dynamics. In this vibrant field of research, further avenues of investigation include comparative analyses focusing on how the context of production, the type of communicative event, and, above all, the participants involved (peer-to-peer vs expert-learner) affect the composition of the slides. Moreover, quantitative investigation may help us to reflect upon tendencies and trends regarding teaching practices across disciplines and may be employed to explore their correlations with learning outcomes. Nevertheless, it is imperative to gain awareness that such approaches should not be based on strict categorizations which deny the inherent complexities which lie behind the ontological and epistemological value of a slide and its constitutive elements. Conversely, reflecting on the blurring of the boundaries between types of semiotic resources and their reciprocal validation can help lecturers to employ the most effective tools in academic contexts, keeping in mind that the implementation of specific modes, and the dynamic interaction between them, may fulfill different pragmatic functions, ranging from informative ones to motivational ones to entertaining ones.

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Acknowledgements: This study is part of the project "Knowledge Dissemination across Media in English: Continuity and Change in Discourse Strategies, Ideologies, and Epistemologies", funded through PRIN 2015, Prot. 2015TJ8ZAS_002.

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