

# STS Concepts Applied in Society



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Series: Prof. Williams LB 133 Intro to HPS

Title: STS Concepts Applied in Society

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This booklet was created by the Introduction to History, Philosophy and Sociology of Science class LB133-13H in Fall 2013. On the following page, please see the excerpted page from the class syllabus which discusses the objectives of the project and how they were assessed.

The students did a great job of connecting what they have learned about social construction to “real-life” empirical examples that they selected independently.

Enjoy!

Assistant Professor Logan D. A. Williams  
Lyman Briggs College, Michigan State University  
2013-12-04

**Capstone Assignment/ Creating an STS Booklet**

*OBJECTIVE: Develop your ability to communicate verbally in small and large groups*

*Outcome 2. Organize your small group with different roles for each person. Tell the class what you have worked on in your small group. Assess the relative contribution of each small group member. Discuss class readings in the large group (classroom of 30 students or less)*

*Task: Participate in Class, demonstrate collegiality.*

*Assessment Tool: Collegiality Grade, Capstone Assignment*

*OBJECTIVE: Develop your ability to work effectively in teams*

*Outcome 3. Select a complex contemporary example of science, technology and society where STS concepts can be applied. Assemble a resource that can be used by yourself and your classmates in the future.*

*Task: create a booklet together as a class, where each person is responsible for one example and uses that example to explain one STS concept/theory. Bind the booklet using the MSU Main Library Espresso Machine. Alternatively, post the booklet online as an open-source document*

*Assessment Tool: Capstone Assignment*

The purpose of this capstone assignment is to employ STS concepts to interpret an example of science technology and society. We will do this by designing a booklet together as a class explaining STS concepts. Your group will present your section of the booklet in class. There will be four groups, based upon the four empirical categories for the course (and thus the four sections of the booklet): Environment, Health, Information, Engineering/Design. Each group is responsible for writing one section of the booklet. Each individual in the group is responsible for one example + STS concept/theory. The empirical example might be drawn from a currently disruptive event in science, technology and society (or an extremely important historical event in science, technology and society). One person in the group should be elected the section editor and given responsibility for: encouraging and guiding the group; writing the short 'introduction to the section'; selecting appropriate images from an open-source database that can be used in the booklet, and creating the template used by all group members to write their part of the section. These responsibilities exclude the section editor from writing an example + concept.

Grade Criteria

Percentage of Total Grade	Task
10% Individual Group Work Midterm Peer Evaluation 10% Individual Group Work Final Peer Evaluation	You will write brief evaluations of your peers at mid-term and term end
10% Group Written Booklet Section Proposal	Write a memo proposing the empirical area your group will cover
10% Individual Written Example + Concept Draft 1 10% Individual Written Example + Concept Final Draft	Use an STS concept/theory that you have learned in class to explain an example of science, technology and society that has not been used in the course. <ul style="list-style-type: none"> <li>• Write a clear introduction to the section</li> <li>• Properly cite the sources of the example, the STS concept/theory, and the image</li> <li>• Write 300 or more words</li> <li>• Include an image that will enhance the explanation</li> </ul>
10% Group Written Booklet Section	Within each section of the booklet, arrange the concepts so that they build conceptually upon each other.
40% Group Booklet Section Final Presentation	On Time Delivery; Audible and Understandable Delivery; Uses Images, Figures and Tables Well; Consistently uses white space (not too much text)

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## Section One:

# Social Determinism in Health and Technology Systems

**Introduction to Social Determinism in Health and Technology Systems**  
**By Jaclyn Stone**

Science, Technology, and Society concepts, better known as STS concepts, illustrate connections between real world dilemmas, and science and technology. For the capstone assignment, our group chose health and technological systems as an “umbrella” empirical topic. Based on our empirical topic, each group member chose empirical examples, which include stem cell research, flu vaccines, prosthetic engineering, and sports medicine, to work with and explain using specific STS concepts that fall under social determinism, as discussed in the following paragraphs. This capstone assignment has helped my group members and I to better understand important STS concepts, as well as how to use valuable skills in future classes, such as critical reading, forming and demonstrating a thesis, and it has taught us to work effectively as a team in small groups. Each of these new skills we have learned was demonstrated in the formation of this booklet, which contains some of the important STS concepts we learned in class. Important STS concepts that help to connect the empirical examples to real world problems and the “umbrella” concept include trans-epistemic communities, expertise, interpretive flexibility, and social construction.

My group chose social determinism as the umbrella STS concept for this assignment, which is why our section is the first section of the booklet. Social determinism is a very broad concept that will make it much easier to understand the other umbrella STS concepts mentioned in the following sections of the booklet by other groups. Social determinism is a theory that social interactions and constructs influence science and technological systems within society (Dr. Logan Williams).

Health determinants, which include biology and genetics, individual behavior, social and physical environment, and health services, shape how modern health systems develop. Because these factors all contribute to an individual's current state of health and the overall health of a population, social determinists are able to identify which aspects of society change according to the wants and needs of a specific population. For example, based on the physical environment of two different populations, one in overcrowded conditions, and one with rural, under populated conditions, the needs of the two populations will be very different. Therefore, according to a social determinist, the development of the two populations' health systems would be vastly different because of the large variance in societal needs for each population.

Each of the empirical examples that this section has either pros and cons, or opposing viewpoints, that are affected by the type of population or specific group of people influencing the research or technology. The specific STS concepts expertise and social construction link social determinism to the real world pros and cons of each empirical example. For instance, interpretive flexibility is rooted in the belief that there is no absolute truth, which means that certain artifacts of society develop according to the context and time period. These artifacts, or technologies, are susceptible to immediate change depending on the uses the majority practices concerning these artifacts. In controversial cases where interpretive flexibility is a contributing factor to technological development, such as stem cell research, society shapes how research develops because of the opposing viewpoints.

Since each different type of population mentioned above affects the development of research and technology, each empirical example also discusses how knowledge from the margins affects different social groups and technological advancement. Each empirical example is related back to social determinism and health technology systems using STS concepts. In order, the empirical examples in this booklet section are the H1N1 vaccine, bioengineering and prosthetic development, embryonic stem cell research, and advanced surgery in sports medicine. The STS concepts used to describe and relate the empirical examples to each other and the “umbrella” STS concept are social construction, trans-epistemic communities, interpretive flexibility, and expertise, respectively. These empirical examples each possess opposing viewpoints, or pros and cons, and their STS concepts can be used to apply them to real world problems.

**What to Take Away From This Essay:**

This section of the booklet provides valuable information that has real world applications, using STS concepts and empirical examples that fall under science and health systems in technology. The goal of each group member is to relate their empirical example back to social determinism, while discussing the opposing viewpoints of the example.

- The example of bioengineering and prosthetics, specifically for the Wounded Warrior Project, uses the STS concept trans-epistemic communities to discuss the ethics behind giving prosthetics to soldiers and injured veterans.
- The example of the H1N1 vaccine and pandemic in 2009 uses the STS concept social construction to determine whether or not the pandemic and

massive spread of the virus affected future flu vaccines for specific populations of people.

- The example of embryonic stem cell research is highly controversial, as discussed in this booklet section, so the STS concept interpretive flexibility is used to discuss the ethics behind the two opposing viewpoints concerning embryonic stem cell research.
- The example of sports medicine, specifically advanced surgery for high profile athletes, used the STS concepts of expertise and credibility to discuss the differing relationships between doctors and athletes, as athletes recover from surgery and other injuries as they return to athletics.

Based on the chosen STS “umbrella” concept, each group member had to choose the above STS concepts that fall under social determinism. These STS concepts were the used to relate the above examples, which fall under health and technology systems, back to social determinism as well. These STS concepts are important because they can also relate the empirical examples to real world dilemmas.

## **Interpretive Flexibility within Embryonic Stem Cell Research** **By Paige Gurizzian**

During this course, we have studied various theories and examples that relate to the intertwined relationship of science, society, and technology. In this paper, I will discuss some specific concepts that demonstrate this relationship through an empirical example.

The example I selected within the “umbrella” topic of health and medicine is stem cell research. I chose to specifically investigate the controversy over the use of *embryonic* stem cells, while there is also debate over other related topics, including adult stem cells and the use of stem cells for cloning. The reason I decided on embryonic stem cells is because it causes the most controversy in our current society, and can therefore be discussed using the theories we have learned in the HPS (history, philosophy, and sociology) course. This essay will demonstrate connections between embryonic stem cell research and our group’s main STS concept, social determinism (Zenzen and Restivo 1982), as well as embryonic stem cell research and the specific STS concept, interpretive flexibility (Pinch and Bijker 1987). Embryonic stem cell use is shaped by society, and is interpreted differently by these members of society, as I will further explain in this essay.

Stem cell research has become a prevalent scientific and technological topic in the United States. Stem cells are unspecialized, meaning they do not have a specific purpose, and there are two classifications of these cells: multipotent and pluripotent. “Multipotent stem cells have the ability to differentiate into most, but not all of the body’s cell types, while pluripotent cells can develop into all types of body cells” and are therefore used more often (Lewis 2012). Embryonic stem cells are an

example of pluripotent cells. Because embryonic stem cells can perform a particular role in the body, they have the potential to benefit humans with defective cells (see Figure 1). This means that the techno-scientific advancement involves a widespread population of patients, patient families, doctors, researchers, and social groups with opinions on the use of these cells.

Along with this advancement in biomedicine, there comes a major controversy of ethics. The use of embryonic stem cells is controversial because the utilization of these cells results in destruction of the embryo. For those who believe that life begins at fertilization (often Christian groups), this medical process means taking a life.

Because of this controversy, scientists are trying to find a different source of pluripotent stem cells. In November of 2007, research groups in Japan and Wisconsin discovered such cells (Lewis 2012). These groups reprogrammed skin cells created in a laboratory into stem cells that were pluripotent. Further progress occurred at Harvard Medical School, when they transformed the skin cells from a human (instead of artificial cells in the lab) to stem cells (Lewis 2012). This discovery of skin cell regeneration- "if continued to be proven successful, will be a clear victory for science, human life, and Christian advocacy" without the ethical dilemmas (Lewis 2012).

When techno-scientific advancement posed a problem for certain members of society, people continued to explore further options to avoid ethical issues. This demonstrates the STS concept of social determinism; society's wants and needs shaped the technology (Zenzen and Restivo 1982).

It is important to understand the STS analysis of this empirical example in regards to the variety of viewpoints on the subject matter. This advancement in science can be beneficial for society, but it has also caused a major controversy. The STS concepts of interpretive flexibility (Pinch and Bijker 1987) and social determinism (Zenzen and Restivo 1982) help explain the reasons for the emergence of this controversy, and how these different belief systems affect the use of the technology.

In most science and technology studies, it is also important to consider knowledge from the margins. For a fuller understanding of the topic, the sociologist, philosopher, or scientist should consider the technology's effects on marginalized people, or the way marginalized people affect the technology. For embryonic stem cell research, the focus is often on society at large and how these cells can benefit or destroy human life. In this context, the potential patients are often marginalized. The general public is so consumed by the debate over whether the use of embryonic stem cells is right or wrong; they do not consider how it could affect a patient's life on the individual level. They also do not consider whether the patient wishes to take advantage of this medical treatment, due to their own ideology. The patients are marginalized because the use of embryonic stem cells is rarely considered from their point of view. Another marginalized aspect of stem cell research is the scientific research. Because society is preoccupied by the medicinal uses rather than the scientific uses of these cells, they often forget about the potential knowledge obtained by studying how stem cells develop at a microscopic level ("Monitoring Stem Cell Research" 2006). "Scientists hope to be able to figure out the molecular

mechanisms of differentiation through which cells become specialized and organized into tissues and organs” and that information itself could be advantageously expounded on (“Monitoring Stem Cell Research” 2006). For a fuller understanding of a technological system (Hughes 1994), it is important to consider the elite, as well as the marginalized (such as laypersons), and the social relations between them that affect that system (Epstein 1995).

As previously discussed, “the main source of contention about stem cells arises because some especially useful stem cells can be derived from early-stage human embryos, which must be destroyed in the process of obtaining the cells” (“Monitoring Stem Cell Research” 2006). The specific STS concept that can best explain this empirical example of embryonic stem cell research is interpretive flexibility (Pinch and Bijker 1987). Interpretive flexibility is included under the broader concept social construction of technology (Pinch and Bijker 1987). Regarding embryonic stem cell research, there are three main social groups who interpret the use of this technology differently: those who support it, those who are against it, and those who do not understand the appliance of it. The social group who opposes embryonic stem cell use includes those who believe that life begins at the first instant of fertilization. For them, the use of embryonic stem cells means taking a life. There are also people who believe that life is not yet formed at this stage, therefore the use of these cells causes no human harm, and instead, only improves life. Lastly, there are those who are uninformed about this biomedicine and its applications in society. These people tend not to take a stance on the use of embryonic stem cell technology and can be referred to as irrelevant groups (Kline

STS Concepts Applied in Society and Pinch 1996). These various social groups interpret the utilization of embryonic stem cells differently due to their ideology and the information they have obtained about the topic.

**What to Take Away From This Essay:**

- The application of embryonic stem cells and the controversy that is associated with this technology can be understood through the STS concept, interpretive flexibility (Pinch and Bijker 1987). Various social groups interpret the use of this biomedical advancement differently based on their ideology, social context, and scientific knowledge on the topic.

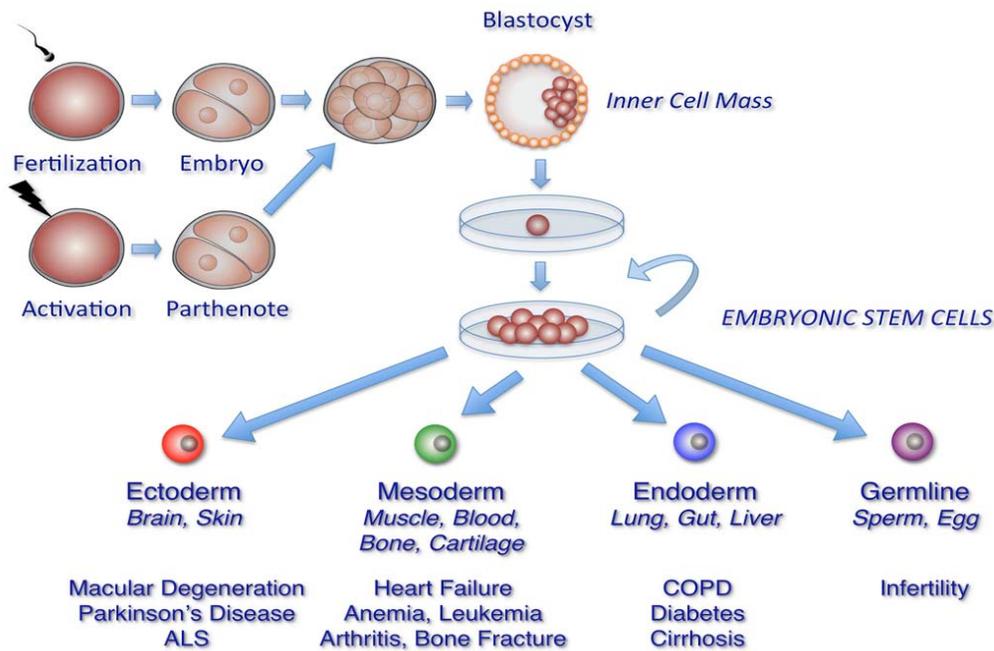


Figure 1. Diagram of Embryonic Stem Cells

Image from Creative Commons

"Generation of pluripotent human embryonic stem cell lines." *Aging*. Impact Journals LLC, n.d. Web. 10 Nov. 2013. <<http://www.impactaging.com/papers/v3/n5/full/100328.html>>.

## **Social Construction within the H1N1 Epidemic and Vaccination**

### **By Tyler Zhang**

Social construction is the ideology that society builds knowledge of science and nature. Society pushed for a vaccine for the swine flu, also known as the H1N1, as the vaccine is what society wanted most. Science and technology was advanced to create the vaccine due to societal pressure, this supports social determinism. Social determinism is the ideology that society determines/governs technology. Social construction is very similar to social determinism. This relates to the bigger topic, health and medicine, as vaccines and influenzas are a subsection of health and medicine.

At the beginning of 2009, the swine flu epidemic began ("Swine Flu" 2009). There were cases in the past, but there were few and spread out over time. The place of origin is unclear as many cases appeared around the world such as Mexico, Britain, the Middle East, and many more. The influenza became less significant later 2009 as societal pressure pushed for a vaccine, thus making it not as important. If there were no societal pressure, the technology to treat the swine flu would not have existed.

The marginalized group would be producing knowledge in this example. The marginalized group, in this case, is less wealthy which would make the vaccines for the H1N1 less available to them. Half of the H1N1 children's deaths between April and August were among African-Americans and Hispanics; that's significantly more than the percentage of both groups (Gonzales 2009). This is important to discuss because this goes against the Mertonian norm of universalism, which is the ideology in which knowledge and science is available to everyone.

Swine Influenza, also known as H1N1 flu, is a respiratory disease caused by a virus commonly found in pigs throughout the world (“Swine Flu” 2009). Swine flu was a major epidemic in 2009 where it became a global concern. Seasonal influenzas are very dangerous due to how contagious a type of flu is and its ability to weaken the immune system. The technology to treat the swine flu came immediately after the influenza began affecting the general population. In other words, the medical professionals and scientists created the medical technology for treatment due to the general population socially pushing for it.

Swine flu existed prior to 2009, but there were very few cases and it was not an epidemic during the time of creation. It was first diagnosed in the year 1918, but it was not clear then that whether human received the virus from pigs or pigs received it from humans (“Swine Flu” 2009). This influenza caused a global scare because they’re infamously known for being able to affect large amounts of people very quickly. In 1918, there was a bird flu that killed around 20-40 million people which was about 3% of the worlds’ population (Brown, et al). This example shows how deadly a simple seasonal influenza such as swine flu can be and how social construction plays a crucial role in treatment.

**What to Take Away From This Essay:**

- The general population, those who were affected by the influenza and those who were not, pushed for medical technology that was socially constructed to treat the illness.
- Without societal pressure, or if the influenza did not happen, the socially constructed technology to treat the swine flu would not exist.



Figure 2. Precautionary Sign for the Swine Flu

Bern, Stephen. *Swine flu precaution (Chester Cathedral)*. 2009. Photograph. Wikimedia Commons, Chester. Web. 11 Nov 2013. <[http://commons.wikimedia.org/wiki/File:Swine\\_flu\\_precaution\\_\(Chester\\_Cathedral\).jpg](http://commons.wikimedia.org/wiki/File:Swine_flu_precaution_(Chester_Cathedral).jpg)>.

**Trans-Epistemic Communities within Biomedical Engineering and Prosthetics  
By Stephan Pilarski**

In this new age of science, the amount of new technology being created is increasing in all fields. One field in particular that has had significant advancements is the health field, where new technology is helping people with disease and injury every day. The social drive behind the health and medicine field for better care and technology for patients help those who have sustained horrific disease or injuries. A group of people, where the injuries are usually the most traumatic, are the military veterans returning from war. Social determinism helps us understand how society demands for veterans to receive the best care because of their sacrifice for their country. With this demand and along with the help of trans-epistemic communities, injured veterans are able to receive the best treatment to go back to a normal life.

For as long as there have been wars, the care for the veterans who have come back has been an issue. With lack of technology, amputations usually were the limit of care for wounded soldiers. As technology progressed, doctors in the 16<sup>th</sup> century started to fit missing limbs with wooden pegs, and starting with the Vietnam War, the first models of prosthetic limbs. In the most modern wars, prosthetic hooks and cosmetic limbs are now being replaced with developing prosthetics that can be controlled by the human it is attached to (Evans-Pughe 2006). Although prosthetics in general are not a new technological discovery, human fine motor control over prosthetics is new. These advancements help society by not only helping the veterans the demand support for, but also for normal citizens who have traumatic injuries.

This advancement in technology directly applies to and helps people who are marginalized in society. Handicapped veterans, and handicapped people in general, go through many troubles in life because of their disabilities. Not being able to reach things they need in high cabinets, or being able to pick up objects they need for everyday life are a few examples how veterans are marginalized. In this case, handicapped veterans are treated with the newest technology so that they will no longer be marginalized in society. With prosthetics that can do more advanced tasks, it makes the wounded veterans lives a lot easier, thus making them less marginalized. It is important for the marginalized people to have a relationship with the elites in the development of prosthetics because their input on how the prosthetics work with them is very important in the development. By being able to talk to the patients the doctors can understand what is going right with the prosthetic and what is going wrong with it from the users and patients perspective. This is very common in trans-epistemic communities, because without this relationship, the technology could be made completely wrong for the consumer, who will then have trouble using it, making their lives harder, or not using the product at all, which doesn't help them in any way.

The field of bioengineering and prosthetic development is greatly affected by the trans-epistemic community. This includes aspects such as funding, and outside support groups for returning wounded soldiers. The importance of funding is critical because these new technologies are very expensive. New developments in this field at a number of universities and labs were discovered thanks to a \$7.2 million project awarded to them by the U.S. Department of Veteran Affairs (Evans-Pughe

2006). From this funding, MIT and a research and developing firm, called Ossur, created a magnetic knee that automatically adapts to the way the patient walks and sense the position and load to deliver the right resistance to each step (Evans-Pughe 2006). Another large contribution of funding to this field came from the U.S. Department of Defense's Advanced Research Project Agency (DARPA). DARPA put \$70 million worth of funding into a project to create a prosthetic arm that would be able to be controlled by the patient's nervous system (Brownell 2007). This arm, containing an electrode device, would be able to receive signals from the brain's motor cortex and perform advanced movements like picking up and gripping objects (Brownell 2007). As important as funding is to the trans-epistemic community from the economic standpoint, the social standpoint is just as significant. Outside support groups that help returning wounded soldiers, like Wounded Warrior Project, help drive the social determinism and the demand that veterans get the best treatment. These outside programs, which are non-profit, collect money and help with the funding to these developments. This also includes the social drive, because it is the citizens who donate to these organizations, which allows for them to fund the projects necessary to help the returning veterans.

**What to Take Away From This Essay:**

- As technology progresses in the medical field, there has been a major advancement of technology in the subfield of bioengineering and prosthetics. These advancements, which are pushed by social demand and the trans-epistemic communities around them, help wounded veterans who have lost limbs during their time at war. With a large amount of funding and a backing

social support, new and more advanced prosthetics can be applied to wounded veterans to help them avoid being marginalized in society.



Figure 3. A Mechanical Prosthetic Hand with a Look-Alike Hand Cover.  
From [search.creativecommons.org/](https://search.creativecommons.org/)

**Expertise and Trust within Operation Rehabilitation**  
**By Joseph Maniaci**

This semester in HPS, we explored many facets of the History, Philosophy, and Sociology of Science. We understood these facets through STS concepts. These STS concepts provide a better understanding of HPS by breaking it down to smaller concepts and defining them.

The STS concepts that will help analyze my empirical example is expertise (Epstein 1995) and trust (Wynne 1992). The topic I chose that related to our umbrella topic of health and medicine is the recovery times from major surgeries. As everyone knows, injuries are the most devastating thing to an athlete's career. It is crucial to their careers that they make a speedy and effective recovery, and this is where my example of Adrian Peterson changes the way all athletes rehabilitate from surgery. Peterson, running back for the Minnesota Vikings, returned from ACL surgery in less than nine months and proceeded to break the National Football League (NFL) rushing record. I discuss the concept of expertise and in particular the different categories; lay lay person, lay expert person and expert, which may affect the recovery of the athlete. Another concept I discuss is trust. Trust can be used to show how patients must trust their surgeon and therapist to lead them in the right direction. The surgeons and therapist are considered to be the ones with the most knowledge, or the expert, so as a lay lay person, the patient must trust the teachings and schooling of the expert to help them to a speedy recovery. When discussing these topics it is important to account for the people who are not very fortunate to be able to recover so quickly. Athletes that are in their early years, for example middle school and high school athletes, may not have the economic

standing to afford surgery or the proper therapy after surgery. These factors can lead to longer recovery after the surgery or permanent injury.

My empirical example takes a look at high profile athletes having ACL surgery and coming back stronger than they were before. Schwab (2013) talks about Adrian Peterson and his recovery time, as well as linking him to other stars that underwent the same surgery, such as: Derrick Rose (NBA- Chicago Bulls) and Robert Griffin III (NFL- Washington Redskins). He discusses some of the ways that Adrian Peterson returned to the sport so quickly. One way was hard work; he worked out harder than ever before attempting to get his knee back to full strength. Even when presented with alternate rehabilitation options, Peterson decided against them even though fellow athletes had used them. Peterson says, "I wanted to do it through hard work, and they knew I'm all in with it" (Schwab 2013). Peterson set the bar for athletes to have the surgery after him. He came back to "game form" in nine months, whereas most ACL recoveries take that long just to walk again. "Rehabilitation and return to normal function after surgical repair of an ACL tear can take nine months or more" (Wedro 2013: 5). Without being able to trust his surgeon and therapist, Peterson would have been unable to return to football so quickly.

**What to Take Away From This Essay:**

- The ability of athletes to recover from surgery so quickly can be understood through credibility and trust. The example will show how their recovery time decreases with better therapy and more determination.



Figure 4. Robert Griffin III Returning to Practice After ACL Surgery (Wikimedia 2012)

[http://commons.wikimedia.org/wiki/File:Robert\\_Griffin\\_III.jpg](http://commons.wikimedia.org/wiki/File:Robert_Griffin_III.jpg)

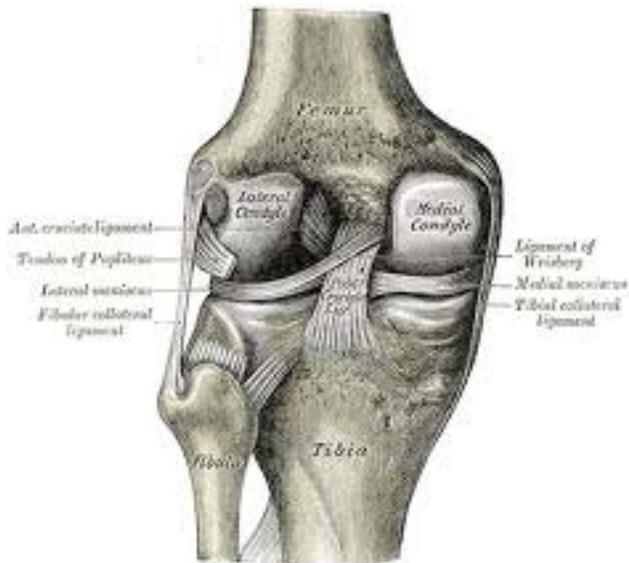


Figure 5. Ligaments in the Knee (Wikipedia 2010)

[http://en.wikipedia.org/wiki/Coronary\\_ligament\\_of\\_the\\_knee](http://en.wikipedia.org/wiki/Coronary_ligament_of_the_knee)

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## Section Two:

# Mertonian Norms in the MMR Vaccine and Autism Controversy

## **Introduction to Mertonian Norms in the MMR Vaccine and Autism Controversy By Micah Turner**

The umbrella STS concept that our group looked into was the Mertonian Norms: Communism, Organized Skepticism, Disinterestedness, and Universalism (Merton 1973). These four norms were connected to our umbrella empirical example, which was identifying whether or not there was an association between the Measles, Mumps, and Rubella (MMR) vaccine and autism. This was done by looking into the various studies that looked into the relationship, and the reactions to these specific studies. The umbrella STS concept and empirical example connect to the course objectives found in the syllabus because through the various norms, the community has access to read articles about MMR and autism critically. Along with that, through a collaboration of the STS concept and empirical example, we have all learned to form a standpoint of an argument; this particular goal being met by our argument as a group that the MMR vaccine and autism do not have a correlation with one another. We have also enhanced our skills of how to converse in a group setting; with all of the individual work that went into this project, along with the group work/class work that had to be completed, we all learned how to converse with one another in both large and small group settings, voicing our thoughts and opinions to one another. Moreover, we all gained knowledge of how to efficiently complete tasks as part of a team, complimenting the thoughts of one another and delegating specific tasks to everyone in the group. In addition to connecting with the course objectives, our umbrella STS concept connects to the umbrella STS concept of the previous section of this booklet, social determinism. This connects because depending on what information is available to lay persons from the experts, the

reactions in society differ; society's reaction is dependent on the information present. Moreover, how the experts relate the information is a factor on how society reacts and how the overall consensus about the topic of MMR and autism is determined. Social determinism is a key factor in how society views the connection between the MMR vaccine and autism, meaning the information that is available and the way it is explained determines the viewpoint society has on the issue and the overall response to the issue as a whole.

Through this section of the booklet, the four Mertonian Norms have been explored to explain how the MMR vaccine does not have a direct link to autism. Communism is related to the concept that all of the information about the MMR vaccine and autism is open to the entire scientific community to read about and to explore. Organized Skepticism is related to the fact that multiple experts are performing studies about the link between the MMR vaccine and autism. Disinterestedness is related to the point that experts who have done the studies are doing them for the benefit of the public, not themselves. Lastly, universalism is related to the generalization of the consensus pertaining to the MMR vaccine and autism across the board of medical societies and other societies pertaining to the public.

**What to Take Away From This Essay:**

Overall, this section of the booklet should help the reader to understand that there is no relationship between the MMR vaccine and autism. This is done through three main points:

- Through a study done in Japan, there is data present that the correlation does not exist and the people living there are not given specific information in regards to the correlation (Uchiyama 2007).
- Through a question and answer session with a pediatrician, he concluded that there is no correlation and gave insight to his patients through that (Stage 2008).
- Multiple studies have been done to show that there is no correlation, agreeing with one another on a consensus and refuting other studies that do not present a viewpoint that correlates with theirs (DeStefano and Thompson 2004).

Studies show that there is not a correlation between the MMR vaccine and autism.

Through the information that has been compiled in the rest of this section of the booklet, the absence of this correlation is presented and backed up with empirical examples.

**Organized Skepticism and Universalism within a Japanese Study**  
**By Holly Crowther**

The STS concept that our group focused on was Mertonian Norms (see glossary). The principles of this concept were used to analyze an article on a nationwide study on the correlation between autism and the measles, mumps, and rubella vaccine in Japan. The norms relate to this article because in order for the claims in the study to be legitimized and applied to further investigation, norms must be followed. In class, Ross's study of immiscible liquids (Zenzen and Restivo 1982) was discussed according to the norms. The claims made by the scientists of Ross' lab were accepted as "scientific" and factual because they were the result of research that adhered to specific norms of science. In Ross's lab, he did not have personal ties to the research he was doing beyond science. In addition, he applied skepticism by constantly reviewing and modifying the reports with scrutiny. Without norms, science is subject to bias and other social influence.

Tokio Uchiyama wrote the specific article that was used as the empirical example for this project (Uchiyama 2006). The article was about a specific study conducted in Japan that compared the rates of regressive autism between groups of children that have and have not received the vaccine (Uchiyama 2006). The government in Japan ended the inoculation program in 1993 as a result of several cases of meningitis that may have been caused by a strain of the mumps virus (Uchiyama 2006). This variance of people that have and have not received the vaccine was important to the data because it provided a type of control and experimental group (Honda 2005). The vaccine is an interesting example of science, technology and society because it involved a new scientific creation from

which the use of it was shaped by the society. In order for the results of the study to be useful in scientific investigation, norms must be followed when conducting research to ensure scientific standards are met. The importance of STS analysis to this empirical example concerns the validity of the report. When looking at norms of science, one is investigating whether or not the findings are biased or influenced by outside factors. The results from this study are crucial to disproving the correlation between autism and the MMR vaccine. It is important to analyze the report according to norms because they emphasize flaws in research and provide a framework for how science should be conducted in order to be accepted by the scientific community.

The subjects of this study came from clients of a private child psychiatric clinic that specialized in developmental disorders (Uchiyama 2006). This sample contains a very specific demographic of people. Typically, in order to receive private and specialized care, one must belong to a higher socioeconomic class. The people that are marginalized in society typically cannot afford this kind of care; therefore they were exempt from the trial. In this case, those who are marginalized are neither producing nor consuming. The vaccine was administered to the entire population for a time, however only people belong to the elite class were studied. People who are marginalized could aid in producing the knowledge that was collected, however, they were not considered in the study. This research failed to represent the entire population. The flaw was considering only the “elite” may have affected the results of the study. It is important that a sample is diverse and represents the entire population to eliminate the affects of context and contingencies specific to each

social class on the results. A study at the University of California at Davis has begun to produce research to suggest, “some environmental factors are causing the increases” (Coghlan 2005).

Of the Mertonian norms previously discussed organized skepticism particularly applies to this empirical example. The diagnosis for autism was based on clinical observation, interviews with the child, and a parent interview that provided information concerning their child’s developmental history (Uchiyama 2006). The fact that the results were dependent on parental report may have created bias and skewed the data so it is important to look at the data with critical scrutiny. Parents are considered somewhat unreliable when reporting the behavior of their child. They may report “false positives” (Uchiyama 2006) or fail to report signs of regressive autism due to denial (Uchiyama 2006). In addition, the sample size of those who had received the MMR vaccine was undesirably small (Uchiyama 2006). Small sample sizes are problematic because they fail to average out outliers as well as a large sample size would. This STS analysis is important because norms play a crucial role in how science is accepted. If research follows the norms of science according to Merton, the science can be accepted and used to prove or disprove a hypothesis. The “possibility of selection bias, small sample size, and discrepancy of the definition and measurement of regression” (Uchiyama 2006) are all anomalies that violate the validity of the study. Looking at this study with scrutiny supports that while the data has strong findings, the results can only cast “additional doubt” (Uchiyama 2006) on the hypothesis that there is a correlation between MMR vaccination and regressive autism.

### What to Take Away From This Essay:

- The study conducted in Japan provided crucial evidence that there is not a link between the MMR vaccine and Autism. It is important to analyze these findings with norms in order to consider the flaws in the experiment. The violations of the norms contribute to the fact that the data cannot prove there is no correlation, only support claims and cast additional doubt.

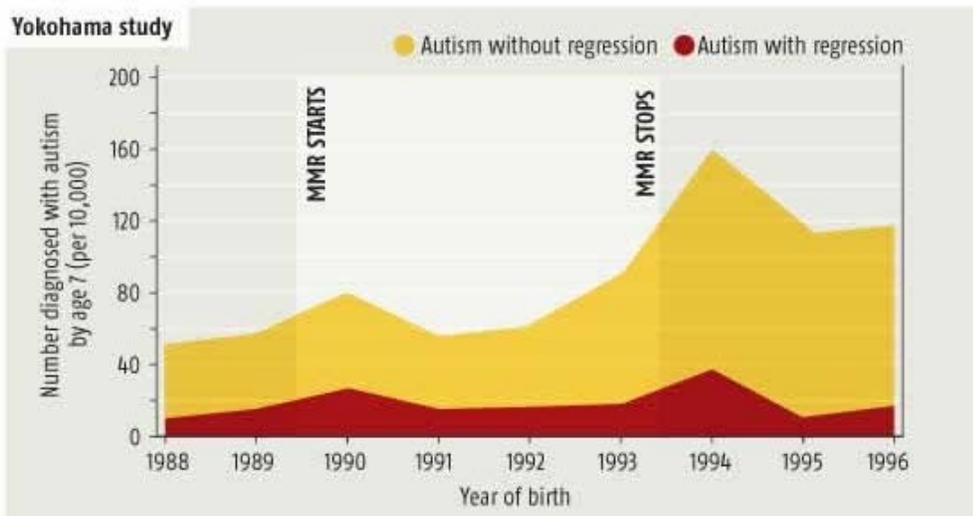


Figure 6. Chart from the Yokohama Study

"Journal of Child Psychology and Psychiatry."; *No Effect of MMR Withdrawal on the Incidence of Autism: A Total Population Study*, 18 Feb. 2005; Web.

**Communism and Organized Skepticism within a Question and Answer  
Session  
By Cahlia Lanier**

Autism is, according to Dr. Doug Barton, “truly a scary thing,” mainly because is it on the rise in the United States without any real explanation of why (Stage 2008). The “MMR vaccine causes autism” hypothesis has been around since 1998 and different scientists, parents, and the media have been arguing about it since. That being said, this controversy encompasses the specific STS concepts of the Mertonian Norm of Communism and the Mertonian Norm of Skepticism inside of my group's overall STS concept of Mertonian Norms. This hypothesis is also being disproven by the empirical examples of the fact that all of the known research of autism has been made available to the public, and the fact that multiple studies have rejected the hypothesis that the MMR vaccine causes autism.

To put it best, I will quote Dr. Doug Barton once more, “a British physician did a very brief study about autistic kids and found that the timing [of their diagnosis] correlated fairly well with the measles-mumps-rubella vaccine. He then published that in *The Lancet* and it created a firestorm” (Stage 2008). That aforementioned physician is Andrew Wakefield, and the “firestorm” his study created is still affecting people around the world today. Back in 1998, “Andrew Wakefield and his colleagues stated regressive autism and severe bowel problems might be associated with the MMR vaccine” (Ahearn 2010). Later on, Wakefield told the media that his conclusion suggested a causal link between the MMR vaccine and autism, and held press conferences to take a stand against the UK, claiming the heads of council released the vaccine without proper testing (Ahearn 2010). These

assertions caused Britain's General Medical Council to launch an investigation regarding the study of Wakefield and his colleagues (Ahearn 2010). When they found out that the scientists had participated in some misconduct in accordance to the research, the GMC accused Wakefield of being “dishonest, irresponsible, unethical, and not acting in the best interests of the children studied” (Ahearn 2010). Both the result of Wakefield's study and its retraction from *The Lancet* have had a major impact on the world. Upon this story getting swept up by the media, the number of MMR vaccines administered declined greatly, which fundamentally puts communities in danger of major outbreaks. Thankfully, upon this hypothesis being put under review, analyzed, and disproven, parents started vaccinating their children again, though some have remained a bit skeptical (Calvert, Ashton, Garrett 2013). What this laundry list of cause and effect does, is prove the underlying reason why scientists reject Wakefield (and colleague's) hypothesis: vaccinations prevent outbreaks, which keep the general public safe. Since vaccinations have not been legitimately proven to cause patients any harm, they should be administered and received to protect the human race as a whole.

People who are marginalized in society do indeed contribute to the rejection of the MMR vaccine not causing autism. Autism is not a class-discriminatory disease; it affects the rich and poor, the well educated and uneducated, it does not matter. Not to mention, the MMR vaccine is, at least in the United States, available to marginalized people and those of a higher class, so that is not a factor in this either. The main relationship between those who are marginalized and those who are not, in terms of MMR vaccines and their inability to cause autism, is the doctors

STS Concepts Applied in Society  
and nurses administering the MMR vaccine (the educated and non marginalized) to those who are less fortunate (the marginalized.) The thing about diseases is they do not care about how high a person's status is, or their power relationship to others. Diseases do not have the capability to have any form of bias, or specific interest. Diseases are diseases, when they strike, they strike, and it is up to those, marginalized and otherwise, affected to counteract them.

According to the article "Q&A with St. Charles Pediatrician Dr. Doug Barton," Dr. Barton alludes that all information regarding the experiments testing the hypothesis that the MMR vaccine causes autism have been open to the public, and all of those mentioned have come to a conclusion that rejects the controversial hypothesis (Stage 2008). This is an example of the Mertonian Norm of Communism. Another example of this concept is the fact that this whole controversy, that is continuing to affect countries around the world, started as public information published by Andrew Wakefield in *The Lancet*. Wakefield had "proven" that the MMR vaccine lead to autism in some of his cases, but as it turned out, the results were illegitimate and it has since been retracted. Despite the retraction, as a result of this "proof" the percentages of MMR vaccines administered have fallen "from 92% in 1955 to 84% in 2002, although in some parts of the country it might have been less than 60%" (Calvert, Ashton, Garnett 2013). This information, made public thanks to those who discovered it believing in the Mertonian Norm of Communism, is incredibly important because if a child goes abroad, contracts the measles virus, and then returns to a community where very few are immunized, "given the highly infectious nature of these diseases, the outbreaks could easily

spread to the wider community” (Calvert, Ashton, Garnett 2013) (ex: see Figure 7). In other words, the effect is global, so it is highly convenient and beneficial to know that the information involving it is open to those around the world as well. A third example of the STS concept of Communism is how the conclusion reached by Wakefield was made public, not only by being published in a public medical journal, but also by being taken up by the media, and broadcasted immensely. Initially, “in the article, the authors noted that their study did not prove a link between the MMR vaccine and autism, but after the study was published, Wakefield reported to the media that his work strongly suggested a casual link between the vaccine and autism. He has held press conferences since then to present unpublished research to bolster his claims... that the United Kingdom released the MMR vaccine without proper testing” (Ahearn 2010). Though this is not in its published form, this is still considered a part of the Mertonian Norm of Communism because it is scientific information being shared.

A second STS concept that is attached to the “MMR vaccine causes autism” hypothesis and controversy is the Mertonian Norm of Organized Skepticism. In the interview with Dr. Barton, he mentions, “since the release of [Wakefield's] study, there have been multiple studies, internationally, that demonstrate there is no risk in the MMR vaccine” (Stage 2008). Just as the definition of Organized Skepticism states, the knowledge of Wakefield's conclusion was scrutinized for its inconsistencies and errors. A beautiful example of this is the fact that Wakefield's methods and procedure is being, or has been in most cases, put under a microscope and analyzed by so many. In the article entitled “MMR Vaccine and

Autism: a Review of the Evidence for a Causal Association,” the author picks apart Wakefield and colleagues' methods themselves.

“There are a number of limitations to evidence from the case reports. First, the small number of cases referred to... may well have been a biased sample and not representative of children with autism. Second, there was no unaffected comparison group. Third, the possibility of a coincidental, but not causal, temporal association with MMR vaccination was not addressed. Fourth, the postulated link between bowel disease and autism was tenuous... there was no confirmatory laboratory evidence...” (DeStefano 2002).

The author is clearly delineating parts of the procedure that were done incorrectly, therefore being a part of the Mertonian Norm of Organized Skepticism.

**What to Take Away From This Essay:**

The hypothesis that the MMR vaccine causes autism is rejected as a whole by the scientific community and a majority of the members of society thanks to the Mertonian Norms of Communism and Organized Skepticism. Scientists used the norms to act on each other in order to reach this conclusion. Without the Mertonian Norm of Communism, the information would have never been available to the public. Without public availability, including the procedure and methods, Organized Skepticism would have been unable to happen; this means scientists would not have rejected the hypothesis. Therefore, the general public as a whole would still believe that the MMR vaccine caused autism and the world as we know it would be at a great disadvantage if an outbreak of measles, mumps, or rubella ever occurred, allowing the opportunity for it (worst-case scenario) to exacerbate into a pandemic.



Figure 7. Main Argument of the Article by Calvert, Ashton, and Garrett  
thedaytutu. "Untitled." <<http://www.flickr.com/photos/96458124@N03/8956769274/sizes/o/in/photolist-eDtMss-bT2vgK-dTWbob-8aKAF6-a1SQoP-fPkWp-9ZH9Ht-9ZHawF-9ZH8dH-9ZHa6V-dAWVK4-9z5j6p-9z8jhd-bbGnci-7zfRA6-9Mc8LA-daXJNQ-9CEde8-ej1v4N-bzxxPG-dehJpT/>>. 13 Nov. 2013.

**Disinterestedness and Communism within Multiple Studies**  
**By Chelsea Jump**

The study that I read discussed different studies on the relationship between the Measles, Mumps, and Rubella (MMR) Vaccine and possible causation of autism. All studies proved that there was no relationship between a child being vaccinated with MMR and the child developing autism. Mertonian norms are also connected throughout the study.

A hypothesis that began in 1998 of a possible link between the MMR vaccine and development of autism and autism spectrum disorders in children began to concern parents, especially those who had autistic children (Destefano and Thompson 2004). This became public because of the news after an article was published about twelve children who had autism, eight out of the twelve had pediatricians who believed the MMR vaccine was the cause of their autism (Destefano 2007). Private and public medical groups globally began to look into this possible relationship. In Denmark there was a study done which proved the 1998 hypothesis false and has been the first study done which used actual children to research and study the possible relationship (Destefano and Thompson 2004). The Center for Disease Control (CDC) performed an epidemiological study on school aged children, after the Denmark study was performed; this study also rejected the 1998 hypothesis. A Japanese study was performed as well which also rejected the hypothesis as well as proving that children were no more likely to develop autism if they had the MMR vaccine opposed to a single-antigen vaccine (Destefano and Thompson 2004).

“Despite considerable publicity, to date, there is no conclusive scientific evidence to prove a link between MMR and autism” (Tonge and Brereton 2011).

The example of science, technology, and society is how the Mertonian norms apply to the research done on autism and its relationship to the MMR, as well as whether or not the MMR vaccine has a direct link to the causation of autism.

Disinterestedness is evident because the parents of children with autism had an interest in the causation of the disease. These parents were pushing doctors and scientists to perform research on the disease. This is an example of a group of people having interest in the area they are researching. Other researchers showed disinterestedness in this research because they had no link to people with autism.

Communism is evident because all the results of the studies were published and made public, through journals as well as online, to those who are interested in looking up information on the topic. The knowledge and findings of their research was made public and published in ways that showed that it was a reliable source of information.

**What to Take Away From This Essay:**

There is no direct link between a child receiving the MMR vaccine and the child developing autism. This has been proved through many global studies by scientists and doctors. The Mertonian norms apply to this research on the MMR vaccine’s alleged link to autism that was claimed in a 1998 article.



**Figure 8. Child Receiving the MMR Vaccine**

By Julian Hameis (CC-BY-SA02.0 (<http://creativecommons.org/licenses/by-sa/2.0>}), via Wikimedia Commons 13.Nov 2008

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## Section Three:

# The Politics of Artifacts within Social Media

**Introduction to the Politics of Artifacts within Social Media**  
**By Mohammed Islam**

There are two assumptions made by technologists: 1) technology is neutral, and 2) technology benefits society. However, the two assumptions are in conflict with each other; thus, only one could be true. Since the latter could be proven true on numerous accounts, the first statement is false as technology that benefits society could not be neutral. Technology that benefits society was made with some intention, and so could not be free of bias. From this emerges the umbrella STS concept that artifacts [technologies] have politics. When looking at technology, we are interested in a specific type, mainly social media. Social media has influenced the lives of the public in many ways, with the emergence of the Internet, social networking like Facebook, and even smart phones. Each of these forms of technology was designed with certain assumptions in mind about the users of social media. The assumptions may not hold true for everyone. In fact, it may leave large portions of the population out, specifically members that are marginalized in society. However, the designs of social media reflect these biased assumptions. Thus, technology has politics; this is a manifestation of bias that continues to exist, first shaped by the environment, but eventually shapes society itself as it picks up technological momentum.

In the previous sections, we discussed social determinism and the Mertonian norms. As explained before, social determinism is the belief that society shapes technology, whereas the Mertonian norms spell out the rules to abide by in the scientific community in order to conduct “good science”. These rules are universalism, the acceptance or rejection of knowledge being objective and bias-free

of the author's background; communism/communalism, knowledge being shared freely without any secrecy, providing only recognition to the contributors; disinterestedness, the practice of science with no personal goal in mind; and organized skepticism, the scrutiny of knowledge produced and/or presented for validity.

Social media was intended for helping people connect from across the world to be able to share their thoughts, feelings, and information. However, social media has developed beyond the intended purpose as explained by social determinism. It not only connects people, but creates a pressure on the public to comply with the lifestyles of others, specifically the lifestyles of the elitist groups. This is a violation of universalism and disinterestedness alike; the companies and innovators are interested in pressuring the population to accept a particular type of lifestyle through the use of social media. Within the last 60 years, social media has changed from digital technology being conformed to the social needs of people, to people being conformed to the social standards set by these technological advancements. Investigating the technological momentum of social media through the Internet, Facebook, and smart phones can help conceptualize the politics of artifacts. We wish to disclose the change in lifestyle brought by the very technology that was designed to aid in our original way of life.

In addition, we wish to be able to summarize the science, technology, and society concepts and be able to differentiate between them within our individual and collective groups that contributed to the making of this booklet. Furthermore, we wish to be able to develop and present an argument based upon the STS concepts

STS Concepts Applied in Society discussed, specifically the ideas of politics of technology and technological momentum within this section. While doing so, we developed our ability to communicate verbally in our individual and collective groups, as well as our ability to work effectively in teams.

In this section, we will discuss the importance social media has in everyone's daily lives by looking specifically at how the Internet, Facebook, and smart phones have been defined and have helped redefine society.

The internet has been around for about 40-50 years. Within these years, the internet has gone from its simple infrastructures to what we know of its capabilities today: web surfing, email, social networking, etc. Although we understand how to do these things on the internet, we still do not know how exactly all of its operations are conducted. The internet is a black box, where the users are aware of the inputs they are giving, and the feedback that they are receiving, but not of what goes on to give that feedback. For example, if someone was to search social media on Google, it would provide a list of related topics on social media; however, how it achieved in providing these top relevant topics from its database is unaware to the majority of the users. The idea seems trivial, but when someone's personal information can be searched in the same manner, the question of whether this is as beneficial changes as the question of the right to privacy arises. It also is important to take note that those without internet access cannot enjoy the features of the internet, categorized as the margins of society; however, it does not prevent them from being included in the database that companies and the government can draw from to receive personal information.

Facebook has affected the lives of many. This can be witnessed all around the globe. In fact, it is so widespread that the creators of Facebook have taken the liberty to make an image of the users around the globe that connect to each other through Facebook, delivering the message of just how influential Facebook has become in this digital era. However, as with the Internet, people with limited or no internet access are excluded from this world of Facebook as the margins of society. They are unable to participate in virtual witnessing, where people are able to “witness” the profiles and political standpoints of others through social networking on the Internet, such as Facebook (Shapin 1984; Doane RA5). Yet, they are not completely secluded from interaction with others. With the aid of broadcast or other forms of media, or by word of mouth, they can still learn of people’s profiles and political standpoints, though it is more likely to be biased as it is not knowledge that is being obtained directly from the source.

The last perspective of social media that we looked at is smart phones and their impact on society. Again, like Facebook, the effect it has on the world is monumental; almost every family household has at least one smart phone in developed nations. Looking around it is possible to see that most people have smart phones these days, with the exception of those who are not able to afford them and/or those in developing countries. For those with smart phones, they observe the shaping of the technology since the companies making them are constantly updating the phones to meet the desires of the users. However, what is not clear is how the technology has changed the thoughts of the users as well, as defined by technological determinism and technological momentum. A recent term has been

coined, “phantom phone vibrations”. This is the idea that you believe that your cell phone might be ringing or vibrating, when in actuality, it is not. The brain becomes conditioned to the technology that is being used every day that it makes the mistake of thinking your cell phone is ringing or vibrating, used to the frequent use of the device.

**What to Take Away From This Essay:**

As discussed throughout the section, social media has a huge influence on the lives of the users.

- The internet is a black box, where the users are aware of the inputs they are giving, and the feedback that they are receiving, but not of what goes on to give that feedback.
- Users participate in virtual witnessing, where people are able to “witness” the profiles and political standpoints of others, leading to bias amongst the users through the aid of Facebook.
- Smart phones have shaped society through phantom phone vibrations, the idea that your cell phone might be ringing or vibrating, when in actuality, it is not.

The influence these technologies has aided in enforcing the bias that is manifested in them by the designers as they made assumptions of the users. The assumptions may not hold true for everyone; however, the designs of social media reflect these bias assumptions. Thus, technology have politics, a manifestation of bias that continues to exist, shaped by the environment at first, but eventually shaping society itself as it picks up technological momentum.

## **Digital Trails – The Black Box of the Internet**

### **By Courtney Irwin**

Many people are leaving behind a “digital trail” of their personal information on the internet without even realizing it (Zwerdling & Schulz 2013). Technological momentum has played a huge role in this problem, because as the internet continues to boom in popularity, it affects society more and more. Politics of artifacts also plays a role because this problem is a political one, since the government can access so much information about its citizens. Most people are not aware how their information is being accessed, making the concept of a digital trail a black box.

Since the dawn of the computer age in the 1990s, the privacy rights of Americans have been quickly changing. When the fourth amendment on search and seizure was created, internet did not exist, and someone’s personal information was kept in that person’s house on written documents; now, most people have personal information on the internet (Zwerdling 2013). It is important that this issue is brought to the attention of the people in society so that awareness of the problem can be spread, and people can be better informed, therefore solving this technoscientific problem.

It is also important to mention how this example only affects people that have access to the internet. Different regions of the world have different levels of internet access than others (see Figure 9). Many people in under developed countries are not included in this wide reaching digital database of personal information in cyberspace. This has several economic and political effects for the under developed countries. Since the government and commercial companies do not have nearly as

much personal information about its citizens, the legal process and the advertising business of the country are affected.

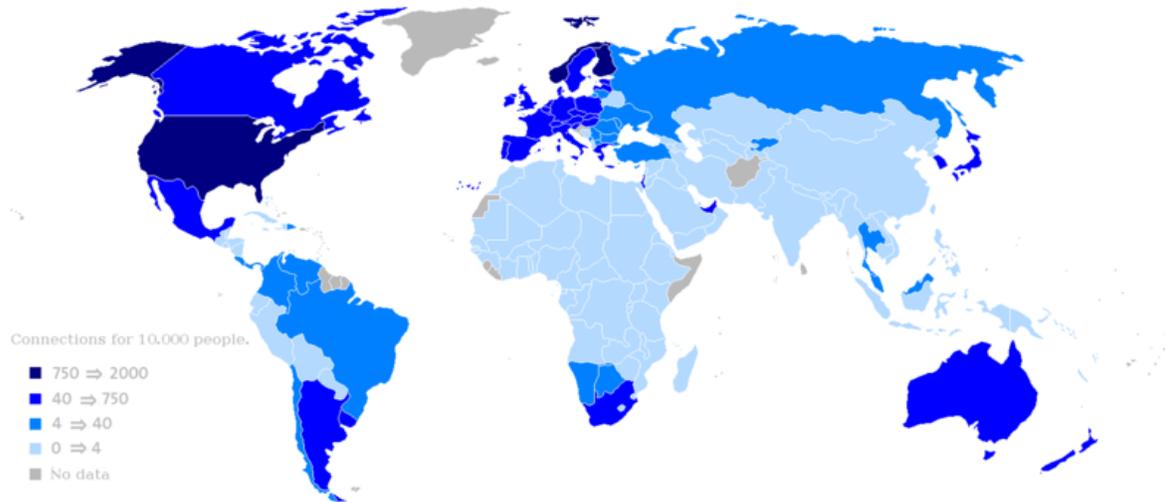


Figure 9. A Map Showing the Internet Connection Rates in Different Regions of the World in 2000

Yug. "Internet Connection Rate 2000." Map. [Wikimedia Commons](http://commons.wikimedia.org/wiki/File:Internet_connection_rate_2000.png). 9 Dec. 2006. Creative Commons. 13 Nov. 2013  
 <[http://commons.wikimedia.org/wiki/File:Internet\\_connection\\_rate\\_2000.png](http://commons.wikimedia.org/wiki/File:Internet_connection_rate_2000.png)>.

Now, the government can access a plethora of information over the internet without even having a warrant, including who that person is emailing and their location information from their cell phone provider (Zwerdling & Schulz 2013). In fact, the government can easily access almost any information that the person shares with any company online (Zwerdling & Schulz 2013). That leads to the next problem: many people do not realize how many companies have access to the information they share on the internet. Some information is shared with companies that are not always open about what they are doing with the information that they have (Zwerdling 2013). In addition to the government and many companies getting the information shared on the internet, it is also very easy for the information to be obtained by personnel involved in legal battles (Zwerdling 2013). Even things that Americans deceptively think are private, like medical records, can usually be

accessed easily by investigators and private attorneys (Zwerdling 2013). The way information is being stored on the internet is a black box in our society because people do not know how their information is being used “behind the scenes” when they use the internet. This black box could be opened if people were more educated about the ways that their information is being stored and therefore were more cautious about what they put on the internet. Another solution that could potentially solve this problem at hand is if the government passed stricter legislation to protect the privacy of citizens on the internet. This topic has recently been brought up in Congress (Handerson 2013). On October 29, 2013, Representative Sensenbrenner and Senator Leahy proposed the Freedom Act to limit the amount of information that the National Security Agency can collect on Americans and foreigners (Handerson 2013).

**What to Take Away From This Essay:**

Many Americans are leaving a “digital trail” of information behind them without realizing it (Zwerdling & Schulz 2013). The ways that information on the internet is being used by commercial companies and the government is a black box. This problem could be solved if more Americans were educated about the ways that the personal information they are putting on the internet could be used.

**Facebook Profiles and Virtual Witnessing**  
**By Alison Doane**

This essay discusses the relationship between the politics of social media and Facebook, explained through Shapin's virtual witnessing. Shapin explains virtual witnessing as the idea that if Shapin wrote down the observations from his experiments in excruciating detail, those who read the report will be virtual witnesses to the experiment (Shapin 1984). In this essay I am going to define virtual witnessing as the idea that individuals can be witnesses to profiles and political standpoints by viewing them online. The difference between online and offline witnessing is the fact that online, an individual has the ability to instantaneously view many different political opinions and personal profiles. This allows for very quick judgments to be made on the context of the profiles and for comments and "likes" to be placed. Offline it is difficult for this many contexts to be viewed and judged. The politics displayed over Facebook are especially important because of the natural risk that differences in political views can cause conflict, especially when judgments and opinions are being shared so instantly online. The empirical examples that I used to explain these STS concepts were 3 articles supporting the argument that individuals can get into trouble for the information they present on their profiles on Facebook. For the sake of argument, I viewed the information presented on an individual's Facebook profile as their personal background and context. This is because the kind of information that an individual usually shares on Facebook is the same personal information that makes up an individual's context and background.

The issues surrounding Facebook started immediately with the development of Facebook. Since it was founded in 2004 (Newsroom 2013), even before it was

made public to those who were not students, Facebook has changed the way that people interact. Before Facebook, there was much less sharing of personal information with the online public. Because Facebook is online and accessible anywhere in the world, it is not specific to any certain geographical location. When Facebook was founded the actual mission statement was “to give people the power to share and make the world more open and connected” (Newsroom 2013). Initially only for students of Harvard University, and later exclusively for students of several other universities in the United States, Facebook now includes everyone who wants to make a profile and join the site, as long as they are 13 or over. This is important to STS because it is a technoscientific controversy that involves explicit politics. The politics of Facebook occur because of the way that Facebook has changed how quickly individuals can find out personal information about one another and make judgments based on these observations. Thinking about this judgment pattern through Shapin’s virtual witnessing helps the reader understand the empirical example because in the example individuals experience repercussion for the actions that they performed on political pages and profiles on Facebook. Shapin would say that these individuals had reacted to information that they virtually witnessed online.

The topic of Facebook as explained by virtual witnessing can be applied also to knowledge from the margins. In this example, the marginalized individuals would be those who are part of the lower class and have a lower socioeconomic status because these individuals have either limited or no access to computers, and therefore the internet. Without access to the internet, marginalized individuals do not have the ability to see the information presented on Facebook, and so without

seeing the information they are unable to virtually witness the background of other individuals and place judgment based on what they observed.

My first empirical example comes from National Public Radio in the form of an article titled “Clicking The 'Like' Button Is Protected Speech, Court Rules”, by Eyder Peralta. In this article, two employees of a police station in Virginia were fired after they “liked” their boss’s opponent’s page on Facebook. These two men took the issue to court and the court ruled that “liking” something on Facebook is protected under the first amendment to the constitution (Peralta 2013). This shows how political opinions expressed on Facebook can be judged by other individuals, who virtually witness the opinions shared online.

My second empirical example also comes from National Public Radio, an article titled “Facebook Arrests Ignite Free-Speech Debate in India”, by Julie McCarthy. This article is about a young woman who was arrested in India for a status that she posted questioning the fact that the city of Mumbai was shut down for the burial of a controversial leader. She removed the post quickly after receiving negative feedback from family and friends, but not before the authorities saw the post (McCarthy 2012). This example specifically shows the permanence of information shared on Facebook, if the wrong person virtually witnesses the status or opinion under question, the information cannot be unseen and the consequences cannot be avoided, even if the post is removed.

My third and final empirical example also comes from National Public Radio, an article titled “Friendly Advice for Teachers: Beware of Facebook”, by Nancy Solomon. This article discusses several examples of teachers that have made

inappropriate comments either to or about students or their employers on Facebook and the various repercussions that they received for their actions. Examples include a New Jersey teacher who made anti-homosexuality comments on her Facebook page, and another New Jersey first grade teacher who worked in a school district comprised mostly of black and Latino students who made a status that at work she felt like “a warden for future criminals”. In this article teachers are advised to keep their private opinions off of Facebook, or take precautions such as using the privacy settings and not “friending” their students (Solomon 2011). This example addressed the fragile politics that occur in the workplace and how small violations of professional boundaries, especially on the internet can cause major consequences. It is all too easy for the person who virtually witnesses a teacher’s post to be someone with relative political power to them, such as a boss, or someone who can report them to such a person, like a student or the parent of a student.

**What to Take Away From This Essay:**

This essay discussed the argument that the background and context of an individual that is virtually witnessed by others on Facebook can have major repercussions if the wrong post is seen by the wrong person. Part of this problem is due to the importance of the politics of social media. Several empirical examples were discussed to support this argument.



Figure 10. Virtual Witnessing on Facebook and its Consequences

Image Source: <http://www.flickr.com/photos/smemon/4608219105/>

**Smart Phones in Society**  
**By Oishi Bagchi**

Smart phones have become one of the most prevalent forms of technology in the United States, with over half of adults owning smart phones (Kerr 2013). As a result, smart phones are becoming and larger and more prominent part of the society, to the point where they are actively shaping our society (Hu 2013). This follows the concept of technological determinism, which is the idea that technology in society influences and shapes its cultural and social norms. To be more specific, the example I used were phantom phone vibrations—a situation where phone vibrations were felt, but in reality, there was no vibration (Hu 2013). This common use of smart phones ties into how society has been using social media over time. We can use the concept of technological momentum to see the relationship between society and social media over time and we can use the example of politics of artifacts to see what kind of effect social media has on society.

Because smart phones are still a relatively new installment in our society, the concept of phantom phone vibrations wasn't brought to attention until around five years ago (Hu 2013). While phantom phone vibrations did not start appearing until after cell phones became a common object for people to own, phantom sounds and feelings still existed before that (Hu 2013). It is only recently, that they became phantom *vibrations* specifically. According to Dr. Larry Rosen, this change in phantom sounds and sensations show “how our devices are changing how our brains process information” (Hu 2013). This example shows how as a society, we have been socialized to these new norms. These phantom phone vibrations can have adverse effects in certain groups of people, such as medical professionals,

when a vibration is a sign of an emergency (Rothberg 2010). In these situations, phantom phone vibrations can lead to a false alarm which can result in panic and misacting (Rothberg 2010).

While these phantom phone vibrations haunt a significant percentage of the American population, there are still other groups of people who do not have access to smart phones. In smaller, developing countries, many people do not have access to smart phones. Even in the US, there are people living below the poverty line who cannot afford smart phones.

For my specific example, I used phantom phone vibrations. Phantom phone vibrations are described as “perceived vibrations from a device that is not really vibrating” (Drouin 2012). Phantom phone vibration is a widespread phenomenon amongst smart phone users. In a recent study amongst undergraduate students, almost 90% of them reported to feel phantom phone vibrations (Drouin 2012). This ties in with the definition of technological determinism because we can see how our social behaviors are socialized according to the technology we use. Before smart phones came around, we would have phantom other things and be reaching for an itch, whereas now we reach for our phones (Hu 2013). This shows that over time, as smart phones became more and more integrated into US culture, our habits literally changed and shaped themselves around these smart phones. Rosen says that there is something in our brain “being triggered that’s different than... a few... years ago” (Hu 2013).

Smart phones aren’t only the most prevalent forms of technology in the United States, but also arguably the ones with the most potential. Their influence

continues to grow, along with their popularity and with the use of technological determinism as a concept, we can provide an explanation for why we adapt to our technology in this way.

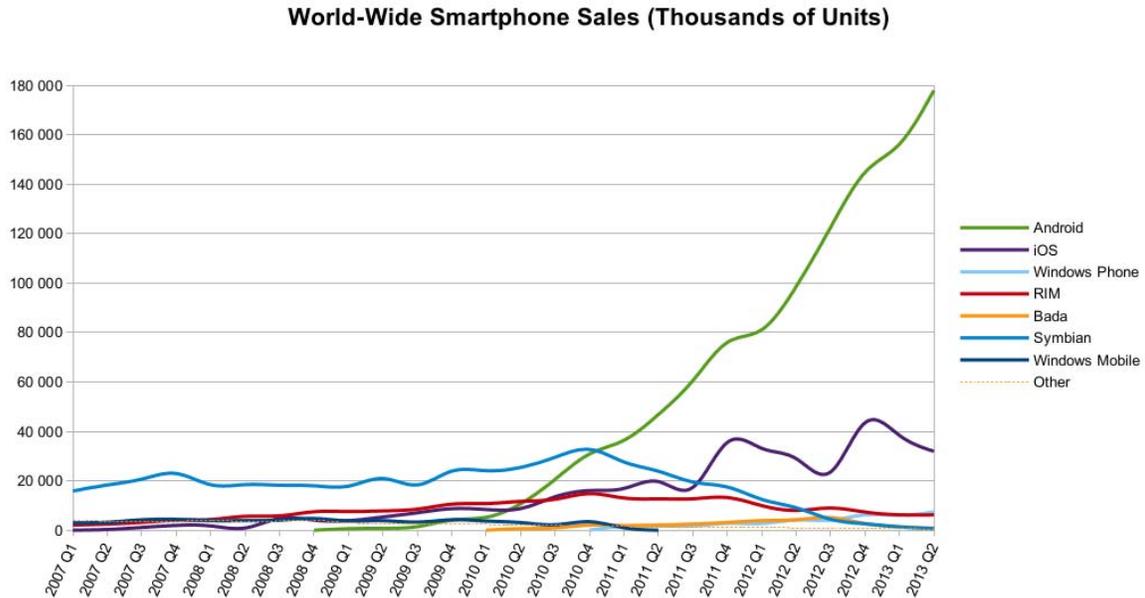


Figure 12. World-Wide Smartphone Sales based on Gartner Actuals (Source: Smartmo)

**What to Take Away From This Essay:**

Phantom phone vibrations can be used to highlight technological determinism in relation to society and social media. We can compare the changes technology has gone through to see the changes society has gone through to adapt to these technological changes.

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## Glossary

**Bias:**

Partiality to one group, as opposed to another; prejudice.

**Black box:**

The users are aware of the input and output of technology, but not of the messy constellations that occur to achieve the output (Kline and Pinch 1996; Sismondo 2009).

**Communalism:**

Scientific results are all a common property and belong to all those who are in the scientific community (Merton 1973).

**Communism:**

*See definition for communalism.*

**Context:**

An individual's environment and background has influence; when the environment influences the problem (Sismondo 2009).

**Contingency:**

Unpredictable future circumstances (Zenzen and Restivo 1982).

**Credibility:**

The ability to be believed or trusted (Wynne, 1992).

**Disinterestedness:**

Scientists are to do research for the benefit of the public and not for their own good or interests (Merton 1973).

**Expertise:**

Specialist knowledge in a specific field (Epstein, 1995).

**HPS:**

A Lyman Briggs course;

“Introduction to History Philosophy and Sociology of Science”.

**Ideology:**

Set of beliefs.

**Interpretive flexibility:**

Different social groups associate different meanings with artifacts (Pinch and Bijker 1987).

**Irrelevant social group:**

Those who do not affect the technology (Kline and Pinch 1996).

**Large technological system:**

An immense network that includes the system builders, economies of scope, economies of scale and all other elements that affect the system (Hughes 1994).

**Lay-expert person:**

Become familiar with expert vocabulary (Epstein 1995).

**Layperson:**

Person who is not an expert in a given field of knowledge (Epstein 1995).

**Marginalize:**

To relegate to an unimportant or powerless position within a society or group (Merriam-Webster 2013); To treat an individual person or social group as

insignificant, irrelevant, or minor.

**Marginalized people:**

Members of society with little or no power.

**Mertonian Norms:**

Accepted ways of doing things in western science (Merton 1973).

**Organized skepticism:**

Scientists take nothing on trust; knowledge must always be scrutinized for possible errors of fact or inconsistencies of argument (Merton 1973).

**Politics of technology:**

The manifestation of bias in technology through the assumptions of designers, derived from the two contradicting assumptions of technologists –

(1) technology is neutral and

(2) technology benefits society (Winner 1980; Balabanian 2006 [1980]).

**Regressive autism:**

When a child appears to develop normally but starts to lose speech and social skills (Borthwick 2012).

**SCOT (Social Construction of Technology):**

Human actions shape artifacts (Pinch and Bijker 1987; Hughes 1994).

**Social construction:**

“a specific model known as SCOT (Social Construction of Technology)... has several advantages in analyzing users as agents of technological change”

(Kline and Pinch 1996);

The ideology that technology and other constructs are created due to social groups and society.

**Social determinism:**

Society shapes technology (Sismondo 2009; Zenzen and Restivo 1982).

**Technological determinism:**

Technology shapes our social and cultural norms (Sismondo 2004).

**Technological momentum:**

Technology is shaped by society at first, then shapes society as it grows larger (Hughes 1994).

**Trans-epistemic community:**

Scientific communities and all the outside influences and areas that affect them. (Knorr-Cetina 1982).

**Trust:**

Belief in the truth of someone or something (Wynne 1992).

**Universalism:**

Background of scientist does not influence the science (Merton 1973).

**Virtual witnessing:**

Being a witness through some medium without actually being there to bear witness to an event (Shapin 1984; Doane RA5).

- *Shapin's Virtual Witnessing:*

By writing every detail about an experiment in the report, those who read the report become "virtual witnesses" to the experiment (Shapin 1984).

- *Virtual Witnessing (appropriated):*

By reading information posted online, individuals become “virtual witnesses” to the standpoints and opinions that are shared (Doane RA5).