

Audiovisuals in Action: Engaging Young Generations¹

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Abstract

Students today have a different way of relating to information due to the new media channels that have arisen in the last decades. These have changed the way high-school and undergraduate students learn, and these have altered the manner by which they perceive the world. Today's Education Theory must take this fact into account in order to enhance the student's learning process. The objective of this project is to give an example of how this enhancement may be achieved. First, it gives a brief overview of the relation between today's young generations and the different channels of information; secondly, it analyzes the cognitive, psychological and educational theories that explain how the human brain learns and the important value that nonverbal information has for the memory system; finally, it will focus on this nonverbal information, looking at the possible effects that it may have on human memory and learning.

Introduction

A couple of months ago, I was chit-chatting with a colleague about the Christmas season. She was telling me how Christmas without snow was not Christmas (she is from Northern Europe), and I was telling her that Christmas without palm trees, flip-flops and piña coladas was not Christmas, either (I am Colombian). From there, we started talking about the seasons and how weird it was that while one part of the Earth was constantly changing, another lived in eternal summer. She then confessed to me something that she had probably never felt comfortable saying out loud: that she had never been able to understand how the Earth's rotation and revolution worked. Let me be clear that my colleague is not in primary school; she is a graduate student.

This issue led me to ask her about her educational background. She told me that she and her family had left their home country when she was around eight years old, thus she had done most of her education in a foreign country and in a foreign language (including the lectures on the

Earth's rotation). She was a bright student, but the fact that in her first years living in a new country she was forced to learn the school content simultaneously with the new language made it very complicated for her to fully comprehend both of them at the same time. Before being able to understand content, she had to learn the language in which the content was explained. Sadly, the knowledge on how the Earth twirls around the Sun and what causes the different seasons did not stick; understanding the vocabulary, the pronunciation and the grammar of the new language was far more important than learning the class' content.

As an amateur educator I felt the duty to solve this problem. I explained it to her: the Earth's rotational axis is tilted, so, as the Earth travels around the sun, if a given hemisphere is tilted away or toward the sun, the seasons change. The Earth is tilted 23 degrees relative to the "ecliptic plane" (which is the imaginary path of the planets around the sun). The time of the year when the tilt toward the sun is maximized (the summer solstice), the amount of sunlight on the Northern Hemisphere is at a maximum; in the opposite situation (the winter solstice), the Northern Hemisphere receives a minimum of sunlight, while the opposite happens in the Southern Hemisphere...

This did not work: while I was explaining it to her, a great part of her mental capacity was occupied trying to make a mental image of my presentation; her brain was trying to understand what I was telling her and, at the same time, trying to create a mental image of what was being expressed. How could I improve my presentation? I had to reduce the load that I was putting on her working memory; I had to make her cognitive process go smoother by doing part of the work that her brain was trying to do by itself. By presenting her with a visual representation of the content, she would no longer have to occupy a great part of her cognitive load in creating her own mental image, hence leaving all her potential free to understand my presentation.

There are many cases where the use of visual representations aids the learning process greatly. Cases such as the one just mentioned, where one has to teach language and content at the same time, can be improved by dividing the work the student's brain has to do into both the verbal and nonverbal channels. This way, the brain can process all the information far more smoothly. Another case where imagery can have a positive impact is when teaching abstract content. The

tandem representation of concepts helps the brain create a unified schema of both the concrete and the abstract materials, for a better understanding of both. Teaching abstract vocabulary or complicated grammar structures could be highly improved through the use of concrete representations of these concepts. Furthermore, the use of audiovisuals in the learning process can be not only useful but extremely important if one takes into account the world in which children currently live.

Young students today have a different way of relating to information due to the new media channels that have arisen in the last decades. These have changed the way students learn, and they have altered the manner by which they perceive the world. Today's education theory must take this fact into account in order to enhance the students' learning processes. My workshop's objective was to offer an alternative for how this enhancement may be achieved. In the theoretical part of the lecture, I gave a brief overview of the relation between today's young generations and the different channels of information; afterwards, I summarized the cognitive and education theories that allow us to understand how the human brain learns and the important value that nonverbal information has for the memory system. This theoretical part intended to build a structure upon which we could look at and propose how this knowledge could be applied to our students' learning processes. In the second part of the workshop, I presented some of the most useful materials that can be found on the web (free of charge) for creating a multimedia educational environment that can link our students' ways of processing information with the contents we intend to teach them (see the Appendix at the end of this article).

New generation = New rules

The new media has changed the way we perceive information. Today's students, their relation to information, and the manner by which they process this information differ greatly from that of all previous generations. The internet, video-games, mobile phones, and the bombardment of information from all kinds of media channels have made today's young students think and process information in a different way from those of the past. Information is everywhere: it is in being able to look at the Rosetta Stone on the web with greater detail and quality than if standing in front of it in the British Museum; it is in receiving instant notification (and visual coverage) of

any important event in any part of the world; it is in watching a Nobel Prize winner give a lecture without having to leave one's bed.

For all these reasons, the relationship that a twenty-first century student has with information and the steps she has to take to obtain it are quite different from what she would have had to do if she had intended to receive the same information thirty years ago. These students are “digital natives” (Prensky, 2001): a new generation of people who are “native speakers” of an information language that moves very fast and that communicates with them through channels that their predecessors did not have. Their relationship with the world is radically different, and, when intending to educate them, we must take this fundamental fact into account; we must teach them through the channels that they understand.

I do not intend to say that traditional instruction should be eradicated; it is important to teach students to process information through the traditional channels, but, if we aim to engage them, if the goal is to motivate their intellects, making them desire more knowledge, we must encourage them to work with the tools that they will actually use in the future. An English textbook has very few chances of winning a young mind's attention if compared with Xbox or YouTube. We have to find ways to insert the contents we intend to teach into the channels that students understand easily and process efficiently. In this way, we can increase their motivation for the subject and make them desire more of it.

Today's world has replaced the traditional ways of receiving information with those fostered by the new media. E-mails have replaced written letters; news is being obtained through Twitter and RSS feeds; there is no book, movie or song that cannot be found on-line if one knows how to look for it. Furthermore, inside this new media, the quantity of text tends to be reduced so as to give more space to visual representations: *emoticons* replace written words in chats; video footage and photos of an event are far more valuable than their written descriptions, and movies about books are seen by audiences that far outnumber the readership of the written originals. As a personal example, around 70% of my blog's visitors go to it for its images or videos in it and not for the written texts, even though the blog aims to offer essays and not pictures (see <http://laliteraliteraria.wordpress.com>; see also Brando, 2014).

Our goal, then, should be to translate this information into the “language” that our students speak: we have to render the information into a channel that can be more feasibly processed by the new generations (audiovisual material); and, secondly, we have to upload this newly rendered material into the media that the new generations actually use when searching for knowledge (the internet).

If a piece of information is not currently on the worldwide web, it might as well not exist. Digital natives’ first, and in many cases sole, source of information is the internet. When a teenager has to hand in a paper on the Second World War, his or her first impulse is not to go to the library and take out a book about it; the first thing they do is to type in the paper’s topic in the Google browser and, in most of the cases, rely exclusively on the results that appear on the first page of hits (sometimes even only in Wikipedia). Then, they go to video browsers (be it YouTube or Google Videos) and search for information on their topic in an audiovisual format.

An average contemporary household does not have the old, reliable, twelve-volume encyclopedia on the bookshelf for the children to do their homework with, simply because these tomes have no way of competing against the almost infinite information that can be found in the internet; buying tapes or CDs for learning a language, or having collections of “How-to” books is out of date when compared to the millions of web pages that offer free resources for language acquisition, or podcasts and video tutorials that allow you to learn anything on any imaginable subject (from making cookies to “how to build your own gun with a 3-D printer”, passing through every digital or physical skill). Information has stopped being hoarded by the “gifted minds” and has been opened up to the masses. Today, information is openly shared, and that is precisely the reason why a YouTube video may reach a wider audience than any printed book may ever achieve. The internet has penetrated faster around the globe than written text has in the last two thousand years. For instance, my video on Descartes has been seen more than 48,000 times in 88 different countries in only two years on-line thanks to YouTube. One wonders how many people would have seen it if it had been in a CD-ROM on the back cover of a philosophy schoolbook.² This shows how powerful the use of internet may be for sharing information.

Another positive feature is that most of the internet-based learning experiences are two-way communication channels just as a real classroom environment would be, comparing it to traditional materials such as textbooks. Using YouTube as an example, it not only allows me to upload and share my videos through it, it also offers me and my audience the chance to give and receive feedback. The audience can comment on my videos, they may ask questions and resolve quandaries through on-line contact with me; they can openly show their liking (or sometimes disliking) of the material, aiding in the process of a democratic construction of instructional tools. Books, television and tapes are a one-way channel of instruction; there is no way to ask a book to resolve your doubts; there is no way to engage in a personal and direct debate with millions of people around the globe through television; and it is a lot easier to share a song you like with your friends by copying and pasting a link on Facebook than by burning five hundred CDs and sending them by post to each of them (for further discussion of YouTube, see Falinger & Owens (2009) and Prensky (2009)).

The internet gives one the opportunity to receive an almost infinite quantity of information from any part of the globe on any imaginable subject in just a few seconds. It allows me to share my own skills, thoughts and opinions with an audience bigger than ever imagined, having the chance to communicate with the audience and engage in an open discussion that allows everybody to grow. For these reasons, today's teachers must understand the wide range of possibilities that these tools offer to their students.

In my opinion, reading Shakespeare's *Hamlet* is an experience that everyone should have the chance to have. Furthermore, there is no possible way to enhance or replace the experience of reading the actual play. The problem lies in the fact that students have not received the proper motivation that will allow them to actually open the book and enjoy it. Teachers must create the scaffolds that will drive the students to have a positive relation with literature, so as not to see it only as dull homework.

An average student who is connected to the internet most of the day and who is accustomed to receiving information at a very high speed and mostly through the visual channel cannot be expected to have the innate motivation to go to the library and check out a book on Greek

architecture to present the subject in class. She will not do it, because a regular textbook does not motivate her curiosity and because the library is not her ordinary channel for retrieving information. It is important to emphasize the fact that I am not stating that the student should not go to the library; on the contrary, what I think is that, in order for the student to have the urge to learn, she must be appropriately motivated through the channels that she understands and enjoys.

Cognitive and multimedia theory: A structural background

In this section I intend to briefly explain the theoretical framework upon which my proposal stands. Why is audiovisual material valuable for teaching content in a foreign language? As mentioned before the example about my colleague, when a student is trying to learn content in a language that is not her own, her brain must work overtime in order to fully comprehend both the subject and the linguistic information. This can be seen either in CLIL classrooms or with children who study in a foreign environment.

Learning language and content simultaneously demands that students manage a very high cognitive load because it requires accomplishing two independent processes at the same time: students are expected to understand and improve their language abilities, while fully comprehending the content of the subject that is being taught. One can better understand the learning process by looking at how memory works. Human memory is divided into three parts: sensory registers, working memory and long-term memory (Atkinson and Shiffrin, 1968). External information has to pass through these three stages in order to be retained in the human brain. It is assumed that external stimuli pass from the environment to the brain through the sensory registers and then to working memory. Here, the information may be rehearsed and encoded in order to be retained in the long-term memory, or rejected and forgotten. It is stated that the longer quantity of time a piece of information resides in working memory, the higher the probability for it to be retained permanently in long-term memory (Baddeley, 2004, p. 1).

A major inconvenience for the learning process is that working memory has very limited space. In contrast to the long-term memory's huge capacity, which allows for storing information perhaps till infinity, working memory can process very few items at a time, greatly limiting the quantity of information that can be encoded in a given moment (Sweller, 1994, p. 299). If the

cognitive load — the amount of information being processed simultaneously in working memory — is higher than the memory’s capacity, then part of the information will not be processed or stored.

It seems straightforward that this is an issue often encountered by the just-mentioned cases of foreign students and CLIL environments. Simultaneous learning of content and language can sometimes overload a student’s mental capacity, thus blocking her meaningful encoding of all the information. How can we as teachers solve this issue? Overload of working memory can be surpassed with multisensory aid. Working memory is divided into two separate systems for processing information: one specialized in the encoding of nonverbal information and a second one focused on dealing with language (Paivio, 1986, p. 53). Each of these systems is independent of the other, which means that either one can be active without the other one having to be so. But, at the same time, activity in one system may lead to activity in the other. For example, hearing the word ‘tree’ not only activates the verbal system (the word ‘tree’) but in the nonverbal system it also creates an image of a tree that would correspond to the external stimulus (Paivio, 1986, p. 54). When presenting material only through the verbal code, half of the potential capacity of working memory is being ignored by not processing information through the nonverbal channel; on the other hand, multimedia materials (that is, presenting information through both words and images) “takes advantage of the full capacity of humans for processing information” (Mayer, 2005a, p. 4).

Multimedia learning theory stands on three basic assumptions: 1) that humans possess two separate channels for processing visual and auditory information (dual code); 2) that there is a limited amount of information that can be processed simultaneously in working memory (cognitive load and working memory); and 3) that the learner is actively engaged in the selection of relevant information, organizing this relevant information into coherent mental representations and integrating these mental representations with the already constructed schemata of prior knowledge (Mayer, 2005b, pp. 32-37).

Because of working memory’s limited capacity, using both codes for transmitting information doubles the quantity of information that a person can receive simultaneously. Furthermore, this

dual coding promotes reciprocity between language and content, reinforcing both of them through the creation of verbal and nonverbal linkage between them.

Conclusion

I intended to show that in order to enhance the learning processes of our students we have to rethink the channels we use to transmit information to them. Because today's young generations have a different way of retrieving and processing information, the best way to attract their attention and motivate them to learn more is by accommodating our contents to the channels that they use most often. Multimedia materials perform an important task in this process because they create a motivational scaffold that can bring the students closer to the content that we intend to transfer to them. And the internet can work as an outstanding educational channel, not only because it allows the learning process to be extended outside of the classroom, but most importantly because it is the environment where "digital natives" dwell most naturally. Our contents rendered into multimedia materials and uploaded onto the web can have an impact on our students' learning processes that we never imagined.

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² My educational materials can be found on <https://www.youtube.com/user/NODICO/videos>.