

FOOD SCIENCE THROUGH GRAPHIC NOVEL: EXAMPLES FROM *OISHINBO A LA CARTE*.

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Abstrak

Sains Makanan adalah sebuah bidang yang berkaitan dengan pelbagai aspek makanan. Skop bidang ini termasuk penilaian sensori, keselamatan makanan dan pemprosesan. Bidang Sains Makanan telah berkembang kesan daripada kemajuan teknologi untuk memproses makanan daripada pelbagai jenis bahan. Hal ini memberi manfaat kepada komuniti yang kekurangan sumber makanan tetapi memberi mudarat kepada komuniti yang terikat dengan hukum agama dan adat resam. Maka, semua orang perlu mempunyai sedikit ilmu pengetahuan mengenai sains makanan pada masa kini. Salah satu cara untuk meningkatkan literasi sains makanan adalah dengan novel grafik. Penceritaan secara grafik membolehkan pembaca memahami dan mengulas lanjut mengenai mesej yang ingin disampaikan. Di dalam konteks ini, mesej termasuk ilmu teknikal seperti sains makanan juga boleh disampaikan kepada pembaca umum. Sebuah grafik novel yang mengandungi tema makanan telah dipilih untuk kajian ini; *Oishinbo A La Carte* oleh *Tetsu Kariya* dan *Akira Hanasaki*. Manga ini adalah mengenai dugaan dan cabaran seorang wartawan gourmet di dalam industri makanan Jepun. *Manga* ini telah dianalisis menggunakan teknik analisis kandungan (content analysis) untuk mengenal pasti kandungan ilmu sains makanan yang ada di dalam nya. Hasil daripada kajian ini, ahli panel analisis kandungan bersetuju yang bahawa maklumat sains makanan akan menjadi lebih jelas dengan menggunakan panel manga yang mempunyai susunan penceritaan yang aktif atau teknik penceritaan aspek-ke-aspek.

Kata kunci: Sains makanan, Novel grafik, Komik, analisis kandungan, Sains.

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Abstract

Food Science is a science field that deals with every aspect of food. The scope of the field extends from sensory evaluation to food safety and processing. Food science has gained prominence due to technology enabling the processing of food from various origins. This may be beneficial to resource-scarce communities but may bring catastrophic result to communities bound to religion and cultural customs. Therefore, a certain level of food science literacy is required for all level of people in this modern age. One method of developing scientific literacy is via graphic novel literature. Graphical storytelling enables readers to understand and elaborate the message being conveyed. The message in this context includes the technical aspect of food science. One graphic novel that contain “food” theme was selected; Oishinbo A La Carte by Tetsu Kariya and Akira Hanasaki. This manga is about the trials and tribulation of gourmet journalists in the Japanese gourmet industry. Content analysis was applied to ascertain the extent of food science knowledge contained in the graphic novel. In this study, both expert panels agree that food science information was detected more often in manga panel where there are active sequences of action or aspect-to-aspect story sequence.

Keyword: Food Science, Graphic Novel, comic, content analysis, Science

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1.0 Introduction

As globalization advanced, the food on our plate also changes from natural source to various synthetic source. For some, this development is a positive change in terms of food supply. However, there are also voices that discourage the development as it had led to deterioration of food quality and safety (Lymbery *et al.*, 2014). As a researcher, we should know (briefly) the story from both perspectives.

Advancement in agricultural techniques had led to an increase of agricultural yield and this led to the production of various food products in the market. This agricultural trend was envisioned by Norman Borlaug, the 1970's Nobel Peace Prize Winner. The trend is named Green Revolution. The trend started with the development of high-yield crops and high-quality livestock through selective breeding. The early methods were more focused on *"increasing the productivity of agriculture on the best farmland to help control deforestation by reducing the demand for new farmland"* (Stevenson *et al.*, 2013). Later, the development of Genetic Modified Organisms (GMO) in early 90's propelled the Green Revolution to present times. (Robert Kenner, 2008). Both early methods and GMO utilize gene manipulation, but the later approach was heavily criticized due to active role of human tampering with natural order of being.

The various food quality and safety issues arise from the application of the GMO. Retrospectively, crops and livestock were treated with care and respect. However, the introduction of the ability to homogenize and increase the output (via GMO) had degraded the crops and livestock treatment to "non-living commodity" level (Robert Kenner, 2008). However, this kind of treatment occurs only in specific part of the world and amusingly, occurs mostly in developed countries. In other countries such as Africa and Asia, the green revolution has been a beneficial contribution to the population (Hishamunda *et al.*, 1998; Komarek *et al.*, 2012; Noltze *et al.*, 2012).

Many environmentalists and economists had criticized the green revolution effort. Environmentalists claimed that the revolution had brought the destruction of flora and fauna due to more lands are converted into farmlands (Lymbery *et al.*, 2014). Economists had evidences that the green revolution had widened the social wealth gap between the food corporations and the people (Bohstedt, 2014; Lawrence *et al.*, 2013; Shah, 2012). In his defense, the late Norman Borlaug replied that his vision may not transform the world into a Utopia but he believes it has led the development into the right direction. He also counter-criticized the critics with the following phrases:

"Some of the environmental lobbyists of the Western nations are the salt of the earth, but many of them are elitists. They've never experienced the physical sensation of hunger. They do their lobbying

from comfortable office suites in Washington. If they lived just one month amid the misery of the developing world, as I have for fifty years, they'd be crying out for tractors and fertilizer and irrigation canals, and be outraged that fashionable elitists back home were trying to deny them these things"
-(Ortiz et al., 2007)

The paragraph above is a summary of Green Revolution challenge. The story attempts to make a neutral stance but bias toward the end. In delivering this story, the readers should understand the issue and crisis of green revolution; *to feed everyone or to feed with good food?* The premise of the story is simple, but the nuance of delivering depends on the writer. Detailed facts sometimes are omitted due to word constraints or reducing readers' stress. Such is the challenge of delivering academic facts into layman population.

Suggestions on the delivery method of an academic fact were aplenty. But the best suggestion includes utilizing pictures as a tool. "A picture is worth a thousand words" (Sue Hanauer, 1968) is an artwork that describes the message perfectly. However, there are various methods on utilizing pictures, from ancient method of writing such as cuneiform (Censer, 2015), doodling (Roam, 2009) and info graphics (Smiciklas, 2012). For this paper, the researcher is focusing on utilizing pictures through graphic novel, or simply known as comic.

Comic as a teaching tool has long been suggested (Vacca, 1959). Since then, there are various literature that support the utilization of comic as part of an education tool (Jacobs, 2007; McAllister et al., 2001; Nagata, 1999). Most of these literature focus on developing storylines or storyboards that would captivate certain academic subjects such as biochemistry (Nagata, 1999), and politics (McAllister et al., 2001) as well as a tool to developing children's multiple literacies (Jacobs, 2007).

There are a few books that provide practical advice on how to convey their story to the audience (McCloud, 1993; Will Eisner, 1985). But the advice also calls for artists to be more creative and experimental, since there is no definitive way on delivering a story (McCloud, 1993). Some comic stories deliver and bring an impact to international community such as Barefoot Gen (Nakazawa Keiji, 2004) and Palestine (Joe Sacco, 2001)

However, these comics are autobiographical. The factual information comes from the experience of the creator. There are comics that contain universal factual information such as comic on science and technology. Although rarely, most of these books are collaboration between the cartoonists and academic experts such as the *Manga* guide series which have produced various guidance to academic



subjects including calculus (Hiroyuki Kojima *et al.*, 2011), physics (Nitta *et al.*, 2009), statistics (S. Takahashi, 2008) and database (M. Takahashi *et al.*, 2009).

There are various but few studies regarding comic. However, most of the studies focus on themes of the comic. Russell (1987) studies the theme of wealth in American comic books such as Archie and Uncle Scrooge. Mala and Colleagues (1987) examine the sexual themes in Playboy cartoons. Inversely, Geary (2004) studies the role of young women in both *manga* (Japanese comic) and anime (Japanese animation). The common similarities of these comic studies are that they all incorporate content analysis. Therefore a basic study of theme in comic should incorporate content analysis since it requires thorough reading of the comic story and cognitive analysis when one compares of what had been read with one's own knowledge.

For this study, the researcher intends to know the amount of factual information of food science is depicted on comics with food theme. The researcher uses judges whom are well versed with food science field for this research but not necessarily the fans of comic culture. The judges acknowledge the universal themes of the field of food science field (sensory evaluation, safety and quality and processing) and agree for its utilization in the development of the coding scheme for this study. The researcher also intends to know the association strength of factual acknowledgement between the judges and what is the most effective way of presenting the information. Since both judges are food science graduates, supposedly both can acknowledge a certain food science facts mutually.

2.0 Methodology

2.1 *Manga Material*

The chosen comic with food theme is *Oishinbo a la carte* published by Viz Media. *Oishinbo a la carte* is chosen for this research because it is a comic that had managed to deliver Japanese cuisine culture all over the world (Brau, 2010). This manga is a product from the collaboration of an avid Japanese gourmet, *Tetsu Kariya* and cartoonist *Akira Hanasaki*. Therefore, this is an example of comic that intends to depict factual information using an expert. Two volumes of *Oishinbo A la Carte* are selected for this study. The two volumes are selected from six volume of the *manga*. One of the selected *manga* is *manga* volume 2 focusing on *Sake*, a Japanese fermented rice drink while the other, volume 5 focuses on Fish, Sushi and Sashimi.



2.2 Procedure

Two food sciences postgraduates were trained as judges. Both of the food science postgraduates were researching different aspect of food science field. Each judge rated the *manga* volume independently. They were asked to count the number of incidence and the page of the *manga* that depicted factual information regarding food science field, according to the coding scheme shown in Table 1.

Table 1: Coding system for the judges

Sensory Evaluation	A panel of people tasting the food. Followed by discussion of the panel that could involve mutual agreement/disagreement of quality, taste, or physical appearance in food.
Safety and Quality	Any topics on food and its accessories that directly affect living things. Include both harmful and beneficial topics
Processing	Any topic that describe the action involving in food preparation or change of chemical, biological and physical of the food.

The coding scheme was developed by analyzing food science textbooks (Murano, 2003; Nielsen, 2010). During coding development, there were more than 3 coding terms used. However, the all of the coding terms were an amalgam of these three-coding system. for example, both food microbiology and food chemistry are included in processing coding scheme.

3.0 Results

The total number of incidence where the two-volume *manga* depicting the factual information regarding food science field were added together but separated based on the two panel experts. Both panel experts counted 14 incidence of sensory evaluation depiction in the *manga*. However, panel 1 counted 18 incidence of safety and quality depiction while panel 2 counted 28 incidence. Inversely, panel 1 counted 25 incidence of processing theme depicted, while panel 2 counted only 22 incident of depiction. Table 2 shows the result of both panel experts' responses.

Table 2: Evaluation of panel of experts on two volumes of Manga according to the Food themes Respondent result

Themes	Respondent 1	Respondent 2
Sensory Evaluation	14	14



Safety and Quality	18	28
Processing	25	22

Both of the panel responses then undergo chi-square test and Cramer V for association test. Based on chi-square test, there are no significant difference between both respondents' analysis ($P = 0.3734$, $P > 0.05$). However, through Cramer V, the result displays weak association between the two respondents ($V = 0.1276$). The weak association between the two panels is apparent when the jotted pages of both panels were examined. Both panel have jotted different pages throughout the sampling session as shown in Table 3.

Table 3: Jotted pages on the Manga volumes listed different pages for their counts of incidence by both panels –

	Respondent 1	Respondent 2
Vol 2: Sake	17, 20, 21, 22, 23, 46, 67, 71, 90, 93, 117, 136, 139, 148, 149, 153, 155, 156, 158, 160, 176, 177, 182, 196, 198, 199, 204, 223, 224, 226, 229	12, 21, 46, 67, 70, 90, 93, 117, 136, 139, 140, 149, 150, 153, 154, 155, 156, 158, 160, 165, 177, 180, 181, 196, 198, 200, 219, 229, 224, 225
Vol 5: Fish, Sushi and sashimi	17, 90, 124, 136, 160, 177, 181, 183, 198, 204, 223, 224, 226, 247, 248, 249	14, 22, 29, 77, 120, 141, 146, 167, 174, 175, 178, 180, 182, 183, 184, 198, 205, 206, 240, 246, 250



4.0 Discussion

Both panels in this study are currently researching different branches of food science field. This may lead to different understandings or opinions regarding a food science subject matter. Both of them noted and agreed that there were factual depiction of food science field in the *manga*. However, there were weak associations between both panel analyses. The reason can be seen on the list of pages where both panels had jotted during analysis. Both panels listed different pages for their counts of incidence. The differences lead to several revelations regarding the study.

Graphic novel has storylines that depicts the flow of story and information. However, the comprehension of the reader is subjective and may lead to different understanding. In this case, both panels do share the view that the story contains factual information however differs in terms of when the information is depicted. For example at page 204 volume 5, panel 1 detected the page of information regarding food safety and quality. Respondent 2 does not agree, but detected page 206 containing information regarding food safety and quality. When inspected, both pages were describing about the same topic; presence of flukes in raw fish (Figures 1a and 1b). The differences of interpretation in the page can be due to different opinions in which page that delivers the message more directly.



Figure 1(a): Panel 1 incident of fluke worm (Kariya. *et al.*, 2009a)



Figure 1(b): Panel 2 incident of fluke worm (Kariya. *et al.*, 2009a)

The similarity between these two incidents is that it is a sequential story. However, instead of sequence of action, it is a sequence of the characters communicating with each other. Figure 1a shows a fish with a balloon dialogue commenting on dangers of eating fresh fish fillet. This is how panel 1 detect the food safety topic on the page. Meanwhile figure 1b shows a knife which does not dictate the coding scheme for food safety. Instead panel 2 detects the food safety topic upon reading the character dialogue that describes other passageways where parasites can invade a person body while preparing the fish dishes.

Similarly, on page 23 volume 2, panel 2 detected the page containing information on quality of *sake* (Figure 2). Specifically, the pages only involve conversations that reveal the misconduct of retailer in storing and shelving *Sake* products. However, panel 1 does not count the page as an incident that relates to any of the coding theme. It is possible that panel 1 may have misread the page, since there was no graphical stimulus or actions involved. Different understanding may become a factor since it may influence panel's awareness and bias toward certain information.



Figure 2: Quality of food depiction in page 23 Volume 2 (Kariya. *et al.*, 2009b)

Both panels do have similarities in detecting factual information, especially when there is graphical stimulus available. Both panels detected that page 90 and 196 of Volume 2 contained processing theme (Figure 3a and 3b). Page 90 describes the *sake* fermentation process while page 196 describes the function of activated charcoal in *sake* production.



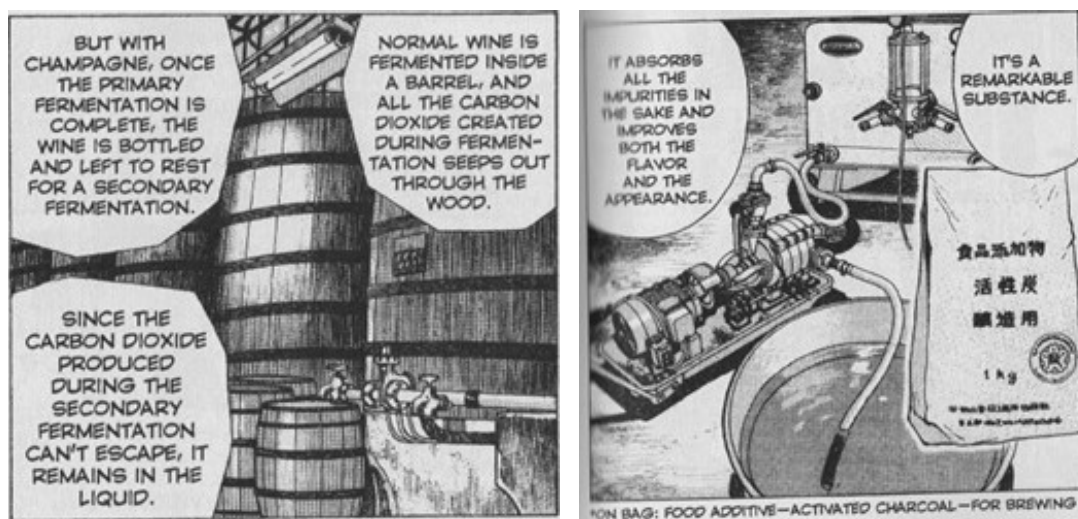


Figure 3(a) (Left) and 3b (right) depicting processing theme (Kariya. *et al.*, 2009b)

Note that both pictures contain only a single picture with several dialogues. Upon reading, the single manga panel show a single background picture with an aspect-to-aspect story sequence. The dialogue transitions from one aspect of food processing to another while the single picture maintains the focus of the story. Similarly aspect-to-aspect story sequential is also seen in the fluke worm incident (Figure 4) and both panels agrees that the manga panel contains food science information.



Figure 4: Observing flukes under microscope (Kariya. et al., 2009a)

Beside the aspect-to-aspect story sequence, both panels also agree on an information if it is depicting a sequence of action. This is shown when both panel agree that page 224 on volume 2 depicting information regarding sensory evaluation. Although it is just a single page depicting groups of people tasting *Sake* (Figure 5), both panels agree that the picture describe the procedure in conducting sensory evaluation on open space.





Figure 5: Sensory evaluation of Sake (Kariya. et al., 2009b)

From the result, the researcher can testify that the *manga's* intention to depict the factual information regarding food has succeed. Naturally, food facts should always be accompanied with food science information. However, the transfer of information from the manga panel is more effective when there is active sequence of action or aspect-to-aspect story sequence.

5.0 Conclusion

As a summary, reader's views and background knowledge can become a determining factor in acknowledging factual information in graphic novel. However, the use of effective story sequence can make the knowledge transfer smoother. In this study, both expert panels agree that food science information was detected more often in manga panel where there is active sequence of action or aspect-to-aspect story sequence.

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