Information Comics: an Overview

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Abstract - **The analysis of the structure of comics is increasing but only recently have "information comics" been analyzed. These are a subset of comics whose purpose is not to tell a story or entertain but to transfer information or communicate concepts, even though that narrative is often considered an essential element of comics. Information transfer is considered an essential element of many texts, especially educational ones. The effective use of comics in education settings has been discussed since at least 1944. While "information comics" do differ in some aspects, this study will show via Peircean Visual Design that "information comics" are fundamentally the same as other comics, and while comics as a whole may be effective in knowledge transfer there appears to be little data supporting this claim.**

Index Terms – Comics, information transfer, Peircean Visual Design..

COMICS

As early as the 1940s, research into the effectiveness of comics in knowledge transfer was undertaken [1]. Unfortunately, due to social stigma and the perceived juvenile nature of comics, much of this research has been ignored or forgotten until recently. Comics are experiencing a resurgence in mainstream culture. Major publishing houses, such as Pantheon and Scholastic, are now publishing graphic novels, a.k.a. comics; and public and school libraries are building comics and graphic novel collections [2, p. 19]. Major motion pictures are increasingly based off comics (e.g., *Men in Black*, *Spiderman*, *Scott Pilgrim versus the World*, *Watchmen*, *Road to Perdition*, *Red*, etc.). The Savannah College of Art and Design has established undergraduate and graduate programs in comics. Academic journals are even accepting graphical abstracts [3] and some are even publishing articles in comic form [4]. All of this shows that comics as a medium are worthy of academic study in and of themselves.

I. Recent research

Thus, academic research has started to again examine comics. Three main areas of research exist: first, the values and social impact of comics; second, the use of comics in education; and third, how comics function as a medium of communication.

While the social impact of comics is research worthy, it has little bearing for this article and will not be covered. The use of comics in education directly relates to information comics and will be covered in detail. The research on the structure of comics provides a basis for analysis of the information transferability of comics, and thus a brief summary of this research will be provided.

This article will provide a brief overview and examples of information comics. It will then examine comics from a Peircean visual design perspective and evaluate current research on the effectiveness of comics in information transfer.

II. Information comics

Information comics are comics designed to educate, inform, or teach the reader something. Though sometimes described as "a cruel hoax," these "comics that introduce history, mathematics, reading, and even the theory of relativity are being gobbled up by parents for their comics-afflicted children and promise to be the growth area of the future" [5, pp. 152-153].

The most thorough examination of information comics is by Jüngst [6]. Her purpose is to show "how" information comics are designed and how they are meant to work as a means of knowledge transfer rather than "why" they might or might not work [6, p. 3]. She examines the type of pictures, texts, the relationships between the pictures, and the texts within information comics, and discovers that there is no significant structural difference between information comics and non-information comics [6]. Unfortunately, most common information comics are pamphlets and are readily discarded [6, p. 27]

Examples of information comics include:

1. Jay Hosler's *Sandwalk Adventures*, a comic book starring Charles Darwin and a talking follicle mite that introduces readers to evolutionary biology [7].
2. The book titled "Hello! Global Citizens" aims to teach children about peace, human rights, and sustainable development. UNESCO Asia-Pacific Centre of Education for International Understanding created the educational comic aimed to help elementary and high school students to overcome cultural differences [8].
3. The financial newspaper Nihon Keizai Shinbun published *Japan Inc., An Introduction into Japanese Economics in Manga* (*Manga Nihon Keizai no Nyumon*), a Japanese comic about Japanese economics [9].
4. *Skin Deep!* was developed by the National Drug and Alcohol Research Centre and the NSW Department of Corrective Services to inform inmates about the dangers of hepatitis, HIV, etc. [10, p. 139].
5. Eisner's military work: *Army Motors* and *The Preventive Maintenance Monthly* [11].
6. Scott McCloud's *Understanding Comics: The Invisible Art* [12], a comic about the structure and theory of comics.

III. Comic structure

While non-academic sources have formed the basis for much of the discussion of comics' structure, the writings of comic artists Will Eisner [11] and Scott McCloud [12] being the most influential, both academic and non-academic sources propose that comics function as a system and communicate via rules, often described as linguistic in nature.

Research in this area is often sidelined by a discussion of the exact definition of comics. Many people may find an exact definition of the term "comics" to be simply superfluous, believing that everyone knows what a comic is [6, p. 11]. The debate over the definition focuses on whether comics are a language in themselves, a medium of communication, or a form of communication written in a visual language.

McCloud defines comics as "juxtaposed pictorial and other images in a deliberate sequence intended to convey information and/or produce an aesthetic response" [11, p. 9]. This definition ignited the debate. It is criticized as being too broad. As Magnussen explains, a collection of paintings by a particular artist arranged chronologically would fit into this definition [13, p. 199] because it would be any deliberate sequence conveying information, e.g., the evolution of an artist's style through time. Much of the discussion mixes the form with the method of

communication. Kunzle specifically requires that comics be created for a mass medium [14, p. 5]. Magnussen emphatically insists that comics be narratives [13, p. 199]. Many "information comics" meet neither of these requirements, but are intuitively a form of comics. Thus, for the remainder of this paper, comics are a form of communication written in a visual language.

Comics make use of both verbal and visual elements to communicate. These verbal and visual elements can be arranged into an overarching framework or visual language.

The visual elements used within comics are often associated with specific meanings. "Readers of comics learn how to associate certain repetitive pictorial elements with specific meanings, effectively treating them as linguistic units" [15, p. 439]. An example of this can be seen in Figure 1 and Figure 2, examples from the Asterix the Gaul adventure comic, *La Zizanie* [16].

FIGURE 1. MULTIPLE VISUAL ELEMENTS DEPICTING ANGER

In Figure 1 we see multiple visual elements indicating that this person is angry; the squiggly spirals emanating from his face, the darkened, reddish hue, the closing of his eyes and the arching of his eyebrows, the jagged tail of his speech box, etc. all indicate anger. Taken together the meaning of these elements is transparent.

FIGURE 2. VISUAL ELEMENTS DEPICTING ANGER

In Figure 2, the short Asterix character is also angry. However, he does not have as many or as direct visual elements depicting his anger. His eyebrows are arched, and from Figure 1 we know this can be an indication of anger. If we were unfamiliar with the image of smoke rising above a person's head, this can lead us to conclude that other visual elements such as the smoke above his head, as well as the closeness of his arms to his body, also indicate anger. Other examples can be much more specific to an individual comic.

An example from the Japanese manga *One Piece* [17], a dark background between panels indicates that the contents of the panels are a flashblack, while a standard white background indicates present time.

This relationship is similar to language where repetitive verbal elements are associated with specific meanings. In fact, the process of relating verbal or visual elements to specific meanings is exactly the same for both elements.

While many traditional visual design theorists have created systems to analyze the relationships between text and visuals, few have used these systems to evaluate comics. A possible reason for this lack of application is that most of these systems emphasize the primacy of text over visuals (e.g., Barthes [18]), or that visuals form a separate communicative structure from the text (e.g., Kress and van Leeuwen [19]. Comics, however, seem to subordinate text to visuals, thus making these systems of little use for the analysis of comics. The verbal and visual elements form something that is more than the simple sum of it elements [15, p. 433].

Recent research by Cohn, et al. [20], provides evidence showing the comics are read much like written text. He postulates (and I agree) that the verbal and visual elements of comics are written with an underlying structure, a syntax, or in other words a visual language [20, p. 34-35]. This visual language includes both visual and verbal elements and is not limited to use only in comics. For example, it is used in children's picture books, the instructions for building your new bookcase from Ikea, restaurant menus, safety icons, PowerPoint presentations, scrapbooking, etc., and even to an extent in academic articles like this one [21-25]. Peircean visual design is applicable whether text is subordinate to visual elements or vice versa, or both visual and verbal elements are balanced.

VISUAL DESIGN

Peircean visual design is a system of semiotics that includes verbal or textual elements as one amongst several related elements, including images, diagrams, tables, bullet points, font shapes, borders, color, text, graphs, etc. The overall effective purpose of each element is distinct [22, p. 58]. While these different elements may seem disparate, they do form a single cohesive system. What varies from element to element is the relative degree to which each element serves three primary functions: the decorative function, the indicative function, or the informative function. Some elements are highly effective for accomplishing one kind of function that other elements are ineffective for.

The communicativeness of a visual is directly related to the function of the visual. Peirce's system is based on three primary functions of communication: generating feeling (the decorative function), physical action (the indicative function) or information (the informative function), or some combination of these primaries [24, p. 47]. These functions are directly related to Peirce's base signs, which he rather abstractly calls firstness (feeling, decorative, variation), secondness (physical action, indicative, contrast) and thirdness (information, informative, pattern).

The improper application of sign types can lead to confusion and a lack of communication. If a visual is trying to convey information, for example a diagram or table, but the decorative elements overwhelm the information, then the communicative function is ineffective or weak. Hence, informative visuals may contain minor decorative features, but these must not predominate or overwhelm the informative function. Conversely, decorative visuals can only indicate or inform weakly or ineffectively [21, p. 2]. There is a correlation between effectiveness of communicative function and the type of visual used.

A common example of ineffective communication is the overuse of indicative elements, such as bullet points. Indicative elements when not overused provide contrast and emphasize important information. For example the overuse of bullet points or multiple fonts in a lecture

handout can cause a viewer to look all over, obscuring any information structure that may exist, culminating in what feels like information overload. A handout, generally, is intended to serve an informative function but due to the overuse of indicatives, it is reduced to generating a feeling, a decorative function. There is a direct corollary of this effect within comics.

Comics are essentially tables of informative icons with informative indices. The visuals are informative icons, while speech and thought bubbles, narrator text, and gutters are informative indices [26, p. 328]. The gutter is an indicative element in that it points to the next panel. The overuse of gutters and thus panels can create confusion in reading order. Figure 3 provides examples of both effective and ineffective use of indicatives in panel layout for information transfer.
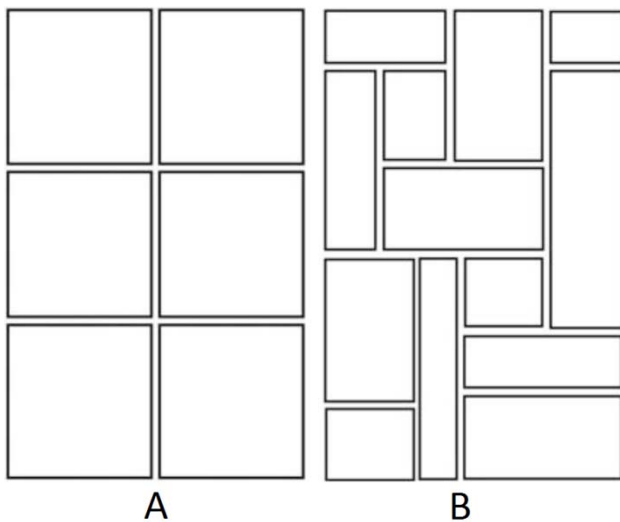

FIGURE 3. COMIC PANEL LAYOUTS

Layout A. in Figure 3 is a common panel layout, and easily read by most people. However, in Layout B. there is no clear reading order. It is difficult for readers to chunk the panels in any manner. And like the overuse of bullet points on a handout, overused gutters in a comic reduce the communication of information to the generation of a feeling. To be fair, the panel layout in Layout B was deliberately designed to generate a feeling. The panels were originally filled with close-cropped images of a 1960s penny arcade. Only taken together do the panels have any meaning: the feelings or impressions of a specific time and place.

Comic panel layout can also be used to enhance the transfer of knowledge. A good example can be seen in Figure 4 [7]. Note that the variation and pattern of panels emphasize the idea of the asking of the question. The reader order of the panels sets the pattern and the gutters between the panels clarify the order of the responses. The panel layout reinforces to the reader the importance of the question.
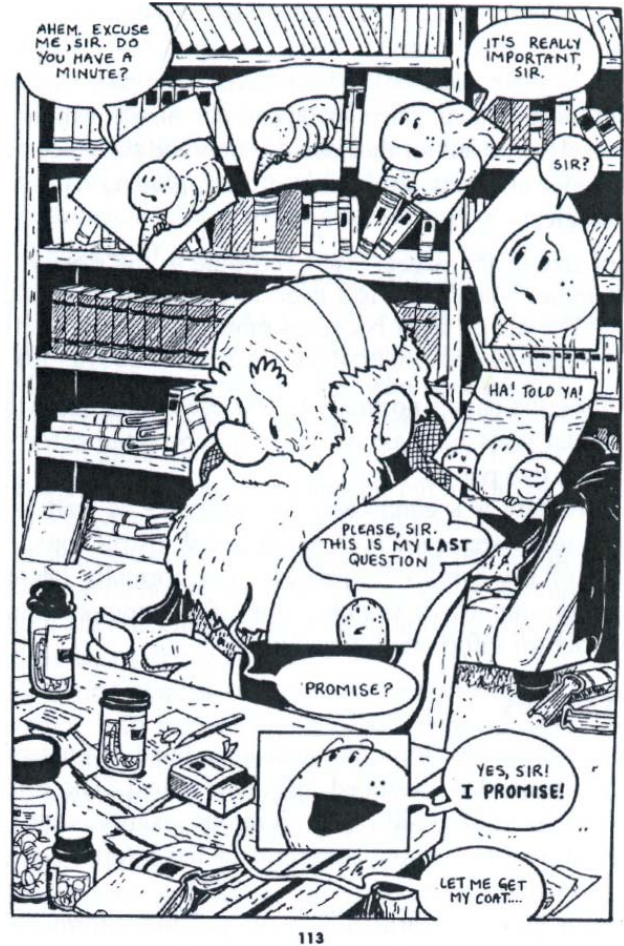

FIGURE 4. EFFECTIVE PANEL LAYOUT

The informative function in Peircean visual design includes word-symbols, sentence-symbols, and whole-text-symbols. Narrative and explanation are both types of whole-text-symbols, and both are informative function activities. Thus, it is not surprising that between comics and information comics, the overall structure does not drastically change. Information comics like [4] or [12] could be considered to be a monologue narrative, but in my opinion it really is an explanation. The author of the article is the only consistent character; there is no plot or narrative, only explanation. However, one of Jüngst's major claims is that information comics do not create new genres, but rely on already established genres [6, p. 324], e.g., biography, lectures, monologues, or classroom settings. Thus, many information comics have some type of loose narrative structure, as described in her many examples [6, p. 261-275]. Jüngst [6, p. 305] acknowledges that some research shows that narrative is not an effective method for knowledge transfer. She asserts that no safe conclusions can be made and calls for more research.

EFFECTIVENESS FOR KNOWLEDGE TRANSFER

It is often assumed that since research has shown that combining the pictures and text enhances understanding and fosters connections between new information and existing knowledge [27, p. 576], that comics will be an effective tool for knowledge transfer. However, in normal textbooks, the pictures are used to structure the page layout and attract the eye. In comics, this purpose falls flat. Pictures in comics are not special, they are everywhere, and the panels represent the main structural element of the comics' sequence [6, p. 48]. Thus, a common argument is that comics are able to present more information in a smaller amount of space than plain text. Green and Myers [27, pp. 574-575] cite a single 50 mm. by 50 mm. panel (see Figure 5) [28] as containing at least as much information as the approximately 250 words they use to describe the panel. This panel combines both visual and verbal elements to convey the fear and confusion felt by the patients, and an important decision to record everything the doctor tells them.

FIGURE 5. EFFECTIVE COMMUNICATION EXAMPLE

Intuitively, Green and Myers feel that this panel is effective in knowledge transference, and thus fail to perform a quantitative study to measure the effectiveness.

There is an implicit assumption that visual and verbal elements together render information in such a way that makes comprehension easier than verbal elements alone. This assumption finds some basis in studies showing that the addition of visual elements enhances text-only material. An exception to this general consensus, Kress and Val Leeuwen [19, p. 127] discuss the "ambivalent role" of pictures that interact directly with the reader; generally deemed only usable for beginning readers. There appears to be a paucity of studies which validate that comics, by having more visual elements, are more effective than text-only materials.

PAUCITY OF STATISTICS

Most supporters of the use of comics in education provide little or no data to support this conclusion. Yang [4] and Jacobs [2] are good examples. Justifications and anecdotal evidence are provided but not statistical analysis or data. This issue occurs as far back as 1940. Sones [1] describes rigorous studies but provides only the general results and no statistical analysis or data. As noted by Jüngst, "Unfortunately, there are hardly any statistically representative studies on the effect information comics have on learning" [6, p. 63]. While comics may be effective in knowledge transfer, the scarcity of hard data is disturbing.

This is not to say that no researchers have attempted to provide hard data. Dolan and Rouen [10] distributed approximately 9,000 copies of the *Skin Deep!* comic with an accompanying survey but only received 200 survey responses. Although those who returned the survey seemed to have profited from the comic book, they admit that the feedback from the target group was minimal and whether the sample was representative was unknown [10, p. 139-140].

The majority of studies that report data tend to be positive about the use of comics for knowledge transfer. Comics are mentioned as being particularly useful for struggling readers [4, p. 187]. However, Lamanno [29, p. 118] cautions the use of comics for intervention material for students who have severe reading difficulties. Despite the students in this study reporting that they felt the comics had helped them in their reading ability, the results of the reading tests did not support that belief [29, p. 118]. This data shows that not all struggling readers may be helped by reading comics, even if they self-report that they have been helped.

Many studies can be criticized in methodology as well. To most study participants comics are a new and novel method for learning, and only used for the duration of the study. This limits the studies [6, p. 63]. An ideal study would have a method of taking into account familiarity with comics.

In a preliminary study, I discovered that comic familiarity showed the potential of significance. Unfortunately, due to the small sample size, results were inconclusive. Cohn [20] provides both text-only and comic versions of his abstract. Having participants randomly read one and answer a series questions shows that comics do have the potential for effective information transfer. The comic abstract is essentially explanatory in nature; this study avoids the question of the effectiveness of the narrative.

CONCLUSION

This article has reviewed the nature of information comics from a Peircean visual design perspective and evaluated research on the effectiveness of information transfer vis-à-vis comics. There is a distinct lack of data supporting the increase in popularity of the use of comics in education settings and for information transfer. Most of the research supporting the use of comics in education provides little data, anecdotal or otherwise. Yet despite this lack of data, most researchers are generally positive about the use of comics. The basis for this positive inclination is research that shows that visual elements increase the effectiveness of text-only materials.

The analysis of comics is a cross-disciplinary field. It will take a variety of skills to fully examine the effectiveness of comics as a communicative medium. As technical communicators, we have the skills to perform the analysis, research, and studies.

Professional technical communicators should be at the forefront of gathering the necessary data to prove or disprove the effectiveness of comics in knowledge transfer. Not only do we have the skills, we have an ethical obligation to make information transfer as clear as possible.

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