

## COMIC STRIP AND SCIENCE COMMUNICATION SCICOM NARRATIVES

Dr. Aquiles Negrete Yankelevich  
Centro de Investigaciones Interdisciplinarias  
en Ciencias y Humanidades (CEIICH) UNAM  
Email: aqny@yahoo.co.uk

**Abstract:** In Latin America the majority of studies on communication of science by means of the media are focused on newspapers and television programs, because they represent the most effective way –in terms of time and money—to study a mass communication medium. However, there are other important ways to communicate science, of which we have meagre information, or about which little has been reported. Such is the case of cultural narrative media like novels, short stories, theatre, comic strips, etc. Narrative knowledge is a legitimate form of reasoned knowledge; nowadays, many scientists acknowledge that narrative cognition generates useful and valid knowledge. Narrative is particularly important in Latin America, as it not only represents a vehicle for information for anyone who has left the classroom years ago and needs to be updated, but is also useful for teaching isolated groups with little schooling.

The importance of communicating science by means of narrative forms has been suggested by several authors (McKnight, 2010; King, 2007; Schank et al, 2002; Korkmaz, 2011; Frisch, 2010; Lanza and Negrete, 2007; Rios and Negrete, 2013). In previous work (Negrete, 2014), I have denominated the narratives designed to communicate science as **SciCom Narratives** where the acronym refers to Science Communication. In this research I propose that comics (a form of SciCom Narratives) represent an opportunity to communicate scientific information and present an example of the use of comics in communicating medical information about AIDS.

In Mexico comic strips are a narrative cultural medium that is deeply established in national culture, as it is the principal access to reading for millions of inhabitants. On the other hand, AIDS in Mexico has been considered as one of the country's major health problems. The aim of this paper is to analyze the narrative (and visual) structure of two of the most popular comic strips in the country, with the perspective of using this medium –that is already recognized as an effective communication channel with the public in general—to disseminate scientific medical information about AIDS.

### INTRODUCTION

Narrative knowledge is more than an emotional expression; it is a legitimate form of reasoned knowledge. Bruner (1988) interpreted it thus, and defined the traditional mode of acquiring logical-scientific knowledge as paradigmatic cognition, and the knowledge acquired under the guise of a story as narrative cognition. Paradigmatic cognition has been continuously identified as the only cognitive mode for the generation of valid and reliable knowledge. However, although the concept of the existence of more than one mode of rationality has been ignored for a long time, in actual fact it has been part of human culture for centuries as, for example, in the Bible and the Koran (Lanza and Negrete, 2007; Polkinghorne, 1998). Now many scientists believe that both paradigmatic and narrative cognition generate useful and valid knowledge. They posit that both types are part of the repertoire of human cognition for the pursuit of reasoning, the representation of information, and the comprehension of reality (Gardner, 1983). While paradigmatic knowledge is retained in individual words that name a concept, narrative knowledge is preserved in stories with plots. Memories in narrative form retain the complexity of the situation in which the action occurred, along with its emotional meanings and motivating factors. The collection of experiences in narrative form offers a base for understanding new experiences of episodes of action by means of analogy (Bruner, 1986; Mitchell, 1981; Ricoeur, 1984).

We have plenty of examples of writers from the past who included science as a subject of their writings (H.G.Wells, Edwin A. Abbott, Arthur Conan Doyle, Primo Levi, George Gamow, Lewis Carroll, Anatoly Dnieprow and others), which shows the existence of the belief that science can be recreated within a narrative framework, and that this could be an appropriate vehicle for transmitting ideas, opinions, doubts and fears associated with the scope and reach of science. Nowadays, the idea that fiction and narrative can play a fundamental role in the intellectual evolution of the human mind is enjoying a comeback (Sánchez, 1998). Research in the fields of narrative and figurative language has spawned important conclusions concerning the importance of narrative cognition and its implications in education and communication (Negrete and Lartigue, 2004). According to Gardner (2001), in his theory of multiple intelligences, one of the ways in which complexity can be presented and communicated is by means of narration. Stories are attractive to people of all ages and conditions. Narrative provides a precise tool with which to represent and transmit knowledge; it is an effective emotional detonator, a long term mnemonic structure, and an important reinforcement for learning (Negrete, 2005). The presentation of scientific information by means of short stories, novels, drama and comic strips should be considered as an important resource for the dissemination of knowledge, among the range of instruments at the disposal of science writers (Negrete, 2009).

One of the major problems faced by governmental institutions is to disseminate the programs and services they develop. The definition of public policy is hardly enough if the definition in question remains locked in a drawer or is announced by means of conferences or brochures, most of which are couched in technical and scientific terms, quite unfamiliar to the people who will benefit from them. Considering this, it is indispensable that, in parallel with the definition and implementation of public policies, knowledge gleaned from research should be made public in timely and appropriate ways to the people liable to benefit directly from it, by means of appropriate communication channels, in accessible language, with references to their everyday life, and containing familiar elements, with the aim of establishing identity and, consequently, creating meaning and promoting long term memory of that which is represented.

In the case of Mexico it is essential to recognize the level of illiteracy, and the scant interest in reading displayed by some segments of the population. Mexico has about 100 million inhabitants (INEGI, 2005). In terms of education, the majority of the population has gone no further than eighth grade of basic schooling: a mean of 7.6 in the case of males, and 7.1 for females (Ibid). Out of every hundred inhabitants over 15 years old, 11 women and 7 men are illiterate. UNESCO recommends reading at least four books yearly per person to guarantee an adequate level of culture and social development. In Mexico the average per capita reading is less than one book a year (Marcín, 2005). Other recent studies show that about 40% of the population over 15 years old read less than one book per annum (CONACULTA, 2004).

Although Mexico is a country in which the reading rate is low, if we take into account the total population we find that the absolute number of readers is considerable. What the Mexican public reads, by and large, are superficial and disposable texts (Malvido, 1993). Evidence of this can be found in the high press runs of magazines covering show business gossip, fashions, and comic strips with stereotyped storylines (sex, crime or pseudo westerns). These publications are read by an even greater number of readers than their press runs suggest, because each copy is usually shared (read) by several individuals (Ibid.).

Nowadays, comic strips are one of the preferred media and the principal access to reading for millions of Mexicans. In 2002 they represented 33.5% of total publications in this country (López, 2003). In 2003, 215,000 titles were published, with a total press run of 512 million copies (CANIEM, 2005). The most highly demanded editorial content in this market is that which deals with sensationalist stories, comics or love relationships. Historia semanal (Weekly story) and El libro vaquero (Cowboy book) (Figures 1 and 2) total, between the two, an annual print run of 41.6 million copies (López, 2003), thus being two of the five weekly magazines with the greatest circulation in Mexico (Gutiérrez, 2001).



Figure 1 – Cover and inner page of an issue of El libro vaquero.



Figure 2 – Cover and inner page of an issue of Historia semanal.



The fact that comic strips already have a great appeal among a broad sector of the population makes them a very attractive medium to try and reach numerous segments of society. For example, in 2000, the Economy Department used a comic strip as a medium to publicize its Microcredits program and the requirements for applying for this type of loan, by means of two stories that reflected everyday life situations. In 2004, on the basis of an analysis of communication strategies designed for the migrant community, the Foreign Affairs Department established as a priority in the development of its information campaigns, the design of a comic strip that would enable the Mexican migrant community in the United States of America to become familiar with the programs and services offered by the Mexican consular network. With the support of the O’Farril Group (editors of *Historia Semanal*), the brochure *Guía del migrante mexicano* (Guide for the Mexican migrant) was distributed jointly with the regular issue of the magazine. The cost of its distribution was about 1.20 Mexican pesos (the equivalent of ten U.S. cents). Although the impact of this publication wasn’t assessed in depth, *Historia Semanal* reported that the print run of copies that included the *Guía* was totally sold out, and this can be considered as an indirect and tentative measure of the popularity and success of the campaign.

AIDS, together with excess weight and diabetes, has been considered a national security issue in Mexico (SSA). More than 90,000 accumulated cases were reported in 2004 (Censida), and it is estimated that one in every 333 persons is infected (SSA). Preventive medicine is essential to improve the quality of life of the population and to face the problem posed by the high cost of treatment. If we are capable of designing and opting for a tool that is suitable for transmitting medical information by means of a “product” that achieves a positive impact and stimulates individuals to avoid risky practices, we will contribute significantly to social welfare. If comic strips applied to the dissemination of science prove to be effective, this model could be reproduced and spread to other areas of health (such as excess weight and diabetes) with a favorable cost/benefit ratio.

### **GENERAL OBJECTIVE**

Analyze the two most popular comic strips in Mexico, with the aim of utilizing this already familiar and effective communication medium to disseminate scientific medical information among the general public.

### **METHOD**

I analyzed both narrative and visual aspects of the comic strips.

#### **Narrative**

Using Propp’s method (Propp, 1932), enriched by other elements proposed by contemporary authors (Atkinson, 1990; Landau, 1984; Harré et al, 1999), I identified the most common narrative structures used in *Libro Vaquero* and *Libro semanal* in terms of functions, spheres of action, plots and characters. Propp suggested that fairy stories (and I extend this to narrative in general) can be understood using four principles: 1) the functions of the characters are stable elements in a story; 2) the known functions within a story are finite; 3) the sequence of the functions is normally the same in any story; 4) stories are of a determined type, according to their structure. According to Propp, functions are acts, episodes, or apparition of several types of characters. He proposed that fairy stories are based on 31 functions (acts or episodes) that I summarize in Table 1.

Not all stories include all the functions proposed in Propp’s classic work (1932), but the ones that are normally incorporated will appear in the order in which they are listed in Table 2. In any superficial review we can recognize the basic structure in famous short stories and novels, such as Cervantes’ *Don Quixote*, Mary Shelley’s *Frankenstein*, Wells’ *The Island of Doctor*

Moreau, and George Orwell's 1984, and also the structure of short stories, like *The Crabs take over the Island*, by Anatoly Dnieprov, and *Nitrogen*, by Primo Levi. In a Proppian analysis, the functions are carried out in seven "spheres of action": the villain, the provider, the assistant, the princess and the father, the dispatcher, the hero and the false hero. The functions and spheres of action make up an ordered whole. Their presence or absence in any story enables the plots to be classified. The plots can adopt one of four patterns: development through struggle and victory, development through the accomplishment of a difficult task, development through both previous categories, and development through neither of them. Therefore, the important point in Propp's proposition is that, although any character can be involved in any sphere of action, and several characters can be involved in the same sphere, we are always dealing with discernable and reiterated structures (Hawkes, 1977). Proppian analysis has been used to study a range of different narrations, not only fairy stories (Landau, 1984; Harré et al, 1999).

	Function	Description
I	Absentation	Family member absents him/herself
II	Interdiction	An interdiction is made to the hero
III	Violation	Hero violates interdiction. Villain appears
IV	Reconnaissance	Villain or hero attempts reconnaissance
V	Delivery	Information about victims is delivered to victims
VI	Trickery	Villain attempts deception of victim
VII	Complicity	Victims submit to deception
VIII	Villainy	Villain causes harm to family members
IX	Mediation	Misfortune or deficiency is made known
X	Counteraction begins	Hero agrees /decides on counteraction
XI	Departure	Hero leaves home
XII	Donor's first function	Hero is tested
XIII	Hero's reaction	To donor
XIV	Provisional receipt	Of magic agent
XV	Guidance	Spatial transfer of hero is made to vicinity of object of search.
XVI	Struggle	Hero and villain are in direct combat
XVII	Branding	Hero is marked
XVIII	Victory	Villain is defeated
XIX	Liquidation	Initial misfortune or deficiency is made good
XX	Return	Hero returns
XXI	Pursuit	Hero is pursued
XXII	Rescue	Hero is rescued from pursuit
XXIII	Unrecognized arrival of hero	At home or in another place
XXIV	Unfounded claim by false hero	Hero is at home
XXV	Difficult task	Proposed by false hero
XXVI	Solution	Task is achieved
XXVII	Recognition	Hero is recognised, often by special sign
XXVIII	Exposure	False hero is exposed
XXIX	Transfiguration	Hero is given new appearance or possessions
XXX	Punishment	Villain is punished
XXXI	Wedding	Hero marries, ascends throne or is rewarded

**Table 1.** Fairy tale functions proposed by Propp (1968)

## Visual

To study the visual style and language of these two popular comic strips, I analyzed their content according to, for example, the total number of illustrations, number of images per page, number of characters, images dedicated to sensuous encounters, images with nudity, etc.

## RESULTS

### Narrative structure of Libro vaquero and Historia semanal

Both comic strips exhibit similar structures in terms of dramatic structure, plot, characters and spheres of action and functions, which can be summarized as follows:

In both comics, en a vast majority of cases, the narrative takes the form of a love story. Adhering to Propp’s classification, the plot is of the “development through struggle and victory” and “development through accomplishment of a difficult task” types. The hero is involved in different adventures (generally, in Libro vaquero it is about direct confrontation and conflict with an opponent, and in Historia semanal it concerns the resolution of diverse problems in a working environment). The hero always achieves his objective. His goal is always an important task linked to recovering territories, wreaking revenge, or attaining justice at work.

Both comics exhibit a linear structure. The conflict is established and develops linearly, with a beginning, a development and a conclusion. Occasionally, flashbacks are included in the narrative to explain the reasons for revenge or the problem in question. All the classic components of stories with closed endings are present: beginning, development and ending (no comic includes an open ending). The story is generally told by an omniscient narrator.

According to Propp’s classification of spheres of action, the characters can be classified as follows. The main character (a cowboy or office worker) is the “hero”, charged with accomplishing something or obtaining the hand of the “princess”. The “king” is the boss at the workplace or the father of the princess, who makes a request (or entrusts a mission) to the hero. A friend (man or woman) represents the “helper”, who accompanies the hero on the mission and also warns him of the difficulties involved. In some cases the helper is the princess herself. On the one hand, the characters that surround the hero can be considered as the “providers”; in this sense, they are the owners of the resources needed by the hero to complete the task or mission; and, on the other, as “villains”, as in some cases they make the hero pay for the resources he needs. The “villain” can be a man or a woman whose objectives are contrary to those of the hero. In comics, the villains are presented as despicable because their motives are always associated with evil (Table 2).

Characters	Spheres of Action
Main character	Hero
Friend (either sex)	Helper
Antagonist (or antagonists)	Villain
The woman who is to be rescued or won	Princess
The boss at work or the father of the princess	King

**Table 2** – Characters in Libro vaquero and Historia semanal, according to the spheres of action proposed by Propp.

In terms of Propp’s functions, the narrative structure of these comics can be summarized as follows: The hero has a problem to solve (mediation). The hero travels to the place where the problem must be solved (normally another town, or his workplace, or maybe the antagonist’s home) (Departure and guide). The main character faces the difficulties that stand between him and achievement of his goal (strife). The hero wins the battle against the villain, obtains what he was seeking (victory) and returns to his town or his job (homecoming). Finally, he is recognized as a hero (honors) and he marries or initiates courtship with the princess (marriage) (Table 3).

Functions	Description
Mediation	Misfortune or shortcoming is made known
Struggle	Direct combat between the hero and the villain
Departure and guidance	The hero leaves his home or is transferred to the vicinity of the object of his quest
Victory	The villain is defeated
Homecoming	The hero returns
Honors	The hero is vindicated, frequently by a sign
Marriage	The hero marries, ascends to the throne or receives prize

**Table 3** – Structure of the comic according to Propp’s functions.

Libro vaquero	mean	Libro semanal	mean
Total number of dialogue lines	409	Total number of dialogue lines	395
Dialogue lines by omniscient narrator	131	Dialogue lines by omniscient narrator	154
Dialogue lines by hero	77	Dialogue lines by hero	187
Dialogue lines by incidental characters	201	Dialogue lines by incidental characters	222
Dialogue lines with sexual content	10	Dialogue lines with sexual content	8
Dialogue lines on love	14	Dialogue lines on love	39
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Total number of images	222	Total number of images	216
Total number of images depicting sex	4	Total number of images depicting sex	22
Total number of images of male nudes	4	Total number of images of male nudes	7
Total number of images of female nudes	8	Total number of images of female nudes	3
Total number of attractive female images	20	Total number of attractive female images	20
Number of images per page	2	Number of images per page	2

**Table 4** – Analysis of images and dialogues of both comics

In both comic strips the sex and the love story play a central role in the development of the plot (and images content) (Table 4). It is reasonable to infer that it is precisely this trait that makes the story attractive to readers. It is worth mentioning that one of the principal differences between Libro vaquero and Historia semanal is that in the former the images

depicting sex are more explicit, while in the latter the story seems to depend more on a romantic approach both in the images and the dialogue.

### **FUTURE WORK AND RESEARCH**

The following stage of this research project is to generate a collection of comic strips, all illustrated, carrying the same information about AIDS, but with different plots and illustrations. To emulate the style and language of the comics I have analyzed, the design of the new strips will abide by the narrative and graphic elements that have been identified in this study as unique characteristics of Libro vaquero and Historia semanal. The new collection of comic strips about AIDS will be tested and compared using the RIRC method that I designed for the assessment of narrative texts with scientific content. The RIRC method explores the effectiveness of a narrative (and other formats) in communicating scientific information using four independent memory tasks to assess learning (Negrete, 2010). This method assesses an individual's ability to retell, identify, remember and contextualize scientific information presented to them in narrative form. The input consists of a qualitative complex stimulus (a story narrative or another text format) and the measurement is performed using questionnaires. Appendix shows some images of the first models of comic generated for this research.

Once the comic strips thus generated in this research project have been tested and assessed according to the RIRC method, it is expected that they will be published jointly with one or several issues of Libro vaquero and/or Historia semanal. Finally, if and when they are published, I expect to measure their mass impact on the population that consumes this type of product.

### **CONCLUDING NOTES**

Comic strips are a cultural medium deeply embedded in Mexican culture. They could be an interesting vehicle and an opportunity for disseminating science, as they embody a mass communication medium that includes forms of narrative and graphic representation. The story and the images expedite the learning process, thanks to the built-in patterns individuals possess regarding both languages (i.e., information previously acquired concerning the reading of images, narrative structure and their meanings), as well as the emotional responses that visual and narrative resources evoke. Furthermore, images and narrative act as mnemonic elements that take up their abode in long term memory, thus contributing to learning.

In Mexico, AIDS has been termed a national health issue. There are simple ways of preventing contagion, and comic strips represent a medium in which information this information can be presented in a context of everyday life, thus facilitating comprehension and learning by the general public of the basic facts of this disease.

Concerning the analyses of Libro vaquero and Historia semanal, it is possible to conclude that they coincide surprisingly well with the structures described by Propp for fairy stories. Both comics exhibit similar structures in terms of dramatic construction, plot, characters, spheres of action and functions. Analysis of the narrative lines of these popular comics suggests that a simple structure, with few variations, offers the most effective way of constructing attractive comic strips and communicating medical information to a numerous segment of Mexican public with a low educational level. The explanation of this seems to be that, notwithstanding that the population has little formal education, it can resort to certain patterns (knowledge previously acquired, possibly by reading this popular medium) that enable it to decipher and glean meanings from simple narratives and unexceptional pictorial representations, thanks to



the fact that the information provided has been set in an everyday context, familiar to the reader.

In this research I propose that comic strips can be used as a tool to communicate scientific medical information to the general public in a way that is more effective than the classical paradigmatic representation. In the case of Mexico, comics constitute a unique opportunity to communicate scientific medical information to a broad segment of the population, which is very difficult to access by means of other media, and for whom comics have become part of their everyday life.

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