

Bridging Two Cultures

Scientists and Everyone Else

As Observed by LB 133 Sec 3 SS15

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Edited by Megan Wudkewych, Santana McIntyre, Emma Freeland with
Logan Williams

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**This or That: A Look into Genetic Engineering from a
Relativist Standpoint**

Section Editor: Santana McIntyre with Logan Williams

Throughout the first portion of this booklet, genetic engineering will be discussed from a relativist standpoint. According to the article “What is Genetic Engineering?” by the Union of Concerned Scientists, genetic engineering is a set of technologies and the manipulation of biological processes in order to alter a set of cells to a desired effect. Relativism can best be described as when one believes that there is no truth that can ever fully be known due to so many varying viewpoints in society (Zenzen and Restivo, 1982). Relativism is an STS concept that relates back to the course because it pertains to how certain biases held by individuals can either hurt or help the progression of science and technology. Furthermore, it ties into how the students of LB 133 attempted to debunk these biases in order to analyze a specific concept as objectively as possible. STS concepts that are different from relativism include realism and the social construction of technology. Realism can be exemplified through animal testing because it describes how realists believe that the truth can be discovered in nature. End of life decisions describe the social construction of science in the sense that it is because of the desires of certain user groups that life ending technologies have emerged. Although this concept seems similar to social determinism, it is slightly different because the social construction of technology targets just specific user groups while social determinism refers to society as a whole affecting technology.

Relativism is composed of various sub concepts. One of these sub concepts is known as social determinism which states that society affects the growth and development of technology (Zenzen and Restivo, 1982). This concept helps to describe genetic engineering because it exemplifies how this sphere of both science and technology is what it is today due to the various evaluations that it has received from society. Another key concept that helps to describe relativism is known as the Rashomon Effect. This concept can be described as the truth to a situation never being able to be fully uncovered because for a single situation there will be multiple interpretations of what the truth is (Zenzen and Restivo, 1982). In relation to genetic engineering, the Rashomon Effect describes the many competing views that there are of this controversial area of science. One last subtopic that relates to relativism is known as the semiotic approach, which means that a technology can be adjusted to fit the expectations of different user groups (Oudshoorn, 2004). Genetic engineering is a very diverse sphere of both science and technology and it is capable of being manipulated to

fit the wants, needs, and desires of various user groups such as farmers, researchers, and even the general public. In summary, the plethora of user groups throughout all of civilization can influence the progression and development of a technology due to the varying viewpoints that each holds in terms of its usefulness or irrelevance to their society. Throughout the remainder of this section, the broader concept of genetic engineering will be analyzed through these subtopics by discussing the Rashomon Effect and genetically modified organisms (GMOs), social determinism and Dolly the sheep, and the semiotic approach and glofish.

The Unknown Possibilities of Genetic Engineering through Social Determinism

By Rohan Garg

Controversy is one of the biggest driving blocks in change and progress. Genetics is a field that has been met with huge amounts of controversy, but has yielded breakthroughs that may never have been seen. Genetics can be split up into different sub groups, Genetic Engineering is a sub group that has seen the most controversy, because of cloning. Dolly the Sheep is an example of genetic engineering and cloning. Dolly can be related to society, using social determinism. Social determinism is how science and society impact each other. It can be related to relativism.

Dolly was born on July 5th, 1996, she was the first mammal to be cloned using an adult somatic cell (Kolata), otherwise known as a stem cell. She was a cross between a Scottish Blackface Ewe and a Finn Dorset white sheep (Kolata). She was domesticated and took residence at the Roslin Institute, located in Scotland. Dolly the sheep was met with both applause and disdain. The applause came, it is possible to clone from adult cells and that cloning in general can be achieved. The disdain came from, the population seeing scientists playing the role of god and tampering with things that should not be tampered with. No matter one's position on this issue, it is the goal of this essay to show how through social determinism, genetic cloning is good. This cloning can be seen as good or bad by Rashomon Effect, which is how there are different perspectives and it is up to the person to determine what is right and wrong. This can be seen with Genetically Modified Organisms and food. Certain foods, such as vegetables and fruits or modified to be bigger and last longer. People do not know what is used to be in it, it could be fish cells or something else. This can be seen as bad and inhuman.

As the decades go by, the needs of the people change. It is because of this aspect of life that technology adapts to what society wants. The essence of Dolly the Sheep is one facet of technology adapting to both the current future needs of consumers. As a society, we want bigger and better things; we want to advance society in any way shape or form. Cloning can lead to medical breakthroughs, such as re-growth of body parts. With Dolly the Sheep being the first mammal to be cloned using an adult cell, we are just that much closer to these medical breakthroughs waiting to be discovered (Hellsten). Despite the

possible benefits of cloning technologies, scientists should be aware of the potential negative consequences that could come along with using such a method. As a residual factor of her cloning, Dolly died from accelerated lung cancer and advanced aging (Peterson). Hence, although there are many potential benefits of cloning technologies, there may be certain side effects of using such a technology that may result in negative consequences.

Social determinism is the driving force behind cloning. It has prompted an increase in scientific knowledge and has led to for the most part a better life for all. Cloning is in its premature stages, feeling things out, but sooner or later social determinism will make it evolve for better or worse, but it will change how we perceive science, technology and society.

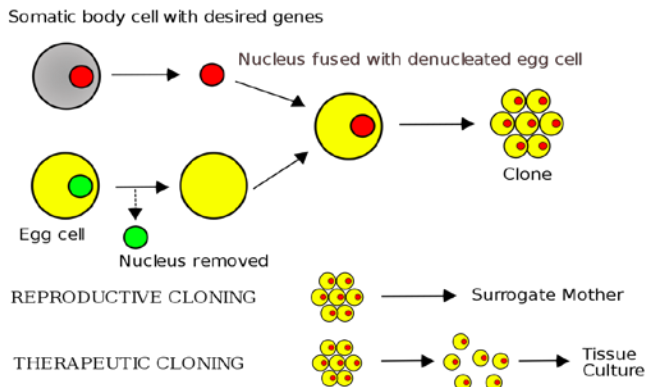


Figure 1: This picture shows the process used for cloning and what happens to the cell (*Wikipedia*. Wikimedia Foundation. Web. 01 Apr. 2015.).

Dolly showed people the scary possibility of being able to create life from nothing. This possibility leads to many groups fearing that scientists are playing God. One cannot hold back the wonders that it can provide. It can help cure diseases, make medical breakthroughs, and also change the lives of humans. Social determinism drives the progress of science, the wants and the needs of society help shape technology to adapt to the needs of the people. Dolly was just the beginning of a movement that will either better human lives or destroy it.

GMOs in Our Tomatoes: The Rashomon Effect

By Jillian Salloum

It is common knowledge to everyone that a lot of crops in the modern world contain GMOs, or genetically modified organisms, although not many people necessarily know what a GMO is or how it affects them. GMOs are organisms that have had a foreign gene inserted from another species in order to display a new trait or characteristic. Most of the time the acronym, GMO, is used to refer to food. It is a very controversial topic among society because many people fear it has more cons than pros. A reason for some controversy is that when viewing and discussing the same thing, people tend to interpret it differently due to their varying perceptions. This idea is known as the Rashomon Effect (Zenzen & Restivo, 1982).

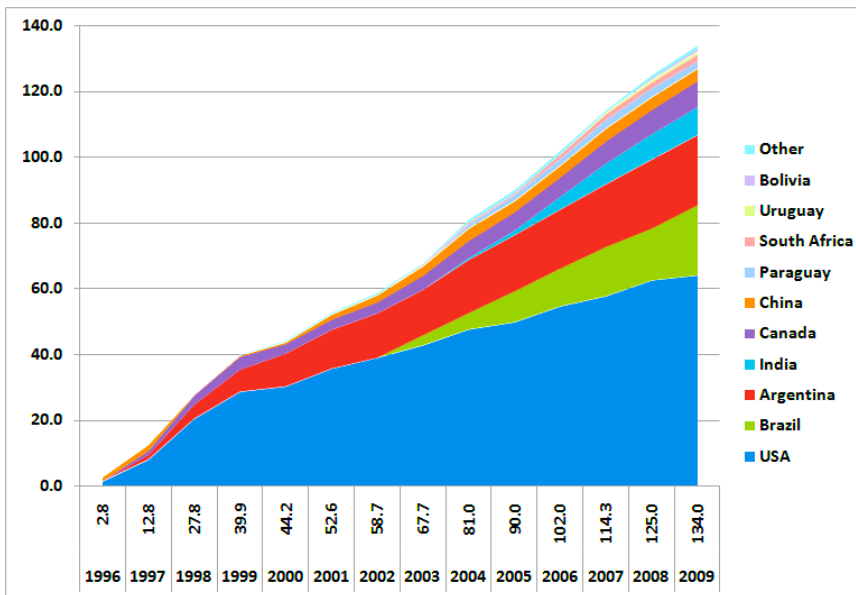


Figure 2: Time vs. Land Area Utilized in Genetically Modified Crops (The graph shows in units of hectares, how much land each country has devoted to genetically modified crops (Genetically Modified Crops).

GMOs are more common in first world countries because of their access to technology that makes it possible. This is visually portrayed through Figure 1. The reason that GMOs are so prevalent is because it tends to financially benefit producers. For example, in inserting a gene

from a bacterium into a tomato you can give the tomato properties to produce its own pesticide to avoid being eaten by insects, but still be safe for humans to eat. Genetically modified tomatoes were used in a tomato puree, and after much scientific testing and analyses it was determined to be completely safe by experts. Once it was proposed for approval, no agreement could be reached. Those in charge of deciding this were far less knowledgeable on the actual science of GMOs which aids in explaining why they rejected it as opposed to the researchers who deemed it appropriate for sale and consumption (Genetically Modified Tomatoes, 2015).

Many people fear how the crops will affect their health through consumption of these organisms developed through laboratory research. It is more common that a scientist or anyone with a strong background in genetic engineering will be in favor of GMOs. The reason for this is because they can completely understand the processes which change the crops, and because they generally know what is going on it seems less foreign and unnatural. They tend to base their acceptance of genetically modifying food on directly knowing exactly how (and more importantly *why*) the plant is being changed (*GMO Compass: Tomatoes*, 2006). The average person who does not know what inserting a gene from one species into another entails may be intimidated by such a foreign concept. Often time people marginalized in society fall under this category because they do not have the same educational opportunities. A lack of understanding instigates a sense of fear and discomfort in consuming this food. These different perceptions directly influence how different people interpret the exact same thing, GMOs, which perfectly exemplifies the Rashomon Effect.

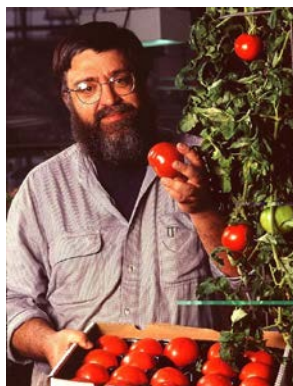


Figure 3: Plant physiologist, Athanasios Theologis, with tomatoes that have been bioengineered.

The Semiotic Approach

By Kara Ernst

One of the newest phenomena among the aquatic species in pet stores today is that of “GloFish”, or fish that appear to glow fluorescent colors under ultraviolet light. These fish have been in high demand throughout the world; however, the original intent of their use was not commercial. For this reason, the STS concept called the semiotic approach may be applied. The semiotic approach is the ideology that a technology may be adjusted to fit the expectations of different user groups (Oudshoorn, 2004). The creation of the GloFish is a form of genetic engineering and involves a process similar to the one used in genetically engineered foods: a gene is inserted that codes for proteins that produce the desired trait. This topic may also be connected to the Rashomon effect as well as the umbrella STS concept of relativism, since different groups of people have different views on how the fish is used as well as whether the process of genetically modifying the fish is safe.

GloFish were originally engineered by scientists in Singapore in 2003 to determine whether toxins were present in the water in coal mines; they were not sold commercially. To create the “glowing” effect, a gene that produced fluorescent proteins was inserted into a zebra danio fish. These proteins would glow in the presence of toxins (Gong, 2003). Once the marketing potential of the danios was realized, however, GloFish began to appear in pet stores around the world. This widespread popularity was attributed to “the prevalence of non-genetically modified (non-GM) danios in aquarium stores, and the simplicity and prevalence of the transgene in genetic research” (Peddie, 2008). In other words, they were a well-known breed of fish, and they were easy to engineer.

This new technology was received with some skepticism. Critics argued that the production of the fish should be regulated to ensure human and environment safety. Some research found that GloFish that were released into the wild may harm wild fish species (Curry, 2012). Eventually, it was determined that the fish were generally well-contained, and even if any should be released into the wild, they would not survive long; therefore, negative environmental effects would be low (Gong, 2003). The Food and Drug Administration also decided that the creation of the GloFish was not dangerous to humans and did not need

regulation. However, public-interest groups believed that more research should be conducted before that conclusion was drawn (Witte, 2014). This is an example of knowledge from the margins; people who are marginalized in society have little or no power and may therefore be overlooked. In this situation the elite were the scientists and producers, and the marginalized people were the buyers of the GloFish. Producers may overlook the safety of the general public to gain profits, but in this case, lay experts, such as the public-interest groups, consider the welfare of the marginalized people. This is important to note because, often, the marginalized people are disregarded, and in this situation, lay experts ensured that they were not.

The creation of the GloFish technology originally served one function and appealed to a specific group of people, but this purpose was changed by producers in order to appeal to a different group of people. The original intended user group was scientists who wished to monitor water quality; essentially, the purpose of genetically engineering the fish was a practical one. Once commercial potential was realized, the image of the fish was changed and became more aesthetically pleasing to consumers. Zhiyuan Gong's (2003) experiment explored ways to color the danios to appeal to more people. These colors included red, orange, yellow, and green, and each color glowed vividly under ultraviolet light (Gong, 2003). Also, since zebra danios are a relatively hardy breed of fish, amateur owners would have the capability of managing the fish as well as more experienced owners. By evolving different color options for the fish, as well as choosing a breed of fish that would be easy to maintain for all consumers, the creators of the GloFish designed a product that would target average people instead of scientists. This change in technology to make the product appeal to a specific group of people is an example of the STS concept called the semiotic approach. The scientists who invented the GloFish technology may not have been gaining as much profit as they would have liked when providing the fish for water testing, so they modified their technology to fit a different group of users. In this situation, the intended user group of the modified item did enjoy the product; therefore, the employment of the semiotic approach was successful.

The topic of genetic engineering is always a complex one. Even for the seemingly simple example of GloFish, one must consider the ethical concerns of the process. Marginalized people and the environment as a whole may be more negatively affected than the

scientists and producers would like to admit. Also, the original purpose for creating the GloFish in the first place was altered to fit a different user group. For this reason, the semiotic approach is an applicable concept to the situation. The next topic to be discussed is animal testing and is similar in its complexity, as it is also multifaceted.

- The purpose of the GloFish was originally a practical one: to determine whether toxins were present in bodies of water. Eventually, the producers began to modify their inventions to appeal to people who may want the fish as pets. Since an item was being changed to fit the expectations of a different user group, the STS concept called the semiotic approach may be applied.

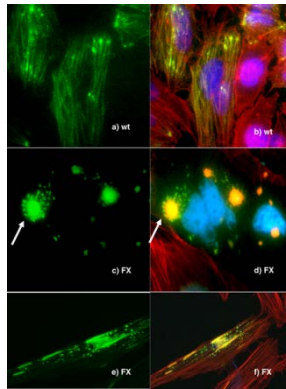


Figure 4: The Appearance of GloFish Versus the Appearance of Unmodified Danios. This figure shows the effect of genetic engineering on the appearance of the zebra danio fish. The vibrant, red fish have been engineered, while the brown ones have not (Głąb).



Figure 5: The Effect of Fluorescent Protein on Human Cells. This figure shows the effect of adding a gene that codes for the production of fluorescent proteins in human cells. A similar effect is produced in the bodies of the GloFish (Slater).

Summary of This or That: A Look into Genetic Engineering from a Relativist Standpoint

By: Santana McIntyre

Overall, it is imperative to understand how relativism relates back to certain biases held by individuals and how they can either hurt or help the progression of science and technology.

- Social determinism is what has allowed technology and science to advance to the heights that it has today. Without such a concept, genetic engineering may not be what it is today and projects, such as the Dolly experiment, may not even be possible.

- The Rashomon Effect describes how one truth can never truly be known because there are too many competing viewpoints. In relation to GMOs, it can never be determined whether this is a “good” or a “bad” thing because some people see this as a beneficial byproduct of genetic engineering while others see it as a downfall.

- With the semiotic approach, a technology can be modified in order to meet the varying wants, needs, and desires of a specific user group. This is a relativist sub concept because it demonstrates how genetic engineering caters to multiple assemblages, such as those who desire to have GloFish as pets.

Relativism is a very powerful theory that challenges realism and the concept of animal testing head on. Realists see nature as the singular and all powerful source of truth in this world, whereas relativists do not believe that there is a single truth to be discovered or that there is a single source that this truth derives from. Despite its similarities to the social construction of technology in relation to end of life decisions, relativism is still different in the sense that it takes into account how society as a whole affects technology, not just a specific user group.

Science and Technology Studies
Applied to Animal Testing

Section Editor: Emma Freeland with Logan Williams

The Umbrella Topic that this capstone group has decided on is Animal Testing and Experimentation, and the social controversy that comes with it. Using Realism, the belief that there is one truth and that the goal of science and experimentation is to reveal that one truth, this portion of the booklet seeks to inform people about animal testing and how it occurs in today's society all around the world. There are many instances of animal testing in the 21st Century, in America and other places. The specific topics that this portion of the booklet focuses on three instances. First, the social implications of cosmetic testing and the people who advocate against it, and then the people who take extreme actions against the animal testing, and finally the use of Bovine Growth Hormone in animals and the social impacts of the agricultural communities.

The Science and Technology Studies concepts that can be related to these examples are the Ethos of Science, which is one of the Mertonian Norms, Bad Data and the use of Analytic Animals in a laboratory setting, and Economies of Scale . Ethos of science will be related to the Animal Activist Rights group known as PETA, or People for the Ethical Treatment of Animals, and the actions they take in order to protect the rights of animals. The concept of Co-Construction is related to the use of Human Growth Hormone in animals whose sole purpose is to create things for human consumption including, but not limited to, clothing, food and souvenirs. Bad Data and Analytic Animals are related to the cosmetic testing on animals and the company called LUSH and their position on animal testing.

Bad Data for use of Animal Testing for Cosmetics

By Elyse Goran

Many companies around the world are taking the necessary steps to avoid animal testing for their products (Herald 2014). LUSH cosmetics is one of the companies that is strongly advocating the elimination of animal testing. The use of animals for testing cosmetics is an example of the STS concept “bad data” (Lynch 1988) because the data from animal testing does not accurately apply to humans. For example, if a certain chemical does not irritate the skin of a rat that does not necessarily mean it will not irritate human skin. This empirical example falls under the STS umbrella concept of realism in animal testing. Since realism is the belief that there is one truth to be discovered from nature, I argue, following extensive scientific research on the validity of data from animal testing, that the only truth is that companies tests excel when animal testing is removed from their production.

In the previous reading we saw that the use of Bovine Growth Hormone on dairy cattle has caused controversy in corporations that use dairy products for their own products. The Bovine Growth Hormone allows for faster production in bovine, which will increase the rate of production in dairy companies. Similar to animal cosmetic testing being unnecessary, the use of bGH is unnecessary and many companies have been successful using products that have not been affected by the hormone. However, large corporations are putting local, small farms out of business due to this hormone. Both LUSH cosmetics and other dairy companies are part of economies of scale. This means that both companies produce on a large scale in order to decrease the prices of their individual products. Many corporations use the Bovine Growth Hormone in order to increase the rate of production, which decreases their prices to increase their profits. With the large corporations using the bGH, it is predicted that 30% of dairy farms that produce on a smaller scale, such as family farms, are likely to go out of business. The use of the bGH has the potential to devastate the local economies of the small farming businesses who choose/can only afford to produce organically. Hopefully consumers will become aware of the hormone and choose to purchase dairy products that support the growth of humane farming and local economies.

In the Unites States during 1933, a 53-year old woman encouraged her daughter to try a revolutionary eyebrow and eyelash dye

called Lash Cure (Horne 2013). Very soon after the application, the girl's eyes became swollen shut, then she soon obtained a fever, and within a week she died from a systemic staph infection. Many similar horror stories occurred right after World War I, so the government urged companies to prove the safety of their products before they were developed. Hence, the cosmetic testing began on mice, rats, and guinea pigs. However, as time went on, many animal rights activists around the world such as PETA created awareness for consumers and encouraged animal rights acts to be passed through the government. Today, it is simple to test cosmetics using the advanced technology in computer graphics and computations, as well as growing human tissue to test on.

Mark Constantine is the chief executive of the LUSH homemade cosmetic company and he actively speaks out against the use of animals for the testing of cosmetics. His main goal is to encourage Australia to take steps to end animal testing cruelty. LUSH currently has over 900 stores worldwide and the stores all develop their products free from animal testing (Herald 89). In addition, there are hundreds of other companies that have joined the cruelty-free group of the cosmetic industry. Constantine shares personal experiences that he has with customers who are appalled to hear that some companies still continue to harm and kill animals to test their products. Animal testing is an outdated practice considering that the animals used for testing are not miniature humans, so the results are not an accurate assessment of how a human would react to the products (Herald 91). In July of 2013, Australia took steps to end animal testing. A bill was introduced, called the End Cruel Cosmetics Bill. Along with this, the United States introduced the Humane Cosmetics Act, and the one-year anniversary passed of the European ban of sales of any product that incorporated animal testing. Overall, the world is leaning towards cruelty-free cosmetics. Constantine's hope is that Australia will do its part in ending animal testing, in order to help animal welfare as a whole.

The STS concept bad data is defined as pieces of evidence that were derived from incorrect procedures, or any means of inaccuracy (Lynch 279). Bad data is evident within animal testing because it is incorrect to assume the results of a cosmetic application to animal would be same as the results of the cosmetic being applied to a human. Comparing humans and rats, for example, will result in inconsistencies and bad data. Biologically, humans and the animals used for testing cosmetics are very different. The use of animals for testing cosmetics is

outdated and very unnecessary as there are many alternative technologies that companies can use to test their products.

Alternatives to animal testing have proved to be fast, cheap, and reliable (Cruelty-Free International 2014). The modern methods are significantly more relevant to humans than animal testing and have proved to predict human reactions more accurately. For example, the Reconstituted Human Epidermis test is used to assess human skin irritation. Human skin is donated from cosmetic surgeons and is used to examine how human skin would react to certain cosmetic chemicals. Furthermore, skin proteins are commonly tested in-vitro for accurate results. A number of cell-based tests and tissue models such as CeeTox and MatTek's Epiderm are utilized to test thousands of consumer products. In addition, companies can prove the safety of their products by using a number of the 20,000 established safe ingredients from the European Union's database. Therefore, it is simple and inexpensive to test cosmetic products using one of the dozens of reliable modern tests that refrain from testing on animals.

- Over the past 150 years, the process of testing products has started at no testing at all, then to mainly animal testing, and now to testing without animals due to the advancements in technology. Many corporations have taken the steps to eliminate animal testing from their systems, but there is still a lot of work to be done to eliminate the testing on animals in cosmetics completely. The STS concept "bad data" applies to this ethical problem because the data contracted from animal testing is hardly relevant to humans and how humans react to certain chemicals used in cosmetics.



Figure 6: Ironic depiction of animals in the cosmetic industry.

Realism, Ethos of science, and PETA and their contribution to STS

By Katie Deming

Under the idea of realism, which is defined as the philosophical perspective that there is a singular truth to nature that we can find using science (Sismondo 2010), falls a key concept called the ethos of science. Ethos of Science is an idea that was created by the Sociologist, Robert Merton. He came up with a set of ideas called Mertonian norms that are considered the best way for scientists to conduct research; Ethos of Science is the ethical part of science and social experiments used in all realms of experimental processes. According to *An Introduction to Science and Technology Studies* “Social norms establish not only an ethos of science but an ethics of science. Violations of norms are, importantly, ethical lapses” (Sismondo, 25). An acceptable example of Ethos of Science where animal testing is considered an ethical lapse would be a civil society group called PETA.

In 1980, an animal rights activist group was founded in Norfolk, Virginia and called People for the Ethical Treatment of Animals, and later abbreviated to PETA. PETA is now known nationwide and worldwide for the actions they take to protect animals; Such activists and their supporters in all countries exist under the belief that animal testing on animals has virtually no impact on improving human health. It was documented in *The Times UK*, (2007) “the animal activists have enjoyed following the Prince of Wales while dressed in fake bearskins”. This is just one of the lesser radical actions taken by the activists.

According to *The Journal of the American Medical Association*, when explaining the processes of taking the illnesses and diseases that were made in a lab, Scientists place the illnesses into healthy, living animals. Scientists then attempt to treat the animals with the treatment may it be a vaccination or a medication in question. After this process has been finished, doctors and scientists then try to do the same for humans, “Poor replication of even high-quality animal studies should be expected by those who conduct clinical research.” What this quote means is that just because you can treat it in animals, does not constitute the same results due to genetic coding or genetic makeup in human beings. Animals and humans are extremely different and that it makes no sense in testing on animals that have no way to object to what is being done to them. In Figure 7, it shows us that rats, fish and mice are the most commonly used animals for animal testing purposes. Another

piece of useful information from the *Journal of the American Medical Association* is “Ninety-two percent of drugs—those that have been tested on animals and *in vitro*—do not make it through Phase 1 of human clinical trials...” In 2006, PETA also released an article that released data of the so-called pointless testing saying “the National Toxicology Program (NTP) has wasted nearly \$1 billion on rodent cancer studies with ambiguous results that often cannot be reproduced.” From PETA’s standpoint what all this information that was just provided above leads to senseless and pointless testing to animals that have unwillingly donated their entire lives to the sciences to produce results that aren’t even helpful for human clinical. So why does this testing still continue? PETA continuously fights to answer this question and change people’s perspectives to end Animal Testing. Even in radical ways have they been known to change people’s perspectives, often pulling major stunts in order to end the torture and testing.

Under the general umbrella concept all of the key concepts of this section relate to realism. Also, each essay’s individual concepts can also interact. For example, one group member earlier introduced the concept of bad data, animal testing and PETA can relate because in PETA’s everyday fight they constantly and continuously refer to the poor replication of animal studies as I earlier stated, this poor replication is in perfect course with Bad Data.

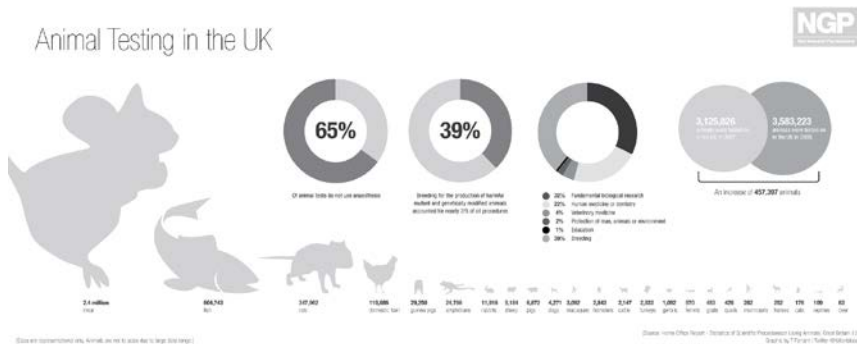


Figure 7: Animal Testing in the UK, Sizes of the animals in this image relates to the number of animals and species and how many are used per year in the United Kingdom. The pie charts relate (from left to right) the number of tests that didn’t use anesthesia, then next is the number of animals that were bred for potentially harmful experiments, lastly is the purposes of all the breeding of the animals.

bGH Impact on Agricultural Society due to Economies of Scale

By Dominic Thorley

This empirical example uses the STS concept of economies of scale to explore how the use of an emerging biotechnology, and the first agriculturally implemented biotechnology, is predicted to affect society. Bovine growth hormone (bGH) use is an animal related aspect of science and technology which has large ethical and social impacts that is outside of the typically STS investigated animal treatments of laboratory test animals. The idea of economies of scale ties into the encompassing realist perspective because realism is the view that there exists a single truth in nature and the job of science is to discover this truth. Realists are concerned with pure science and have come up with guidelines to ensure this takes place. These are called Mertonian norms and were discussed in the previous section. The ethos of science idea establishes through the four Mertonian norms science should be pure and free from bias. Based on this model the socioeconomic impacts of science should not be considered because that would not agree with the Mertonian norm of disinterestedness, where science is performed by scientists without conflicts of interest

The use of bGH became possible in the early 1990's. In the early 1980's bovine growth hormone was first synthesized through recombinant DNA technology. The Food and Drug Administration (FDA) then approved the product in 1993. The company Monsanto commercially made this the growth hormone available. Since the use of recombinant bovine growth hormone (rBGH) is banned in the European Union and Canada this issue is restricted to the United States. The use of this hormone has many social impacts including the ethicality of use due to negative health effects for cattle; cows treated with rBGH are more likely to develop mastitis, an udder infection. However, I will be focusing on the economic and social impacts that the use of this technology has on the agricultural community.

bGH has opposite effects for the marginalized and elite persons of this society. The use of bGH is predicted to be detrimental to dairy farmers that have small scale operations, who might be considered marginalized in comparison to large corporate farms that are likely to benefit from this technology.

The bovine growth hormone is a naturally occurring hormone in cows. However, the use of this synthesized protein as a supplement for

milk production in cows is supposed to increase milk production while the required caloric intake for the cow decreases. This is a claim that has been backed up by a study funded jointly by Cornell University and Monsanto the producer of the hormone. The study concluded that daily injection of bGH increase the average milk production by an average of 10-15 percent. “In addition to Monsanto, at least three pharmaceutical companies Eli Lilly, Upjohn, and American Cyanamid, believe that they can produce and sell bGH so cheaply that large, efficient, dairy farmers will not be able to do without it” (Cornstock 1). This is compelling evidence that bGH is an important widely used product. However it is predicted that the use of bGH will have negative economic effects. “... there is great concern over the financial viability of many dairy farms, and over the future of federal dairy policy. It is widely expected that significant declines in employment in the dairy sector, national herd size, output and price will accompany the introduction of more market oriented policies” (Magrath and Tauer 1). Some sociologists believe that the use of the hormone supplement will have even more detrimental effects. Rifkin claimed that bGH use will cause up to 30% of all dairy farms to go out of business, which will be the largest dislocation in the agricultural history of the U.S. (Cornstock 2).

This problem of economic turmoil due to the implementation of bGH is due to economies of scale. This is because larger more successful farms are able to afford the new technology to increase their profits further and perhaps force smaller and less economically affluent farms, that are less likely to adopt bGH, to disappear. A study performed has shown the connection in predicted bGH use and economic power. Adoption rates for farms with over a half a million dollars in annual sales were predicted to have a bGH adoption rate of between 80 and 90 percent. Farms with revenue less than twenty thousand a year had a predicted adoption rate of 10 to 20 percent. (Cornstock 5). These results referring to the adoption rates of bGH were conducted by the Office of Technology Assessment (a federal congressional office that no longer exists.)

Therefore, I believe that the use of bGH has a negative impact on the agricultural community due to the concept of economies of scale. This leads nicely into the next section of the booklet as that is about the Social Construction of Society. As the current section deals with the impact of technology on society, the next section will look at how society interacts with and implements technology.

- The use of bGH likely affects the dairy farming community negatively as it will probably cause a large increase in the number of failed farms. This is due to the idea of economies of scale, which explains why many non corporate or struggling farms will be unable to compete with large scale corporate dairy farms that choose to adopt bGH use.



Figure 8: Visual representation of profit minded corporate farms.

Summary of Science and Technology Studies Applied to Animal Testing

By: Emma Freeland

After reading this section the reader should have learned what the STS concepts used in this section are and how they apply to real life, mainly involved in animal testing.

- Stated in above is the meaning of Ethos of Science, which determines Animal testing is unethical and true meaning upheld by scientific data. PETA campaigns around the world to increase public knowledge of animal testing.

- The use of bGH likely affects the dairy farming community negatively, as it will probably cause a large increase in the number of failed farms, due to the economy of scale

- Over the past 150 years, the process of testing products has started at no testing all, then to mainly animal testing, and now to testing without animals due to the advancements in technology. Many corporations have taken the steps to eliminate animal testing from their systems, but there is still a lot of work to be done to eliminate the testing on animals in cosmetics completely.

**End of Life Decisions and the
Social Construction of Technology (SCOT)**

Section Editor: Megan Wudkewych with Logan Williams

In the previous section, the relation between realism and animal testing was discussed. While realism presents this idea of there only being one truth, especially emphasized by the use of animal testing, we chose the STS concept of the social construction of technology (SCOT). The social construction of technology is the idea that society shapes the way that technology is designed and used. The umbrella example that was elected to discuss is end of life decisions and the various choices that an individual can make concerning these decisions. Instead of focusing on the presence one truth within these various life decisions, we chose to present how that social construction of technology is represented through these decisions and some of the options that are available to us at the ends of our lives.

All of the essays of this section are subconcepts of the social construction of technology. In the first essay of this section, the narrow empirical example of abortion its relation to the STS concept of technological frames will be discussed. Technological frames is an STS concept that relates to the different ways people think and interpret technology. Abortion is a very controversial end of life decision that many people interpret differently. This falls hand in hand with the concept of the social construction of technology because the way people think about this technology will influence its use and development in society. This section will also discuss how abortion relates to the knowledge of the margins.

The second essay will focus on the use of euthanasia in humans and the interpretive flexibility of this technology. The use of euthanasia in humans is a largely controversial topic and is subject to different interpretations based on a person's prior beliefs. This relates to the social construction of technology because the interpretive flexibility of this technology is influencing the policy and the accessibility of this specific end of life choice. This section will also cover how euthanasia and the interpretive flexibility relate to knowledge of the margins.

The third essay of the booklet will discuss the strict parameters of euthanasia use in humans and the STS concept of closure. Although euthanasia use in humans is a controversial topic, people may feel much better about its use knowing the strict parameters that are taken into account in order for someone to make this end of life choice. These strict parameters set around this end of life decision relate to the social construction of technology because the closure people feel concerning

the strict parameters influencing the way that this technology is used and interpreted in society.

The final essay will discuss hospice care and its relation to the STS concepts of user groups. Hospice care is applicable to many different types of user groups from varying ages and backgrounds whose health is declining severely but it is mostly associated with the elderly. The varying user groups and decisions revolving around end of life care, specifically hospice care, relate to the social construction of technology because the needs of the different user groups influence the type of care they receive and how this industry continues to develop and use the technology.

Technological Frames within Abortion

By Michael Hinnawi

The umbrella topic we have chosen is end of life decisions. The umbrella STS concept that corresponds with this topic is SCOT (Social Construction of Technology). SCOT argues that technology does not determine human action but rather human action shapes technology. A sub topic of SCOT is technological frames which is my narrow STS concept. This STS concept will help me explain the end of life decisions revolved around abortion and specifically the pro-choice side of it. Technological frames refers to the ways of thinking and understanding of technology. It leaves a gap between the relevant groups and the social groups. As well as taking existing technology practices and uses it as a guide for the future ones, without determining the future of the old practices (Bijker). This goes hand in hand with abortion and the various methods of going about the procedure. My specific example and STS concept connects to the previous groups main umbrella topic of Realism, as well as their umbrella topic of animal testing. Realism is the idea of accepting a situation and dealing with it accordingly. This is easily seen in mothers dealing with abortion. If it is something they have to do they must have a realist mindset and accept the situation and deal with it accordingly. Then with animal testing, technological frames can easily be the STS concept that pertains to it. Animal testing technology is very controversial and if everyone understood the technology being used many peoples opinions would change. However, to keep with the idea of realism people dealing with abortion and animal testing must accept the situation and find a way to deal with it.

Abortion has been around since the ancient societies. Only thing that has changed since then is the methods of doing it. To keep it domestic, in America Abortion has been legal since 1973 following the famous Roe v. Wade case. Ever since then abortion has been legal and created a war of controversy. Abortion is a hot issue in American society and everyone has their own opinion; either you're pro-life or pro-choice. This issue has even made its way into politics with certain political parties stating their stance on the issue, which adds another element to every political race. Media is always trying to sway people's opinions, as seen in (Figure 9) a pro-choice advertisement is pushing its opinions onto the public. It is also a social issue as well, abortion is way more prevalent in the marginalized communities. This is not because they do

not care about life but a lot of the time marginalized people have no choice. They do not have the financial backing to raise a child. This makes it less of a choice and more of a forced decision. As with the elites of society it is more of a choice because either way they can financially backup their decision. This is important to discuss because it creates an even larger gap between the marginalized and the elites of American society. Due to the fact that the United States is currently pro-choice, this will be the stance we are going to discuss. More specifically the technology surrounding abortion and its different methods. This is an important STS analysis because abortion is legal and society wants to find the best overall way to go about the procedure. Hopefully what you take out of this, no matter what your position is on the matter, is finding the best technological method of doing abortion is morally correct.

The science and technology study of abortion is a relatively new concept. with over 40 million procedures performed worldwide, the health risks endured must be known to women (Singh). Now with various methods of doing the abortion procedure comes the opinion on which one is best. With technological frames it is a way to break down each method and determine which one is best suited. Keep in mind technological frames is used for all relevant groups and though it may guide the future of technology it does not determine it (Bijker). With that being said the two dominant forms of the abortion method are medical and surgical abortion.

Medical abortion is the newer method and is considered an alternative to the traditional surgical way of doing an abortion. Medical abortion is used with pharmaceutical drugs that terminates the fetus medically with misoprostol alone. This is not to get confused with the morning after pill. This physician given medication is much stronger than the morning after pill and can be used in the first or second trimester of a pregnancy (Casey). The popularity of medical abortion has increased drastically. From 1992 to 2008 medical abortions has increased from 18 percent to 68 percent of all abortions (Singh).

This shift in popularity has to do with the simplicity of the technology. This is where the STS concept of technological frames comes in, the movement of technology has allowed for the relevant group to influence the norms of society. The existing technology has guided toward this new practice without determining the fate of the old technology. Another reason why it is so popular for women now a days is the moral advantage. Even if you are not comfortable with the the

traditional surgical way of abortion based on your views, this makes it a little more easier. As well as being much safer than surgical abortions (Caplan). Overall the shift toward medical abortions seems fitting with the movement of technology surrounding it.

The traditional method of the abortion procedure is the surgical approach. This outdated approach gives abortion more controversy than it already has. Surgical abortion has been deemed less morally correct because of the brutal lack of dignity for the women and the fetus. The two most popular methods are vacuum aspiration where the fetus is sucked out of the womb using a suction device. Along with dilation and evacuation (D&E) where the baby's body is crushed and pieces are removed one by one out of the womb. Not only are these methods gruesome for the fetus but pose many health risk factors on the mother. The D&E technique requires greater skill and effort by the physician and becomes more difficult the later you are in the pregnancy (Callahan). Nevertheless, both surgical procedures have a risk of damage to the cervix and to the uterus which could lead to long term health risks for the mother, as well as effect possible pregnancies in the future (Singh).

With all these negatives surrounding surgical abortion the question can be asked why is it still around. The simple answer to that question is technological frames. This STS concept explains both spectrums of the technological advancement of abortion. Even though the technology is moving toward the medical approach, the relevant groups still understand the need for the surgical approach. With the surgical method you can have an abortion way later in the pregnancy, this is very useful in the world of abortion. Technological frames allows for a broader approach to social construction of technology. It keeps a gap between the relevant groups and the social groups thus allowing change and no change of technology at the same time.

As long as the United States stays pro-choice legal abortions are going to happen. With that being said science and technology is continuously working on making it much more simple and morally viable. With technological frames abortion can move toward the medical method, as well as continuously working on making the surgical method technologically better. Technological frames can stem into other ideas as well. The next group member's empirical example is Euthanasia. There is plenty of controversy surrounding the technology behind euthanasia. With various methods of doing the procedure, technological frames can easily decipher which is best. Furthermore, the next members STS

concept is interpretive flexibility which could easily be the STS concept for abortion. Interpretive flexibility means different user groups interpret things differently. So with abortion there are two user groups with pro-life and pro-choice. Then with pro-choice there are two user groups between medical and surgical abortions. Both empirical examples and STS concepts work hand in hand with each other to create a greater understanding of end of life decisions.

- The controversy surrounding the two methods of abortion can be understood through the STS concept of technological frames.
- Medical abortions are growing in popularity and with technological frames the idea of learning from old technology is seen.
- Surgical abortions are outdated and morally incorrect. However still has a use due to the fact that it can be done so late in a pregnancy. Leaving a relevant group which allows technological frames to back it up.



Figure 9: Picture of a Pro Choice Ad. This image shows a common internet ad supporting pro choice. It highlights the idea that the decision is up to the female. She can do whatever she desires with her body. Image from creative commons Pro Choice. 2009. N.p.

Interpretive Flexibility in the Practice of Euthanasia

By Parul Gupta

Some people might be under the impression that the advancement of medicinal technologies is universally considered a positive notion. However, after you read this essay on the controversies surrounding euthanasia, you will be exposed to the hot debates that arise from the practice of euthanasia in science, technology, and society. The STS concept, interpretative flexibility, plays a significant role in explaining the controversies that surfaced from the practice of euthanasia. Interpretative flexibility is a central concept because it takes into account how different individuals view this new medical technology and how they feel it will impact the world around them. This is shown in this example as the two groups, pro-choice and pro-life, have conflicting opinions on the topic.

This paper will discuss the relationship between the narrow STS concept of interpretive flexibility to the practice of euthanasia in society. Interpretive flexibility, a sub concept of the Social Construction of Technology, is defined as the different meanings and interpretations of a single artifact among various groups of people (Pinch and Bijker 1996). Social Construction of Technology is the notion that human action shapes technology (Pinch and Bijker 1996). The development of euthanasia has not only generated a lot of controversy among the society, but has also brought into conflict two specific groups of people within the society: the pro-life group and the pro-choice.

The practice of euthanasia falls under the larger umbrella example of end of life decisions as it is used as a last resort for a patient requesting death due to the extreme suffering they are undergoing due to their terminal condition. Euthanasia is more formally defined as the deliberate killing, committed with compassion, to relieve the physical pain of a person suffering from a terminal disease and whose death is, therefore, inevitable (Antoniou, G. C. Bulai, and Gh. Chivulescu, 1976). There are three forms of euthanasia: voluntary, non-voluntary, and involuntary. Voluntary euthanasia is when death is caused upon the request of the suffering person. Non-voluntary euthanasia is when one ends the life of a person who cannot choose by himself between living and dying. Involuntary euthanasia involves a patient who is able to provide informed consent, but does not, because he or she was not asked (Antoniou, G. C. Bulai, and Gh. Chivulescu, 1976).

Along with the aging of the population and the advances in medicine, a significant number of terminally sick people are kept alive with the help of various techniques. The scientific development of these medical techniques and increased longevity raise complex issues and engender an interesting debate, namely, should a patient have the right to terminate his or her life when medical conditions and suffering become too unbearable? According to the Supreme Court in Massachusetts, euthanasia brings two groups into conflict, pro-life and pro-choice, in the United States since the 1970s. This new technological creation and practice of euthanasia has two very different meanings to each group. During that time, the concept of euthanasia had been drawing more attention because of technological advances in modern medicine and growing public concern of protecting human rights (Diaconescu, Amelia Mihaela, 2012).

In order to help better understand the empirical example, I will discuss the two different viewpoints below. The pro-choice group believes that one should be able to choose their death. For example, in patients with terminal diseases, including cancer, death can be a slow and painful process. This group believes no one should have to remember their last moments of life to be characterized by misery and pain. Instead, they should be able to request their doctor to help ease into death in a way that isn't painful. By giving terminally ill patients the option to end their life with dignity, they claim that the patient can be provided with the assurance that they will live their remaining life free from anxiety. According to Segal and Frich, "[t]here is a difference between living and being alive. Being alive is only a biological phenomenon. Animals and even plants are alive ... But living means much more" (1993). Below, you can see the legalization status of the practice of euthanasia in countries worldwide (see Fig. 10). On the other hand, the pro-choice group believes that this enables physicians the right to play God. One main objection to legalizing euthanasia is the notion of playing God by going against God's "plan" for an individual's life. Dr. E. London, the president of the World Medical Association (WMA) stated: "It is only God that has the power to decide when life has no value. If we accept the fact that man has the right to decide who of those around him has to die and who has to live, it means that we already find ourselves on the way to concentration camps" (Diaconescu, Amelia Mihaela, 2012). Many people opposing euthanasia believe that doctors and even family members should not have the power to decide when to

end the patient's life. For example, some physicians may be more inclined to making the decision of providing euthanasia without giving other possible medical treatments a chance. Giving them the power to play God can indeed result in a great disaster along with untimely death of treatable patients.

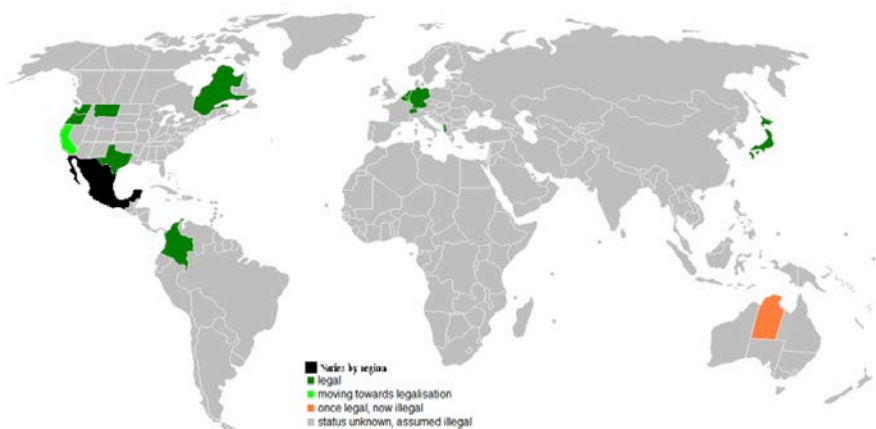


Figure 10: The legalization status of the practice of euthanasia worldwide from "Euthanasia." - Simple English Wikipedia, the Free Encyclopedia. N.p., n.d. Web.

The figure above is relevant to the discussion of this paper as it portrays the legal status of the practice of euthanasia in countries all around the world. As shown in the figure, the majority of the countries assume the practice is illegal. The dark green shade and light green shade, which is shown in the majority of the figure represents legalization or the push towards legalization in that specific location.

It is important to analyze the STS concepts of interpretive flexibility because of its significant role on the Social Construction of Technology. The notion that human action shapes technology has been reemphasized in this essay, as the two different groups that hold conflicting viewpoints are the determining factors of the legalization status of this new medical technology.

The practice of euthanasia invokes fear that the physicians and family will have the power to decide what is to be considered excessive suffering or costs. This could result in the elimination of suffering or cost at the expense of disregarding those who are perceived to be suffering. Although those marginalized in society can take advantage of the practice of euthanasia, they are particularly vulnerable to the effects

of inadequate health care resources and a less thorough consideration of their life due to their financial situation (Smith, 1997). Middle class families have the ability to purchase supplemental insurance in order to pay for additional medical services. Those without such resources, however, may have to choose among recommended services, face bankrupting their families, or go without much-needed health care altogether. The elite in our society may be immune to the potential for coercion that the choice of euthanasia creates for those marginalized in society. However, those living with the reality of unaffordable health care needs, remain vulnerable to the possibility of avoidable suffering and premature death. In fact, a notion exists in which there is a duty to die when a seriously ill individual faces the likelihood of financial hardship (Smith, 1997).

To reiterate, the main argument of this essay is to emphasize the interpretive flexibility that exists in the practice of euthanasia. This relatively new medical technology has created two different reactions from the two different groups of people: pro-choice and pro-life. As you read earlier, technological frames refer to the stability in "ways of thinking" and "fixed patterns of interaction" that "emerge around them" (Bijker, 1987). This essay relates to technological frames as this concept describes the influence on interaction and therefore, the shaping of specific cultures. Moreover, it also discusses how both the facilitating and restraining of interactions within the relevant social groups in society plays a key role in the development of a technology (Bijker, 1987).

Additionally, this essay relates to the following one, which discusses the STS concept of closure in the empirical example of strict parameters for euthanasia. Closure is defined as the final stabilization around a particular design (Pinch and Bijker 1996). The implementation of euthanasia within society will require strict medical parameters to ensure that physicians and family members follow all proper procedure and act only out of compassion and beneficence towards the patient when making the decision to use euthanasia.

The main argument of this essay is:

- There is an existence of two groups within society that have conflicting views on the practice of euthanasia within society.
- These different groups reflect the STS concept of interpretive flexibility, which plays a significant role in the development of technology.

Closure and Strict Parameters of Euthanasia

By Avena Patel

My narrow science and technology and society concept is closure which is explained by the narrow empirical example of strict parameters regarding euthanasia. This falls under the umbrella concept of SCOT which is shown through the empirical example of end of life decisions. The previous essay talks about interpretive flexibility and euthanasia. This explains how how different people view euthanasia and the medical technology associated with it, this concept also looks at how this new technology will affect the world around them.

Euthanasia was first put into use in the 5th century with the Ancient Greeks and Romans. However, it was not regulated until the 15th century by the christians in Ancient Europe they found that is was a sin do to their view was that human life is a trust from god. The important stakes for society are that people now have the choice to die with dignity, or commit physician assisted suicide. This can be explained by implicit politics which shows the social norms and “unwritten rules of society”. In our society is is not usually socially acceptable to commit suicide. However, the parameters of Euthanasia help make it so that many patients do not take advantage of this. This is meant for patients who want to die with dignity, and who are in extreme pain and who do not want to die in pain.

In the 1890’s the debate over the legalization and use of euthanasia came to not only include those within the medical field, but lawyers and social scientists as well. Within the United States however, its was not until 1870 that using anesthetics was proposed to intentionally take a persons life (Carrick, Paul 1985). Even now, the debate on the ethics and legalization continues. The debates have a continuing pattern of four different topics. The first being that the general interest in euthanasia is not related to biomedical technology. Next the amount of euthanasia patients will increase rapidly during times of economic recession. The third debate being that the decision to accept or decline a request is not strictly medical, which means that the physician will have to use his personal judgement and ethics making the decision process more challenging. Which leads into the final debate of ending life-sustaining procedures will become a standard as the demand increases (Ezekiel J. Emanuel, 1994).

Within the United States, Oregon has legalized euthanasia. The death with dignity act states that “On October 27, 1997 Oregon enacted the Death with Dignity Act which allows terminally-ill Oregonians to end their lives through the voluntary self-administration of lethal medications, expressly prescribed by a physician for that purpose.” With this the state set strict parameters that the patients and physicians must follow. Those who choose to follow this path must follow a strict schedule. The patient must make two verbal requests to her doctor separated by 15 days. The physician must then sign a consent form within the presence of witnesses, along with a conformation of the diagnosis. Then the patient must go through psychological examination, and alternate options must be given including hospice care, pain control, and comfort care (Leman, Richard 2006).

The regulations in place for euthanasia are there to help make sure that patients do not abuse euthanasia. This then relates to Closure where we look at the final product and its usage. Many places are concerned with this so they restrict this to patients with a six month life expectancy. Also patients have to get a physician's and psychiatrist's approval in order to go through with the decision. In some European countries you must get the courts approval in order to move forward. The closure of euthanasia is still in process due to the high controversy regarding the topic.

The set strict parameters will lead to closure of euthanasia and allow an increase in acceptance and an advancement in medical technology. However, the closure of euthanasia and its strict parameters will not be a part of modern medicine for a long time due to its ongoing ethical debate. This goes back to current options of Hospice care through different user groups.

- Euthanasia has been a part of medicine for a long time however the regulations of this practice has recently come into question along with its ethics. This essay focuses on the strict parameters that will be set if this practice ever reaches closure within society.

User Groups and Hospice Care

By Mykela Hawkins

In this essay, the STS concept of user groups will be interpreted and related to a broader umbrella example of end of life decisions and Social Construction of Technology through the empirical example of hospice care. “User groups” is one STS component of the broader STS concept of Social Construction of Technology. Hospice care is a kind of decision people can choose at the end of their lifetime, as opposed to other end of life decisions, such as euthanasia. As seen with the previous example of closure and the strict parameters of euthanasia, user groups are also flexible and interpretive, and hospice care can be viewed as an alternative to euthanasia.

A physician created the first hospice center in 1948 in a residential suburb in London. The idea was introduced to the United States in 1963. The idea presented in 1963 for specialized care for dying patients sparked a chain of events that evolved into modern hospice care as it is known today (“History of Hospice Care”). Hospice care gives society, especially those terminally ill, and their families, another option on how to live out the last days, weeks, months, or even years of their lives. It is arguably considered a better option for dying patients than any other type of care, in a hospital, for example. A better understanding of what exactly hospice care is, as well as who is affected by this system of care, can explain why different user groups exist.

Hospice care, or “comfort care” as it is sometimes referred to, is defined as “a program of supportive services for terminally ill patients and their families” (Greer, Mor, Morris, Sherwood, Kidder, and Birnbaum, 1985, pg. 9). This care can be provided to people either at their home or in a designated facility. Hospice is an option for terminally ill or dying people of a multitude of ages. It aims to relieve pain in a comfortable setting for its patients. (Greer, Mor, Morris, Sherwood, Kidder, and Birnbaum, 1985). Some people believe that spending the remaining days of one’s life in a comfortable state and surrounded by friends and family gives the terminally ill patient less stress and more enjoyment than compared to other types of terminal care.

Hospice guides patients through the dying process as a natural cycle of life. Hospice patients are less likely to receive tests, such as x-rays, and more often receive care based on social factors, like therapy. (Greer, Mor, Morris, Sherwood, Kidder, and Birnbaum, 1985; see Figure

12 below). Hospice care involves both the patient and their family, both during and after the patient's dying process. The STS concept this essay has associated with hospice care is user groups. There are different user groups that may or may not utilize this type of care depending on their condition near the end of their life.

The decision-making process at the end of one's life, in terms of organizational decisions and living conditions, are crucial. Terminally ill patients are presented with a variety of options, such as aggressive treatment, euthanasia, or comfort care, such as hospice. Hospice care is arguably the most comfortable and humane way for terminally ill patients to carry out their last days.

- When compared to the methods of hospital care and euthanasia, hospice care is regarded as a comfortable setting and sometimes considered the best choice for an end of life decision. It focuses on treatments for both the patient and the stability of their families, both during and after the dying process.

TABLE 3. HOSPICE AND NONHOSPICE PATIENTS' PATTERN OF CARE: PERCENTAGE RECEIVING MEDICAL AND SOCIAL SERVICE INTERVENTIONS IN THE LAST WEEKS OF LIFE*

	Home care based		Hospital based		Conventional care	
	3 weeks	1 week	3 weeks	1 week	3 weeks	1 week
Intensive medical services (Radiation therapy, surgery, chemo- or hormonal therapy, thoracentesis)	13% (0.03)	10% (0.02)	21% (0.03)	11% (0.02)	32% (0.06)	19% (0.05)
Diagnostic tests (Blood tests, X-rays, or scans)	34% (0.03)	35% (0.03)	37% (0.04)	36% (0.03)	64% (0.06)	62% (0.06)
Oxygen or respiratory therapy	21% (0.03)	29% (0.03)	24% (0.03)	26% (0.03)	19% (0.04)	35% (0.05)
Social services (last week of life) (Counseling, financial or legal assistance, paperwork, service referrals, training in patient self-care)		61% (0.03)		65% (0.03)		49% (0.05)

*Numbers in parentheses are the standard errors of the estimates based upon the logistic regression equation.

Figure 12: As this table above shows, there is some variation present between the last weeks of life of patients and the kinds of treatment they receive in home care (comparable to hospice), hospitals, and conventional care (Greer, Mor, Morris, Sherwood, Kidder, and Birnbaum, 1985).

Summary of End of Life Decisions and the Social Construction of Technology

By: Megan Wudkewych

There are some things that it is important for you to pull away from this booklet section. They are listed here:

- In the first essay in this section, the narrow empirical example of abortion its relation to the STS concept of technological frames will be discussed. Technological frames is an STS concept that relates to the different ways people think and interpret technology. Abortion is a very controversial end of life decision that many people interpret differently. This falls hand in hand with the concept of the social construction of technology because the way people think about this technology will influence it use and development in society.
- The second essay will focus on the use of euthanasia in humans and the interpretive flexibility of this technology. The use of euthanasia in humans is a largely controversial topic and is subject to different interpretations based on a persons prior beliefs. The relates to the social construction of technology because the interpretive flexibility of this technology is influencing the policy and the accessibility of this specific end of life choice.
- The third essay of the booklet will discuss the strict parameters of euthanasia use in humans and the STS concept of closure. Although euthanasia use in humans is a controversial topic, people may feel much better about its use knowing the strict parameters that are taken into account in order for someone to make this end of life choice. This strict parameters set around this end of life decision relate to the social construction of technology because the closure people feel concerning the strict parameters influencing the way that this technology is used and interpreted in society.
- The final essay will discuss hospice care and its relation to the STS concepts of user groups. Hospice care is applicable to many different types of user groups from varying ages and backgrounds whose health is declining severely but it is mostly associated with the elderly. The varying user groups and decisions revolving around end of life care, specifically hospice care, relate to the social construction of technology because the needs of the different user groups influence the type of care they receive and how this industry continues to develop and use the technology.

These are the essential arguments or points that you should take away from this section. I hope that it is now clear to you how all of these empirical concepts and examples relate to the social construction of technology and end of life decisions.

Glossary

Bad Data: pieces of evidence that were derived from incorrect procedures, or any means of inaccuracy (Lynch 1988)

Cloning: replicate (a fragment of DNA placed in an organism) so that there is enough to analyze or use in protein production (Biology online dictionary).

Closure: The final stabilization around a particular design (Pinch and Bijker 1996)

Economies of Scale: “The theory of the economies of scale is the theory of the relationship between the scale of use of a properly chosen combination of all productive services and the rate of output of the enterprise.”(Stigler 1)

Ethos Of Science: A piece of Mertonian norms, that states the socially and ethically acceptable practices that are acceptable for use by scientists creating new scientific knowledge from nature.

Euthanasia: the painless killing of a patient suffering from an incurable and painful disease or in an irreversible coma.

GMO (genetically modified organism): inserting a gene from one species into another to achieve a specific characteristic; when used in modifying crops it is intended to optimize efficiency (NCBI, Human Molecular Genetics, 2nd edition).

Interpretive Flexibility: The ideas that each consumer group understand wants and needs for a product differently and visualize a different final end product, used within society (Pinch and Bijker 1996).

Rashomon Effect: when different people have conflicting interpretations on the same thing due to their unique perceptions (Zenzen and Restivo, 1982).

Realism: One believes that there is one truth, and it is the goal of science to discover this one truth (Sismondo 2010).

Relativism: Can best be described as when one believes that there is no “truth” that can ever fully be known due to so many varying viewpoints in society. It is the opposite of realism in terms that this ideology does not believe that the truth of life can be discovered in nature alone (Zenzen and Restivo, 1982).

Semiotic Approach: The ideology that a technology may be adjusted to fit the expectations of different user groups (Oudshoorn, 2004).

Social Determinism: is the theory that social interactions and constructs alone determine individual behavior (Sisamondo 2010).

Social Construction of Technology: This concept emphasizes the interpretive flexibility of an artifact. It states that technology does not determine human action, but human action shapes technology (Pinch and Bijker 1996).

Somatic Cell: any cell of a living organism other than the reproductive cells. (Biology Online Dictionary).

Technological Frames: refers to the ways of thinking and understanding of technology (Bijker); takes existing technology practices and uses it as a guide for the future ones, without determining the future of the old practices (Bijker)

User Groups: "Users contribute to technological change, not just by adapting objects to their local needs, but also by feeding back into the design and production processes" They are the different populations that use technologies (Kline and Pinch, 1996, Pg. 99).

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