

14 A study of multimodal discourse in the design of interactive digital material for language learning

Silvia Burset¹, Emma Bosch², and Joan-Tomàs Pujolà³

Abstract

This study analyses some published interactive materials for the learning of Spanish as a first language and English as a Foreign Language (EFL) commonly used in primary and secondary education in Spain. The present investigation looks into the relationships between text and image on the interface of Interactive Digital Material (IDM) to develop learners' language skills. Screen design is evaluated with regards to the following formal units of analysis: graphic elements (shape, colour, size, resolution, significance), typography (style, colour, size, readability), composition (location, ratio) and action (recognition and effects) to assess their functionality in various learning activities. A discussion is also presented on the way these features of multimodal discourse can influence the language learning processes.

Keywords: interactivity, design, multimodality, language learning.

1. Universitat de Barcelona, Barcelona, Spain; sburset@ub.edu

2. Universitat de Barcelona, Barcelona, Spain; emmabosch@ub.edu

3. Universitat de Barcelona, Barcelona, Spain; jtpujola@ub.edu

How to cite this chapter: Burset, S., Bosch, E., & Pujolà, J.-T. (2016). A study of multimodal discourse in the design of interactive digital material for language learning. In A. Pareja-Lora, C. Calle-Martínez, & P. Rodríguez-Arancón (Eds), *New perspectives on teaching and working with languages in the digital era* (pp. 163-172). Dublin: Research-publishing.net. <http://dx.doi.org/10.14705/rpnet.2016.tislid2014.431>

1. Introduction

The growing publication of digital educational materials for language learning in primary and secondary school is mainly due to two factors. On the one hand, it is logical that the teaching-learning situations benefit from all the advantages that digital environments provide in their multiple facets. On the other hand, it is evident that twenty-first century children and youngsters are active participants in the so called digital era, which entails that the forms of communication which they are now engaged in have changed considerably to previous generations, and therefore, an adjustment is needed to formalise the contents of digital materials to the new needs of the users.

Taking this into consideration, a key dimension that differentiates digital materials is the concept of interactivity. In this context, interactivity is identified as the relationship established by the users with the interface to process information actively, and thus increase learners' motivation, which results in more effective learning.

From this perspective and in the framework of a wider research tackling interactive material for the learning of Spanish as a first language and EFL, the present study looks in particular into the relationships between text and image on the interface of IDMs for language learning.

The analysis of screen design deals with the following formal units and features (in parenthesis): graphic elements (shape, colour, size, resolution, significance), typography (style, colour, size, readability), composition (location, ratio), and action (recognition and effects). Besides, their functionality in language learning activities is also discussed.

The study of the design of interactive digital materials for language learning is a research issue that should be addressed from different perspectives. To ensure meaningful interactivity between the learner and the digital material, courseware design should be analysed taking into account the usability of the learning material from the study of multimodal discourse (Han, Yun, Kwahk,

& Hong, 2001; Marzal, Colmenero, & Morato, 2003; Nielsen & Morkes, 1998; Nokelainen, 2006).

2. The concept of interactivity

The concept of interactivity is investigated from several different fields, such as Human Computer Interaction (HCI), instructional design, artificial intelligence, e-learning, or multimedia. From the instructional design research, some studies indicate interactivity has a positive influence on learning (Najjar, 1998; Ohl, 2001; Robertson, 1998; Sims, 1997; Yacci, 2000) and motivation (Stocks & Freddolino, 2000; Teo, Oh, Liu, & Wei, 2003). Increased user control, as reported by Brady (2004), “should increase learning and [...] satisfaction. Similarly, increasing active processing should result in increased learning outcomes” (para. 2). Thus, it is crucial to study the interactivity of IDMs to understand how it applies, how it can enhance the process of learning and when better performance can be achieved to improve this process.

Will students learn more and better with IDMs? With the same content, IDMs have more potential to promote learning and language acquisition than traditional materials may provide. The answer lies in interactivity, which can capture the attention of learners and motivate them to learn. Students are asked to act at various times, keeping their attention throughout the whole process.

Sims (1997) classifies interactivity in various non-exclusive concepts (object, linear support, construct, reflexive, simulation, hypertext, contextual without immersion and virtual immersion), which refer to various instructional tasks and help understand the relationship between the digital material and the learner. Later, Sims (2000) analyses the elements of online interactivity through the four key components of any instructional design: the learner, the content, the pedagogy and the context. Furthermore, Kennewell, Tanner, Jones, and Beauchamp (2008) distinguish between two types of interactivity: technical and pedagogical. The first one refers to the relationship between a device (such as an Interactive Whiteboard (IWB), a tablet, or a computer)

and the student, and the second one refers to the relationship of teacher-students through a strategy of content teaching in which the latter are active participants.

In the teaching and learning of languages, the four relations established by Moore (1993) are key to the development of communicative competence of students. The interactivity of the student and the material, the student and the interface, and the interaction between students and teacher and among students themselves generate enough practice to develop learners' communicative skills.

In a digital environment, teachers need to develop a particular pedagogy about the use of the material either for the IWBs, computers, tablets or *iPads*; that is, when they can be used and what for. This decision is determined by the characteristics of the digital materials available for teachers. IDMs are, therefore, a powerful tool for teaching and learning that acts as medium, which, in turn, allows for integration of other tools, such as the ones provided by the so-called web 2.0 (Sessoms, 2008).

The new spaces of communication and interaction in web 2.0 imply substantial changes in the use of language (Yus, 2010). The language of the Internet is characterised by its multimodality, i.e. by the use of different modes for effective communication. In this sense, that must also be the subject of teaching and practice, according to the new interpretation and production processes involved in digital literacy (Cassany, 2011).

3. Multimodal discourse of the interface

Language is defined as a code, a system structured in ways that mean something in an independent medium, either from written text, music or art (Barthes, 1970). However, a new approach considers now that the codes are structured resources in the same message. The message is the meeting point of different codes. Thus, a mode is a means of expression used to convey meaning. Each message uses a number of modes thus becoming multimodal.

Following the social semiotics theory (Burn & Parker, 2001), multimodal discourse text analysis (where text here must be understood as any written or graphic document) is expressed according to a series of parameters and must consider three social functions: a) the representation of an aspect of reality, b) the orientation in which relationships are established between interlocutors (either real people, fictional or between fictional agents and readers), and c) the way in which communication is organised with consistency and structure from a conceptual unit and a structural one.

Kress and van Leeuwen (2001) pioneered a proposal of a *grammar of the visual* based on Halliday's (1994) model. According to Halliday (1994), every text is a multifunctional semantic unit that produces meanings at three levels: one related to the ideas expressed by the ideational function, the other that refers to the attitudes of the addresser about the message and the addressee using the interpersonal function, and the last one refers to the linguistic structure of text expressed in the textual function. Thus, Kress and van Leeuwen (2001) translated this three-level model: ideational, interpersonal and textual to a three-dimensional visual grammar. The visual mode extends in three comparable mode dimensions: (a) the ideational function, as the ability of visual resources to represent objects and situations of the world; (b) the interpersonal function, understood as the ability of visual language to express the relationship between the producer and the recipient of a sign; and (c) the textual function, in which visual resources combine to form a grammar.

From the above it follows that the degree of interactivity of digital materials is determined largely by the quality of the interface design. Design is understood here as the adequacy of the formal presentation of the content (text and image) to develop optimal performance in the processes, phases and sequences of various activities. Therefore, the interface is a space in which the effectiveness of multimodal discourse will be successful if the formal components that structure the display follow some quality criteria that are determined by their functionality.

As far as digital materials for language learning are concerned, interactivity enhanced learning is determined by the ease and functionality of the management

processes in the development of activities, which in turn are determined by the quality of the design elements that structure the screens.

4. Analysis of screen design: measuring interactivity from a multimodal discourse perspective

The quality of graphic design is a key element to facilitate interactive processes in the development of digital activity. The formalisation of typography and image, and the relationship between the two (i.e. multimodality) may influence the reception of messages and facilitate or hinder interactivity.

To assess the interactivity that screens can generate in a didactic sequence of digital material, four aspects of design are considered.

The first one is a graphic aspect, that is to say, the iconographic elements that compose the screen image. The categories analysed are

- *Shape*: all the features that define the appearance of iconographic elements (technical realisation, style, perspective, proportion, etc.);
- *Colour*: chromatic properties of the iconographic element (hue, saturation, lightness);
- *Size*: proportions of the iconographic elements in relation to the space they occupy;
- *Resolution*: quality in the definition of the screen image;
- *Significance*: relevance and adequacy of iconographic elements in relation to the content.

The second aspect is typographic, and is analysed by means of the following components: (a) *style* (properties that define the look of the typographic element,

that is, family, font, etc.); (b) *colour*; (c) *size*; and, last but not least, (d) *readability* (clarity in text reading).

The third aspect is composition, i.e. the relationship between the different elements, whether iconographic, typographical, or both simultaneously, which make up the screen image. Two categories are studied here:

- *Location*: place where the different elements are located;
- *Proportion*: harmony between elements regarding their dimensions.

The fourth aspect is devoted to the elements of action, i.e. graphic or typographic elements that must be activated to interact with the screen and allow the user to select, start, fast-forward, rewind, close, etc. The categories considered in this aspect are

- *Recognition*: identifying that the graphic or typographical elements will cause an action;
- *Visual effects* (if any): when activating the element, variations in colour, size, and lighting are displayed;
- *Sound effects* (if any): when activating the element, sounds are emitted.

The main criteria by which the different categories are analysed are functionality and consistency. Therefore, those components that hinder the interactive processes are identified. Interactivity impedes the teaching-learning processes in the graphic dimension when, for instance, the images have only a ‘decorative’ function, the colour combination is strident, or poor resolution prevents the proper display of the represented objects. Similarly, in the typographic aspect, the font chosen or an excessively small size may hinder readability, as may a colour that does not stand out enough from the background. Likewise, at a compositional level, images and texts can be pressed to each other or not distributed harmoniously. And finally, regarding the elements of action, they

might be difficult to identify, and visual or sound effects (if any) might be gratuitous or too distracting.

Each screen is considered a ‘unit of analysis’, and the categories defined above are described for each one. However, independent analysis of each screen is not sufficient to assess the interactive processes, as activities are formed into a chained sum of screens. Thus, another criterion is introduced to analyse the *coherence* between screens of the same material. On the one hand, the existence of coherence between screens of the same unit (the subsequent unit of the analysed material) and, on the other hand, between the screen that is evaluated and considered to serve a similar role in the second unit analysed.

Examples of interactivity that impede teaching-learning processes are baffling the user with unexpected typographic, chromatic and compositional changes, or random changes occurring in the shape and location of an element of action in the same unit screens or with similar function.

5. Conclusion

In the interactive processes come into play several factors, such as learner, content, pedagogy and context (Sims, 2000). In the present study of language learning in digital environments, the learner should receive content from a clear and precise multimodal discourse so that interactivity can prompt learning. Clarity of content is key both in the educational design of the activity and its formal aspect of the design. In this sense, graphic design affects not only aesthetic considerations, but focuses primarily on issues related to functionality.

The main function of IDMs for language learning is, obviously, to learn and practise language using an active methodology in which interactivity promotes learning from effective multimodal discourse. The multimodal discourse is generated on the screen from the established interrelation between the written text and image. In this sense, graphic design directly affects the interactive

processes, not only regarding the instructions of the activities but also the learning of the content.

In summary, analysing the criteria related to (a) the formal presentation of screens (graphic elements, typography, composition, and action); and (b) the coherence in IDMs, determines the quality of their interactivity and, consequently, their effectiveness for language learning.

References

- Barthes, R. (1970). *S/Z*. Paris: Editions du Seuil.
- Brady, L. (2004). The role of interactivity in web-based educational material. *Software Usability Research Laboratory*. Wichita State University. Retrieved from <http://usabilitynews.org/the-role-of-interactivity-in-web-based-educational-material/>
- Burn, A., & Parker, D. (2001). Making your mark: digital inscription, animation, and a new visual semiotic. *Education, Communication and Information*, 1(2), 155-179. Retrieved from <http://dx.doi.org/10.1080/14636310120091913>
- Cassany, D. (2011). *En línia. Llegir i escriure a la xarxa*. Barcelona: Graó.
- Halliday, M. A. K. (1994). *An introduction to functional grammar*. London: Arnold.
- Han, S. H., Yun, M. H., Kwahk, J., & Hong, S. W. (2001). Usability of consumer electronics products. *International Journal of Industrial Ergonomics*, 28(3-4), 143-151. Retrieved from [http://dx.doi.org/10.1016/S0169-8141\(01\)00025-7](http://dx.doi.org/10.1016/S0169-8141(01)00025-7)
- Kennewell, S., Tanner, H., Jones, S., & Beauchamp, G. (2008). Analysing the use of interactive technology to implement interactive teaching. *Journal of Computer Assisted Learning*, 24(1), 61-73. Retrieved from <http://dx.doi.org/10.1111/j.1365-2729.2007.00244.x>
- Kress, G., & van Leeuwen, T. (2001) *Multimodal discourse*. London: Arnold.
- Marzal, M. A., Colmenero, M. J., & Morato, J. (2003). Selección de recursos didácticos en red: accesibilidad y usabilidad como elementos de un sistema de evaluación para la educación. In *Segunda Conferencia Iberoamericana en Sistemas, Cibernética e Informática*. Orlando: CISCI.
- Moore, M. (1993). Theory of transactional distance. In D. Keegan (Ed.), *Theoretical principles of distance education*. London & New York: Routledge.
- Najjar, L. (1998). Principles of educational multimedia user interface design. *Human Factors*, 40(2), 311-323. Retrieved from <http://dx.doi.org/10.1518/001872098779480505>

- Nielsen, J., & Morkes, J. (1998). *Applying writing guidelines to web pages*. Universitat de Barcelona. Retrieved from <http://www.useit.com/papers/webwriting/rewriting.html>
- Nokelainen, P. (2006). An empirical assessment of pedagogical usability criteria for digital learning material with elementary school students. *Educational Technology & Society*, 9(2), 178-197.
- Ohl, T. (2001). An interaction-centric learning model. *Journal of Educational Multimedia and Hypermedia*, 10(4), 311-332.
- Robertson, J. (1998). Paradise lost: children, multimedia and the myth of interactivity. *Journal of Computer Assisted Learning*, 14(1), 31-39. Retrieved from <http://dx.doi.org/10.1046/j.1365-2729.1998.1410031.x>
- Sessoms, D. (2008). Interactive instruction: creating interactive learning environments through tomorrow's teachers. *International Journal of Technology in Teaching and Learning*, 4(2), 86-96.
- Sims, R. (1997). Interactivity: a forgotten art? *Computers in Human Behavior*, 13(2), 157-180. Retrieved from [http://dx.doi.org/10.1016/S0747-5632\(97\)00004-6](http://dx.doi.org/10.1016/S0747-5632(97)00004-6)
- Sims, R. (2000). An interactive conundrum: constructs of interactivity and learning theory. *Australian Journal of Educational Technology*, 16(1), 45-57.
- Stocks, J., & Freddolino, R. (2000). Enhancing computer-mediated teaching through interactivity: the second iteration of a World Wide Web-based graduated social work course. *Research on Social Work Practice*, 10(4), 505-518.
- Teo, H., Oh, L., Liu, C., & Wei, K. (2003). An empirical study of effects of interactivity on web user attitude. *International Journal of Human Computer Studies*, 58(3), 281-305. Retrieved from [http://dx.doi.org/10.1016/S1071-5819\(03\)00008-9](http://dx.doi.org/10.1016/S1071-5819(03)00008-9)
- Yacci, M. (2000). Interactivity demystified: a structural definition for distance education and intelligent computer-based instruction. *Educational Technology*, 40(4), 5-16.
- Yus, F. (2010). *Ciberpragmática 2.0. Nuevos usos del lenguaje en Internet*. Barcelona: Ariel.



Published by Research-publishing.net, not-for-profit association
Dublin, Ireland; Voillans, France, info@research-publishing.net

© 2016 by Antonio Pareja-Lora, Cristina Calle-Martínez, and Pilar Rodríguez-Arancón (collective work)
© 2016 by Authors (individual work)

New perspectives on teaching and working with languages in the digital era
Edited by Antonio Pareja-Lora, Cristina Calle-Martínez, Pilar Rodríguez-Arancón

Rights: All articles in this collection are published under the Attribution-NonCommercial -NoDerivatives 4.0 International (CC BY-NC-ND 4.0) licence. Under this licence, the contents are freely available online as PDF files (<http://dx.doi.org/10.14705/rpnet.2016.tislid2014.9781908416353>) for anybody to read, download, copy, and redistribute provided that the author(s), editorial team, and publisher are properly cited. Commercial use and derivative works are, however, not permitted.



Disclaimer: Research-publishing.net does not take any responsibility for the content of the pages written by the authors of this book. The authors have recognised that the work described was not published before, or that it was not under consideration for publication elsewhere. While the information in this book are believed to be true and accurate on the date of its going to press, neither the editorial team, nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, expressed or implied, with respect to the material contained herein. While Research-publishing.net is committed to publishing works of integrity, the words are the authors' alone.

Trademark notice: product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

Copyrighted material: every effort has been made by the editorial team to trace copyright holders and to obtain their permission for the use of copyrighted material in this book. In the event of errors or omissions, please notify the publisher of any corrections that will need to be incorporated in future editions of this book.

Typeset by Research-publishing.net
Cover design and frog picture by © Raphaël Savina (raphael@savina.net)

ISBN13: 978-1-908416-34-6 (Paperback - Print on demand, black and white)
Print on demand technology is a high-quality, innovative and ecological printing method, with which the book is never 'out of stock' or 'out of print'.

ISBN13: 978-1-908416-35-3 (Ebook, PDF, colour)
ISBN13: 978-1-908416-36-0 (Ebook, EPUB, colour)

Legal deposit, Ireland: The National Library of Ireland, The Library of Trinity College, The Library of the University of Limerick, The Library of Dublin City University, The Library of NUI Cork, The Library of NUI Maynooth, The Library of University College Dublin, The Library of NUI Galway.

Legal deposit, United Kingdom: The British Library.
British Library Cataloguing-in-Publication Data.
A cataloguing record for this book is available from the British Library.

Legal deposit, France: Bibliothèque Nationale de France - Dépôt légal: mai 2016.