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REPRESENTATION OF SCIENCE, TECHNOLOGY, AND MEMORY OF POSTWAR JAPAN IN JAPANESE ANIME

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ABSTRACT

This research discussed the debates over the development of science and technology in postwar Japan portrayed in Tetsujin 28 anime. Most of the notable anime produced in Japan during 1940s to 1980s were closely related with the memory of wartime, as well as the development of science-and-technology. Tetsujin 28, as one of the anime engaged with the memory of postwar Japan, however, had an interesting storyline representing the debates over development of new technology at the period. By using John Fiske's semiotics analysis, this qualitative research discussed the way Tetsujin 28 initially created by Mitsuteru Yokoyama (1934-2004) represented postwar Japan, as well as the interface between human and new technology developed during the period. The finding shows that postwar Japan represented in this anime is filled with a great sense of optimism in the middle of modernization. Japan is facing the prosperity era whose development is based on science and technology. Furthermore, the existence of Tetsujin 28 and other robotics technology can be seen as a representation of risk following the development of science and technology. On the other hand, the interface between the robot and human being depicted in this anime, in turn, will pave the way for new forms of life and hope for the prosperous nation.

Keywords: *science and technology, postwar Japan's risk, Tetsujin 28 anime*

INTRODUCTION

As one of popular culture in Japan, anime (Japanese animation) has drawn attention around the world. Anime, for instance, plays an increasingly important role in the global mediascape of electronic and print media that in turn, is shaping the collective imaginations, experiences, and feelings of people throughout the world (MacWilliams in Miyake, 2009). The history of the development of anime, however, is closely related with the history of manga (Japanese comic) in Japan. According to Sugimoto (2011), the manga is top-ranked for publication in Japan in the period of the 1940s. For more than two decades, manga accounts for approximately 40% of the total print publications, which is most of them are story manga with a specific plot and storyline. Many of that manga is later adapted as anime along with the development of animation technology in Japan at that time. The fact that Japanese society upholds the conformity in front of others (*tatemae*), and also the flow of modernization following the World War II (WW II). It is allowed the manga to be the best media for most Japanese mangaka (manga artists) to express their thoughts by creating story manga which is later widely adapted as an anime.

Anime in Japan has existed since 1917 in the form of two to five minutes of the short film, mostly about folktales at that time (Tsugata, 2013). Anime continues to grow under the influence of the socio-political context of the period. Various animes are produced, ranging from war propaganda themed anime like *Momotaro's Sea Eagle* (*Momotaro no Umiwashi*, 1943) that foster the spirit of war by taking the time setting when Japan is attacking Pearl Harbour on December 8, 1941, to various anime that engaged with the memory of the WW II, like *Godzilla* (*Gojira*, 1954), *Space Battleship Yamato* (*Uchu Senkan Yamato*, 1974), *Barefoot Gen* (*Hadashi no Gen*, 1983), and *Grave of the Fireflies* (*Hotaru no Haka*, 1988). Science-and-technology themed anime, such as *Astro Boy* (*Tetsuwan Atomu*, 1951) and *Gigantor* (*Tetsujin* 28, 1956), on the other hand, have also gained popularity among the public in Japan and even in the neighboring countries.

Astro Boy anime, for instance, becomes the first anime TV series aired in Japan in 1963-1966, and also serves as one of the most important anime in the research on the development of anime in Japan and the surrounding areas. Koh (2013) has described in detail the processes of adaptation of *Astro Boy* which is associated with socio-political conditions in South Korea, according to his own

experiences in dealing with the penetration of Japanese anime to his country at the time. Koh (2013) has argued that *Astro Boy* reminds the dark memory of the atomic bombing of Japan, but on the other hand, it can also be seen as a symbol of optimism about the rise of science and technology in postwar Korea.

Besides *Astro Boy*, there have been many other types of research dealing with anime as an object, particularly those that engaged with the memory of the WW II (Napier, 2005; Wicaksono, 2013; Yamada, 2009). Napier (2005) suggests that the *Space Battleship Yamato* anime goes beyond both remembering and forgetting by defamiliarizing the war experience, allowing not only working through of the trauma of defeat but ultimately a reworking of the defeat. Moreover, Wicaksono (2013) argues that *Grave of the Fireflies* anime could even be seen as a representation of Japanese people who are fighting or struggling against themselves by the fact that there is no single scene in the anime that are clearly showing the nation of Japanese enemy during the WW II. While Yamada (2009) sees another side of war-themed anime. He finds that the technique bridging wartime weapons and postwar images in Japanese anime can lead to the new situation in which war could be regarded as a source of stories needed in postwar Japan.

However, it is interesting to discuss the representation of postwar Japan in anime, which is closely related to the dynamics of the development of science and technology at the period. In addition, as one of the most crucial moment in the history of modern Japan, the defeat of Japan in WW II can be seen as an important lesson for the Japanese (Dower, 1990), as well as a starting point of the development of science, technology, and economy in postwar Japan from 1960 to 1970.

Then the question comes to the way postwar Japan is represented in anime, a medium that allows viewers to recall the events relating to the history, or even turns it into fantasy and a certain experience (Napier, 2005). By focus on one anime depiction, *Tetsujin 28*, originally created by Yokoyama Mitsuteru who comes from wartime generation as the research object, this research discusses the representation of postwar Japan during the devastation period of the 1950s in the anime. Furthermore, the way the *Tetsujin 28* anime represents the relation between human and technology will also be discussed.

METHODS

Like a drama or film, an anime also tells the background context of time and space that is actually represented in every scene in it. Theoretically, the representation is closely related to the production of the meaning of concepts that exist in one's mind (Hall, 1997). There are various approaches to see how these meanings can be conveyed; however, the constructionist approach is chosen for this research since the approach says that meaning is something constructed. Meaning does not only contain a sign, but it only could be interpreted by someone who has a series of concepts (Hall, 1997). Thus the representation can never be separated from the socio-cultural realities. Therefore, the research will use the concept of science-technology-society to see the representation of postwar Japan in *Tetsujin 28* anime.

This research is a qualitative research that is rooted in the interpretative approach, particularly using the semiotic analysis method to see signs in the research object. The semiotic method applied to this research is the John Fiske (2010) semiotics analysis, which analyzes the representation by categorizing signs into three levels; (1) the level of reality, (2) the level of representation, and (3) the level of ideology. At the level of reality, the analysis is applied on a system of signs in the anime *Tetsujin 28*, such as in the form of character's behavior, speech, gestures, expressions, sounds, and so on. At the level of representation, the analysis is focused on a system of signs depicted on the objects such as characters, narrative, dialogue, and so on. At the level of ideology, the system of the sign will be reorganized into the unity or coherence that is accepted as an ideological code.

RESULTS AND DISCUSSIONS

Tetsujin 28-go (鉄人28号 / Tetsujin Nijuuhachi-go /Ironman The 28th, then written *Tetsujin 28*) is an anime adapted from a famous manga written by Yokoyama Mitsuteru (1934-2004). The manga is first published as a story manga in Shonen magazine Japan, vol. 56 (7) until vol. 66 (5) 1956 (Yamada, 2009). Like most of the notable manga in Japan, *Tetsujin 28*, is later adapted into several anime series, such as those broadcasted in 1963-1966, 1980-1981, 1992-1993, 2004, and 2013-2015. This research, however, will specifically discuss *Tetsujin 28* anime 2004 version which is directed by Imagawa (2004) that is consisting of 26 episodes and airing on TV Tokyo on April 7th – September 29th, 2004. There are many scenes in this anime that will bring the viewers back to the time of modernization in Japan following the devastation period of the 1950s.

Tetsujin 28, which literally means Iron-man number 28 is a superpower robot that is invented by Kaneda as a secret weapon to support Japanese military win the WW II. In the anime, it is said that the Japanese military has secret laboratory facilities where research, development, and production of various military weapons are carried out on a mysterious island in the Southern Pacific. Kaneda as project leader receives an order under the ambitious project Tetsujin Keikaku (Tetsujin lan) to create superpower robots, including Tetsujin 28. Tetsujin 28 is a model robot made after robots previously experienced failure and refinement as much as 27 times. The number 28 is closely related with the name of US bomber aircraft, Boeing B-29 Superfortress that dropps the atomic bomb on Hiroshima and Nagasaki in August 1945. The Japanese people then consider the B-29 as a symbol of strength and power at that time (Yamada, 2009).

By taking the time setting of postwar Japan, the manga focuses on the adventures story of Shotaro Kaneda, a 10-year-old boy who is controlling Tetsujin, and various conflicts around him. In addition, various forms of development of science and technology occurred during the 1950s can also be seen in this anime. The focus of the *Tetsujin 28* is on Kaneda Shotaro, the son of Kaneda, and his postwar experience. This anime focuses on Shotaro's pursuit to control and fully understand Tetsujin capabilities while encountering previous creations and scientist from the Tetsujin Keikaku. Kaneda holds access to remote control, the only device that can control the Tetsujin 28 robot, which at the time after the war, lay dormant at a hidden location. There are no many differences with the original manga version or the other anime series. In the 2004 series, there are some key characters besides the figure of Tetsujin itself, namely; Kaneda, Shotaro Kaneda, Shikishima, Kenji Murasame, Furanken, and Dragnet.

As mentioned earlier, Tetsujin 28 (hereinafter written by Tetsujin) is a giant super robot originally created as a secret weapon to strengthen the Japanese military in WW II. In the anime's opening song, Tetsujin is depicted as a very powerful robot with a booming voice, and invulnerable to bullets and enemy attack, but there are times when Tetsujin is defeated by its enemy, such as the robot Gilbert. As a robot, Tetsujin in this anime has no soul and emotion, and can only be operated using a remote control box. The remote control is a very crucial device since not only can it be used to operate the robot but also to control the robot's behavior and "emotion". If the one holding the remote has a bad temper, then the robot will behave accordingly. If the human is a nice person, the robot will also show nice and kind gestures. In so doing, the robot's mission will depend on who is controlling the remote. It can turn into a very powerful destructive weapon, but it can also assist peaceful or humanitarian missions. The story about this Tetsujin begins after its resurrection from the missile in 1955 or 10 years following the war, the same period as when the manga is first published.

Kaneda (金田博士) is a great scientist, creator of Tetsujin in the period towards the end of WW II. Under the Tetsujin Keikaku project, Kaneda and his colleagues work in a secret lab in Southern Pacific to create and develop Tetsujin robots. The story of this project begins when Kaneda develops some robots as weaponry to support the Japanese military in the war. While Kaneda and his colleagues stay at a secret facility in the Southern Pacific, Kaneda's wife who at that time is pregnant is left on the countryside. During the war, the countryside is destroyed by a bombing, and Kaneda's wife is killed. Fortunately, the child, later known as Shotaro, is still alive, and later is adopted by Shikishima. On the other hand, Kaneda who basically strongly disagrees with the idea of war creates Tetsujin robots with the hope that in the future, the robot can be useful for the human. He treats Tetsujin like he treats his own son, therefore, he names the missile "Shotaro", the same name as his son.

Shotaro Kaneda (金田正太郎), the main character of this anime, is a 10-year-old boy, son of Kaneda. Much like his father, Shotaro who is famous as a young detective in Tokyo is well educated and very intelligent. As a young boy, however, Shotaro's emotion is often still unstable, including when he is controlling Tetsujin. Basically, Shotaro loves peace and hates war. Having perceived the story behind the production of Tetsujin robot by his father, Shotaro starts to develop the strong emotional bond with the robot. This anime shows inner-conflicts experienced by Shotaro because of the development of new technologies, as well as the reasons behind the creation of the robots.

Shikishima (敷島博士) who served as an assistant to Kaneda is also involved in Tetsujin Keikaku. He is the man who raised and took care of the baby Shotaro following the death of Kaneda and his wife during the WW II. He tells Shotaro the dark history behind Tetsujin robot project. As the war ends, he initiates the development of *Shikishima Juukou* (Shikishima Heavy Industry) as the production site of iron and metal for shipbuilding and construction, including the robot, which is said to play an important role in Japan's economic boom at the time. Shikishima is also one of the scientists who contribute to the application of robot technology in the postwar period. In this anime, he supports the development of robot technology, as long as it is for the sake of humankind. He also continues to reassure Shotaro that what he has done with Kaneda in developing robotics technology in the past is not a bad thing. He believes that in the future, robots will eventually be useful for the humankind.

Kenji Murasame (村雨健次) is the one who strongly disagrees with the use of robotics technology as a weapon. As a former Japanese military personnel who is also involved in WW II, he has a dark memory on the war. In Murasame's view, Tetsujin brings back the memories of wartime gloom, especially when the robots are under the control of bad guys.

Furanken Shutain (不乱拳酒多飲博士) is a prominent Japanese biologist during the war. He creates a *jinzouningen* (人造人間) or artificial man that resurrects human corps by injecting special cells. During the research, he is using the bodies of soldiers who have died on the battlefield as a media, including his own son's body. Besides creating *jinzouningen*, he also creates a super robot named Black Ox. It is said that Furanken creates them as a rival for the Tetsujin that is created by his colleague, Kaneda.

Dragnet (ドラグネット博士), a cyborg-scientist who is also a colleague of Kaneda and Furanken comes from Japan's allies during WW II. In contrast to both of his colleagues, Dragnet creates a Super Human Kelly or Kerri Chouningen (ケッリ超人間). Kelly is the first super-human created by Dragnet in collaboration with Makimura (牧村博士). Kelly is an American whose body is used as a media experiment. In this anime, the *chouningen* term is used to refer to the human whose entire body organs, except the brain, is replaced by the machine to make it has super strength. Unlike the robot, the superhuman still has emotions as a human being, while at the same time he has very strong superpowers as the robot does. After creating a Super Human Kelly, Dragnet creates Gilbert, the robot that will be used for space exploration in the future.

Among these characters, most of them are great scientists who work with Kaneda to develop military weapons by utilizing their expertise under the project of Tetsujin Keikaku. At first, they work together, but for a moment as they have different views on the use of science and technology in the war. Kaneda refuses to develop a robot as a weapon because of its potential to cause fatalities. However, since Kaneda has no choice, in the end, he creates the Tetsujin robot, and therefore he lives in regret for creating a robot for the weapon. Franken and Dragnet, whose ambition to rival the success of Kaneda, then create their own creature. Furanken as a biological scientist creates *jinzouningen*, while Dragnet creates *chouningen*.

By looking at the general storyline and the characters involved in it, the theme of *Tetsujin 28* anime is closely related to science and technology as well as the dynamics of its use and development in Japan since from the wartime, devastation, to peace period of postwar Japan. In particular, it can be discussed that *Tetsujin 28* anime represents these two major topics; (1) the postwar Japan, and (2) the dynamics of relations between human being and technology following the modernization that takes place in postwar Japan.

Like dramas, films, or other literary works, *Tetsujin 28* has also its context of space and time, and it is highly related to the background of the author. Yokoyama Mitsuteru, the author of the original manga *Tetsujin 28*, comes from the wartime generation who lives in the shadow of wartime crisis, and experiences himself the Kobe City bombing as five years old boy. However, in both of the manga and anime version, especially anime series of 2004 taken in this paper, *Tetsujin 28* tells a lot about the condition of postwar Japan.

The anime is opened with visual images of Tetsujin 28 under Shotaro's control fighting his enemy. Time of the

post-WW II period could be felt by the strains of the musical arrangement of wartime mars which is very tempestuous. Moreover, the capital of Japan, Tokyo, is also depicted made up with European-style buildings and construction, as well as the suburbs that are designed for the industrial area. The story begins with a narration describing the situation of Japan in 1955 or 10 years after its defeat in WW II.

Postwar Japan in this anime is described as a period of modernization toward prosperity era. Japanese people, at that time, are filled with optimism and hope as the economy continued to grow following the end of the Allied occupation in Japan in 1952. In many episodes, Tokyo is depicted to have economic development and modernization in various fields. Tokyo residents are no longer wearing traditional clothes, but *youfuku* or Western-style clothes. Tokyo tower is under construction. The central energy plant also begins to build in many locations across the country. Some new technological developments, such as television and the invention of instant noodles can also be seen in the anime. Robotics technology starts to be developed. While out there, the world is still tense. At that time, the two superpowers of the world are competing for each other to flaunt their technological advances, one of which is the successful launch of a space satellite by the Soviet, followed by the States.

Back in the time when Japan is in the shadows of war, the military resources, especially soldiers and weaponry become important variables for war. Overshadowed by the urge to win WW II, the Japanese military starts a large-scale and ambitious project called Tetsujin Keikaku to create super giant robots that are used as the weapon to win the war. Even though ten years have passed since WW II, however, still there are several projects related to the war that continued to develop in spite of the peaceful condition following the war. One of them is an industrial robot project initiated by Shikishima through Shikishima Juukou.

Ten years following the world war, Shikishima Juukou does not only pay attention to the iron and metal industries for shipbuilding and constructions but also on developing robotics technology (the anime call it as *Kikai De Tsukurareta Ningen*). Development of robotic technology by Shikishima is inseparable from his experience earned from the engagement with Kaneda in developing secret weapons project in wartime era. Another technological development follows the development of iron and metal industries, or in the context of this anime, is the development of robotics technology. At that time, the rapidly growing post-war economy is believed to be followed by the development of robotic technology.

The storyline shows that postwar Japan in this anime is struggling to escape from their defeat sense in the WW II, represented by development in various fields. Interestingly, this development takes place along with the development of robot technology. The Japanese people in this anime are trying to divert the war technology into more humanistic technology. Robots used in the war which are destructive can be changed into something that more humane and beneficial. The anime shows that the revival of postwar Japan can be achieved along with the development and utilization of science and technology in peaceful ways. As Koh (2013) has argued that modernization in South Korea is also related to the depiction of *Astro Boy* anime in the country at that time. In the context of the postwar Korea in 1970's to 1980's, the anime is viewed as a symbol of people's hope of ideal and modern Korea, following the footsteps of Japan that have already successfully carried out modernization.

Postwar Japan represented in this anime is filled with a great sense of optimism in the middle of modernization. Japan is facing the prosperity era whose development is based on science and technology. The use of technology in the country, including the robot which in turn is expected followed by the economic growth that can also be seen as a representation of Japanese people's hope and optimism for the prosperous nation. However, still, there are some issues found in this anime associated with the risk and the dynamics in the relationship between human and technology.

The postwar Japan in this anime is represented with the great sense of optimism. The rapid economic growth also occurs along with the development of the country which is based on the use of technology. The development and use of these technologies, on the other hand, have also followed by the emergence of conflicts in the anime. Shotaro and other characters experience various conflicts that are brought by the emergence of new technologies, including the presence of Tetsujin itself.

Conflict as implications of the existence of robotic technology in postwar Japan in this anime represents a condition that Fischer (1999) refers to like the hype. It is a historical condition in modernity involves the human-technology interface, that in turn, form the working space of social and cultural imagination through technology. In this anime, it is narrated that the resurrection of Tetsujin becomes the starting point of the emergence of other robots, such as the Black Ox, Gilbert, and others, which not all of them are created or controlled for a good purpose. As a robot, they are designed not to have emotion, feeling, and power to control it themselves. They are subject to the man who creates or controls them. For the case of Tetsujin, it can even only be moved by using a remote control box, so that when the news about the Tetsujin spreads around the world, many perpetrators want to control the robot. A gangster from the States, Thrill Suspense, is trying to steal the remote control, and after they succeed in controlling Tetsujin, they use it to commit crimes, looted, robbery, and so on.

Furthermore, Fischer (1999) argues that modernism paves the way for developing "new forms of life" through the mediation of science and technology. Modernism, on the other hand, also increases the opportunities of developing such new risks that are brought by science and technology (Beck, 1994). As technological hype, the existence of Tetsujin and robots offers the hope of a new form of life as it can be seen in the relationship between human and robots in the social world. Thus, the understanding for Japanese people who at the period are living in the shadows of war to position themselves as part of the human-technology interface, which is in the context of this anime is a robot technology, becomes increasingly important.

The presence of robot technology, on the other hand, increases the possibility of new risks, particularly when these technologies are faced with an emergency condition or rapid and unexpected social changes. In the context of this anime, the condition when robots are not controllable, or when they are in the hands of perpetrators that can be seen as emergency situations that in turn, give a context to the interface between human being and technology. In such emergency situations, the robots also indirectly bring back the dark memory of wartime to Japanese people.

In other scenes, it is narrated that modernization happened in Japan requires the sufficient supply of energy. When the Japanese government is struggling to deal with the energy issue, a bunch of bad guys named PX Syndicate

(PX 団; PX-dan) comes to destroy the country's main energy plant. As the country runs out of energy supply, the government has no choice but to stop the construction project across the country. The government then immediately initiates the development of a new energy facility called Kurobe Dam which is located on a mountaintop with a very extreme environment. Therefore, the government holds a Robot Expo, the contest for scientists to create robots that can be used in the project. Robots, in people's view, can perform any task in accordance with the orders of its creator, even in an extreme environment like Kurobe Dam.

From that storyline, there are two issues; the view of anthropocentrism and the emerging new forms of life. The view of anthropocentrism puts any form of technology as a value-free tool and therefore is fully subject to the will of the human as the creator. The fact that most of the robots in the anime has no soul and emotion and can only be operated using a remote control box by the human. It can be seen as a representation of anthropocentrism in the anime. The interface between human and robots, on the same hand, will pave the way to emerge new forms of life that are represented by the involvement and utilization of the robots in the social world, or in this case is for the construction of Kurobe Dam.

In addition to such issues regarding modernization, the key characters involve in the debates over the use of technology in the postwar period are also interesting to see. In this anime, scientists and researchers who are expert in the field of science and technology are described to have a significant role, both in wartime and postwar period. During the war, they are involved in research and manufacture of military weapons, whose effects actually emerged in the aftermath of the war, ten years later. This anime shows that scientists are not always in the lab, struggling with their research, but they are also involved in government and military projects. The results of their research are used, even as a tool to support government activities. As expressed by MacKenzie (1996), progress in science and technology is not a natural development, but the development is happening because of the political selection process, consideration of value, and even interest groups or individuals against one type of technology. This robot technology development cannot be separated from the scientists who are involved in it since the beginning.

There are three forms of new technology in this anime, which is created by great scientists during the war. The new technology, in turn, represents the debates over the interface between human and technology. They are (1) *Tetsujin* (machinery robot), (2) *Jinzouningen* (artificial humans), and (3) *Chouningen* (super-human robot). A striking difference of each form is in the persistence of the human element (*ningen*: human being) on *jinzouningen* and *chouningen*, which also indicates a new relationship between the human body and science.

In *jinzouningen*, the corpse of the human body is defined as an entity that can be recycled and reused into something useful, or specifically, it will be used as the Japanese troops to support the military win the war. Thanks to science, the body which is no longer functional can be engineered and revived once again. As for the case of *chouningen*, the human body is defined as an entity that can be combined with the machine. In here, it can be seen that there is a shift in meaning in the interface between human and machine. The human body and robotics machine, which naturally are two different things, have turned into the new entity that can be combined. These two cases demonstrate the relationship between science and the body that in turn offers a new meaning to life and death. Life basically can be created from a corpse of the dead. The human body, on the other hand, can also be engineered by incorporating some elements of robotics machine into the human body that are still alive.

CONCLUSIONS

As one of the popular anime engaged with the memory of postwar Japan, *Tetsujin 28* anime has an interesting storyline representing the debates over the development of new technology in Japan in the period of 1950s. Postwar Japan in this anime is filled with a great sense of optimism in the middle of modernization. Japan is facing the prosperity era whose development is based on science and technology. In the context of the modernization of postwar Japan, the existence of *Tetsujin 28* and other robotics technology could be seen as a representation of risk following the development of science and technology. On the other hand, the interface between the robot and human being depicted in this anime, in turn, will pave the way for new forms of life, and in which eventually gave birth to a new meaning of life and death.

In regards of anime as one of Japanese popular culture, *Tetsujin 28* can be seen as a product that represents the spirit of the Japanese people to get out of the dark memory of their defeat in the WW II. Through anime, a media that has been recognized globally, they want to show the spirit by changing the dark memory represented by the robot as a weapon of war, into the hopes of for prosperous nation through the use of robots and science and technology to assist peaceful or humanitarian missions.

REFERENCES

Beck, U. (1994). Risk society: Towards a new modernity. *Social Forces, 73*(1), 328-329. https://doi.org/10.2307/2579937.

Dower, J. W. (1990). *The useful war. Daedalus, 119*(3), 49-70. Retrieved from http://www.jstor.org/stable/20025316.

Fischer, M. M. J. (1999). Emergent forms of life: Antrophologies of late of postmodernities. *Annual Review Antrophology, 28*, 455-478.

Fiske, J. (2010). *Introduction to communication studies: Studies in culture and communication* (3rd Ed.). London: Routledge.

Hall, S. (1997). *Representation: Cultural representations and signifying practices (culture, media, and identities series)*. California: SAGE Publications.

Imagawa, Y. (2004). *Tetsujin 28-go*. Japan: Hikari Production.

Koh, D. Y. (2013). Growing up with Astro Boy and Mazinger Z: Industrialization "Hi-Tech World", and Japanese animation in the art and culture in South Korea. In M. Yokota (Ed.), *Japanese Animation*: East Asian Perspectives (pp. 155–175). Mississippi: University Press of Mississippi.

MacKenzie, D. A. (1996). *Knowing machines: Essays on technical change (inside technology)*. Cambridge: The MIT Press.

Miyake, L. K. (2009). Japanese visual culture: Explorations in the world of manga and anime (review). *Project Muse, 64*(2), 445-449.

Napier, S. (2005). World war II as trauma, memory, and fantasy in Japanese animation. *The Asia-Pacific Journal : Japan Focus, 3*(5), 1-7. Retrieved from http://japanfocus.org/-Susan_J_-Napier/1972/article.html.

Sugimoto, Y. (2011). *Introduction to Japanese society* (3rd Ed.). London: University of Oxford Press.

Tsugata, N. (2013). A bipolar approach to understanding the history of Japanese animation. In M. Yokota (Ed.), *Japanese Animation: East Asian Perspectives* (pp. 25–30). Mississippi: University Press of Mississippi.

Wicaksono, A. G. (2013). Penggambaran perang dalam anime "Grave of the Fireflies". *Commonline, 1*(2), 1–10.

Yamada, N. (2009). Shōnen to kihaku-ka suru karada-sei: Yokoyama mitsuteru "Tetsujin 28-gō" ni okeru "Heiki Riarizumu" no Dōnyū. (A boy and the dilution of embodiment: Introduction of weapon realism in "Tetsujin 28th"). *Nihon Manga Gakkai, 15*(4), 54–70.