Moralizing food technology

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Abstract
Food technologies are present on many levels in society from food professionals to consumers. Food technologies are important for the processing and preservation of food but they also inform the way people relate to food. An approach for analysing the mediating role of food technology for food perception and food ethics is presented. The approach is based on post-phenomenology and the idea of a technologically mediated morality. Four steps are included in the analytical framework: perception, interpretation, intentionality and mediated morality. The framework is applied to the case of the mechanical tomato harvester.

Keywords
Perception, intentionality, mediated morality, story-telling

Introduction: Food technology

Food technologies shape the food physically through processing. However, food technologies also informs and shape the way people from producers to consumers relate to food. There is therefore good reason to further examine how food technologies forms and shapes human understanding of food and how this influence on food ethical decisions. The question is therefore what roles food technologies have in food ethics and to what extend food technologies can be seen as moralising agents?

Before going into this a clarification on what should be understood by the term food technology is needed. First of all, food technology should be distinguished from agricultural technology in that the later is part of the production of crops and animals on the farm. In agriculture focus is on producing "raw materials" and much less on processing. Food technologies on the other hand involve processing, preserving, and packaging of "raw materials" that mainly originate from agricultural production.

Technology is often perceived as mixture of technique and science. The ancient Greek word "techne" can be translated into craft or craftsmanship. "Techne" was for the Greeks an ability to make or perform something. The combination of craftsmanship and science gives technology its unique character. Science adds something to traditional craftsmanship. It qualifies and refines craftsmanship and it introduces new utilizations and practices that could not be realized without science. The production of high fructose corn syrup (HFCS) by an enzymatic process that converts glucose found in corn into fructose is an example of a new food technology. HFCS was first produced in the laboratory in in 1957 but it was not until the 1960s that it came into industrial production. HFCS is a sweetener and is cheap replacement for sugar.

The case highlights the importance of scientific knowledge for food technology. Much present day food technology can thus be understood as an application or integration of food science in all sorts of food processing and preservation practices. This understanding excludes for instance traditional bread making as a food technology as it is not based on science. However, food technology is not only used for industrialized purposes, some modern household appliances like the refrigerator, the freezer, the electric oven, the coffee machine,

the microwave oven, food processors, the bread machine, or more recently the sousvide devices also bears the signs of technology.

Since many people like to communicate about food food production and consumption is deeply intertwined with communication technologies. These cannot be considered as food technologies but they are important for perception, interpretation, understanding, and actions with food.

Story-telling around food technology

Technology has become an integrated part of modern people's lives both in the private and professional sphere. Humans constantly make use of technology for transportation, working, leisure activities, and also for preparing food. This use of technology does not go by unnoticed. Technology affects and changes human lives. Indeed, it is the purpose of technology to change human lives. The American artist Laurie Anderson once described technology as the campfire around which modern human beings tell their stories. What does this analogy imply and in what sense do we tell stories around technology?

People gather around campfires because they provide light if it is dark and warmth if it is cold. It provides protection for dangerous animals and it is a good place to cook. It is the right place if you want company as the campfire is always made by someone. As a place for company it is also a place for story-telling.

Technology can provide some of the same features as the campfire. It can enlighten us and it can provide us with some level of comfort and security. As shown above we also use technology, industrially and in households, to prepare food. Just like campfires do not tell stories neither do technologies. Stories are told *around* campfires and *around* technology because they attract people and invite to company. It is in their capacity as a meeting place for people that want to socialize that campfires and technologies have conquered a central position for story-telling: there must be someone to tell the story and there must be someone to listen to the story.

We gather *around* technology to tell all sorts of stories. Anderson did not go on to discuss differences between telling the stories around a campfire and around a technology but it is not hard to imagine that it makes a difference when stories are told around a television or around a campfire. Or when stories are told around an industrialized convenience food plant or around household kitchens. Or when stories evolve around shopping in an on-line food store or evolve around shopping in the local food grocery.

Stories connect people and make community in the sense that ideas are shared through the stories. Since man is a story-telling animal, these stories, like all other stories, have the capacity to change the perspective of the listener and reader allowing new interpretations and understandings of ourselves, of others, and of the world. In the end this can lead to behaviours and actions that would have been different if the story had not been told or told differently. To stay in the world of narratives and food the question can be formulated as: what are the implications of stories being told around food technology?

Technology and mediated reality

To examine the question raised above one approach would be to consider how food technology shapes perception and how this informs understanding. The idea here to be presented here is that perception and understanding is mediated by food technologies. The following describes the theoretical approach adopted to examine the mediating role of food technology.

Technology alters human perception. A simple example would be that when looking through an optical lens the picture of the world that is perceived is different from perceived without a lens. Or, our perception of geography and landscapes is different whether

we have a car or a bike at our disposal. The world is not the same whether you have a loaded gun in your hand or not. Technology changes the perspective and perception of the world. Whenever technology is involved it imposes new views on the world and thus changes how the world is experienced. Technology mediates perception.

The smartphone also illustrates this as it affects profoundly the human perception. By the use of smartphone apps dealing with nutrition/health or animal welfare for instance smartphones (co)shape the experiences of what can be considered as healthy food and what can be considered as animal friendly farming practices.

The technological mediation of perception has been elaborated by Don Ihde (1990) in his so-called post-phenomenological variant of phenomenology. Post-phenomenology analyses technology as a constitutive part of human beings' life-world. In the post-phenomenological perspective human beings and things constitute each other (Verbeek, 2011). In a technological world human experience is considered not as something that stands on its own but rather as something framed by and mediated by technology.

The technological mediation of reality has further consequences as it not only affects perception but also understanding and interpretation of reality. Perception is dealt with in phenomenology and interpretation in hermeneutics. In daily language the distinction between the two might not always be clear, however, perception is generally associated with becoming aware of or to know things by means of the senses. Interpretation on the other hand is to explain the meaning of something, which is often done by referring to the wider contexts of the situation. The purpose of interpretation is to create an understanding of the issue at hand.

To give an example, testing for pathogenic microbes at a certain point in a food chain is an activity that involves both scientific knowledge and specific techniques for identifying microorganisms that are otherwise invisible to the eye. For instance can the presence of *Bacillus cereus* be revealed on a cereus selective agar. A microscope is often used to confirm the presence of the bacteria. Here perception is mediated by the specific qualities of the agar and the magnifying ability of the microscope. Identification of the pathogenic microbes in the sample would hardly be possible without these techniques.

Interpretation takes it a step further in asking what it means when a certain number of a specific microorganism can be found in the sample. The meaning of the perceived result can only be deducted by putting the result into the context of the established scientific knowledge produced in the field of food science and food safety. By doing so the combined efforts of perception and interpretation provides a scientific answer to the question of whether the food in question should be considered as safe or unsafe for human intake. Ihde calls this process of interpretation a *hermeneutic relation*.

Simple technologies like the thermometer create representations of reality that can be perceived by the human senses in form of simple numbers. Interpretation involves considering if the measured and perceived temperature complies with the HACCP standards for food safety. More complicated technologies like apps for smartphones are also perceived by the senses but the interpretation of the data/information provided is much more complex and often ambiguous.

However, the human-technology intertwinement does not end here. With the term *technological intentionality* Ihde indicates that technologies are not neutral, but often designed to represent reality in a specific manner with a specific focus. The test for pathogenic microbes in the food chain is designed to focus and thus represent reality from the perspective of food safety. Technology thus directs human intention towards some issues and away from others.

Technologically mediated morality

Ihde's analysis of technology is gathered around the structure of experience whereas Bruno Latour's focal point is on action. Technology provides a framework that shapes the scope of possible actions. Technologies "want" people to do things in specific ways. Corresponding to the idea of technological intentionality Latour speaks of a *script* that prescribes how users are to act when using them. Testing for pathogenic microbes in a food chain aims a keeping up with hygienic food safety standards and thus to avoid food born diseases; it prompts specific actions of the people involved in the food chain.

Verbeek (2011) speaks of a *mediated morality* in the sense that technologies embody morality. A very obvious case is Latour's favourite example of speed bumps that urges car drivers to slow down and thereby forcing them to take care for other more vulnerable road users. This self-evident example of a technology that embodies morality can be interpreted as a kind of delegation. Latour (1992:154) described delegation: the "transformation of a major effort into a minor one". Although Latour's examples focus on how difficult and demanding tasks by the use of technology are transformed into minor tasks, I will here use it in an ethical perspective. In the moral sphere delegation can be understood as how the major effort of the car driver to take care for other vulnerable road users is transformed to a minor effort by the fact that not slowing down the car may cause harm to the car. This actually comes close some forms of nudging. However, not all cases that involve technology are that obvious.

Often when some sort of technology is involved decisions on what to do and the ethical reflections that belong to these decisions will be located somewhere in the human-technology association. Technology offers certain perceptions of the world that favours some interpretations and that informs the judgements and decisions made by the individual.

It is easy to imagine that the mentioned smartphone app on nutrition/health or animal welfare could inform moral decision-making concerning the individuals diet. To paraphrase Bruno Latour (1999): you are different with a smartphone app in your hand; the smartphone app is different with you holding it. Human and non-human entities are in this sense intertwined and folded into one another. Hence, technologies are not just a neutral ensemble of tools and instruments that can be separated from ethical considerations.

From this understanding of the role of technology it is not far to state that technologies have moral implications in the sense that they exert an influence on human action and interaction. Morality and ethics, to put it very shortly and formally, is here understood as human interactions either with oneself, with others or the natural environment that has to do with understandings of right/wrong and good/bad. For example using a smartphone app on nutrition and health may indeed have implications for one's perception of what is "good" and "bad" food and hence influence one's diet, which in turn may influence one's social relations. To sum up the theoretical approach presented here it can be stated that technologies:

1. Technologies mediate the perception of reality
2. Technologies frame interpretation; how meaning is constructed in the human-technology association
3. Technologies shape human intentionality by directing attention towards some issues and away from others
4. Technologies mediate morality; technology contributes to ethical ideas of right/wrong and good/bad

The moralizing character of the mechanical tomato harvester

What does this theoretical approach mean for the moral dimensions and implications of food technology? To answer that I will in more detail look into the case of tomato production and

the technologies used in this field. In the article *Do Artifacts Have Politics?* Langdon Winner discusses the social and political consequences of new technologies (Winner, 1980) and discusses among others tomato production and processing. Winner's analysis of the tomato production is more macro-sociological and political in its approach but it serves here as suitable starting point as it describes the case well.

To illustrate the intertwinement of technology and the social Winner describes how the mechanical tomato harvester developed by researchers at the University of California in the late 1940s has had a number of effects; handpicking has been replaced by machines, farm workers have been dismissed, harvesting costs have been reduced, the number of farms have declined as the machines are costly and only few can afford them, yields have increased, farms have become bigger, and the tomatoes have become less tasty as new hardier and sturdier varieties were developed to fit the new harvesting method. To Winner this process was not the result of a plot, but "a social process in which scientific knowledge, technical invention, and corporate profit reinforce each other in deeply entrenched patterns that bears the unmistakable stamp of political and economic power" (Winner, 1980: 126).

The example describes the industrialization of agriculture that has made the separation of food production and food consumption possible at large scale. A number of other techniques were of course also needed in that process, for instance the introduction of artificial cold, the "cold chain", was paramount to the efficient and industrialized mass production of food (Truninger 2013: 84). The main conclusions of Winner are that 1) the introduction of new technologies tend favour certain developments and delimit others 2) technology is the symbol and embodiment of a specific social order 3) chosen technologies become "strongly fixed in material equipment, economic investment, and social habit, [and] the original flexibility vanishes for all practical purposes once the initial commitments are made." (Winner, 1980: 127-8) and 4) technology establishes a pattern of power and authority: certain kinds of technology are strongly linked to particular institutionalized patterns of power and authority (Winner, 1980: 134)

Winner's analysis operates on the social level revealing some of the implications of the technological development for social structures whereas the post-phenomenological/moral mediation approach focus on experience and thereby it accentuates the individual involvement. Common to both, however, is the preoccupation with the moral dimensions of technology. The mechanical tomato harvester as a technology can be analysed from different actor perspectives using the post-phenomenological/moral mediation approach.

The consumer is a suitable actor to consider in deeper detail. How can we hypothetically imagine the outcome of the introduction of the tomato harvester from the consumer perspective? In general, consumers will not have any personal experience of the new mechanical tomato harvester due to the separation of production and consumption in industrialized societies. Consumers only see the tomatoes, the product, and not the production practices. However, in this case also the product has been altered and has an influence on consumer perception. The pure perception of the new varieties, which in this case is a culinary perception, is different for the new tomato variety as it is less tasty and hardier compared to the old varieties.

The next step in the analysis is to look at how this change in taste is interpreted, that is how meaning is constructed around the taste of new tomato varieties. Consumers who have tasted the old varieties may consider it as a decline in food quality. It can be assumed that such consumers would be less satisfied with the new variety compared to the old ones. Consumers who do not know the taste of the old varieties have nothing to compare with. Still it must be assumed that their interpretation of the new tomato variety will rank these new tomatoes lower on a culinary scale than would have been the case with the old varieties.

The lower ranking of tomatoes on the culinary scale can be expected to have consequences for consumers' intentionality. Attention will be directed away from fresh tomatoes and towards other foodstuffs. Multiple scenarios can be imagined here. One could be that canned tomatoes would be preferred over fresh tomatoes. Another would be that other kinds of vegetables would be preferred. A third possibility is that fresh tomatoes would be substituted by completely other kinds of foods such as bread or meat. A fourth possibility is that consumers get used to the new variety and accepts the lower culinary quality without changing eating habits. Cheapness of the new variety and the development of new adjusted recipes would support the fourth option.

Consumers do in general construct stories around the industrialization of agriculture and food processing (Coff, 2005). It is in fact well known that modern tomato varieties are less tasty even though consumers seldom know why. In this case stories are not constructed around technologies like the mechanical tomato harvester but from the culinary perception of the loss in taste.

There are also moral impacts of the changes brought about by the mechanical tomato harvester. The new tomato variety mediates morality by changing the perception, interpretation and intentionality of consumers concerning tomatoes. Tomatoes are as vegetables in general considered as healthy but the technologically induced change in taste and price influence thoughts about good/bad and right/wrong aspects of eating tomatoes. This may indeed leads to a change in eating habits, which for instance may have individual and public health related consequences.

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