Emotions in Design for Values

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Abstract

The contributions to this handbook show that technology is not value neutral, as is often thought. In this chapter, we argue that the inherent value-ladenness of technology evokes positive and negative emotions of the people who encounter or use it, by touching upon their personal and moral values. These emotions enable people to make concrete practical and moral judgments and to act accordingly. In this chapter, it is therefore proposed that emotions of users and designers alike should not be marginalized as being irrational and irrelevant, but instead be embraced as valuable gateways to values. Emotions reveal those values that matter to our well-being given a particular design or technology, and they are an important source of moral knowledge by being crucial to our capacity of moral reflection. This chapter discusses six sources of emotions in

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human-technology interaction and proposes how an understanding of user emotions can support design processes. In addition, the chapter discusses how emotions can resolve the lack of moral considerations in traditional approaches that assess the desirability of technology. It is argued that emotions do this by opening the gateway to moral considerations, such as responsibility, autonomy, risk, justice, and equity. This means that moral emotions can – and should – play an important role in the development of technology and can be considered to be indicators of success and failure in value-driven design processes.

Keywords
Emotion • Design • Values • Risk • Well-being

Introduction

Emotions are usually seen as a distortion of good, rational decision making. In the same vein, emotions might also be seen as a distorting factor in the design of technologies. This chapter challenges this view. Based on recent emotion research, we argue that emotions should play a role in technology design, because emotions reveal important personal and moral values.

The traditional account of technology is that technological design is value neutral and based on rational decision making. According to this account technology is not related to values and emotions because these are seen as a-rational or irrational. There are two challenges to this view. The first challenge is that technology is not value neutral. Technology has impact on our well-being and experiences; it is inherently value-laden. Technology is pervasive: Our daily lives are filled with interactions that are influenced, facilitated, or stimulated by technology. Public services in all domains, such as transport, healthcare, entertainment, and education, heavily rely on technology. Moreover, technology is integrated in all kinds of commonplace consumer products and services, such as telephones, laptops, cars, and dishwashers. People experience positive and negative emotions in response to perceiving, using, and owning consumer products and thus in response to the technology that is integrated in these products. These emotional responses are an expression of personal and moral values and disvalues and can be intended and deliberately designed-for, but they can also be unintended, or even unwanted, and unforeseen by the designer. It is important to already in the design stage explicitly reflect on the values that are affected by technology and to incorporate desirable values in technology and diminish disvalues. We should design for values, an idea which is extensively discussed by the various contributions to this volume. The second challenge to the traditional view of technology is that emotions are not irrational. Recent emotion research has shown that emotions are necessary for our *practical* rationality.

In this chapter, we will show the implications of the combination of these two insights for design theory. We will argue that technologists should consider emotions in the design for values, their own emotions but also those of users and other

stakeholders, as these emotions point out important personal and moral values. We will discuss some ideas on how technology evokes emotions and propose some possibilities for taking these emotions into consideration in the development of new technologies.

New Approaches to Emotion

Emotions are generally seen as opposed to reason and rationality. Whenever something goes wrong, we blame it on the emotions. When we want things to go right, we invoke rationality. This view is so deeply ingrained in our culture and intellectual heritage that we hardly ever call it into question. In daily language, we (ab)use emotions to explain irresponsible or harmful behavior: "I should not have hit him, but I was blinded with anger," and "I should not have called you in the middle of the night, but I was overwhelmed by the fear of losing you." It is a view that is reflected in empirical decision research, where the dominant theoretical framework is Dual Process Theory. According to Dual Process Theory, we apprehend reality through two different systems: system 1 being emotional and spontaneous and system 2 being rational and reflective. System 1 has the advantage of navigating us smoothly through a complex world but comes at the cost of being highly unreliable. System 2 is normatively superior but requires a lot of time and conscious effort (cf. Kahneman 2011). A similar opposition is prominent in metaethics, the study of the foundations of ethics. The usual taxonomy of metaethical theories consists of sentimentalist versus rationalist approaches to ethics. Sentimentalist approaches see values as expressions of our subjective emotions (Hume 1975 [1748–1752]). Rationalists ban subjective emotions from credible ethical reflection and state that objective values are constituted or understood through rationality (Kant 1956 [1781/1787]). Hence, the dominant approaches to decision theory and value theory endorse the common dichotomy between reason and emotion.

However, this dichotomy has been challenged by recent emotion research. Psychologists and philosophers who study emotions argue that emotions are not opposed to but a specific form of rationality. Emotions are needed in order to be practically rational. The neuropsychologist Antonio Damasio (1994) has studied people with specific brain defects, in the amygdala and in the prefrontal cortex, who don't feel emotions anymore and who at the same time have lost their capacity to make concrete moral and practical judgments. These patients still score equally high on IQ tests as before their illness or accident that caused the damage. They also still know in general that one ought not lie, steal, etc. However, their personality has completely changed. Before their impairment, they were normal, pleasant people, but after their brain damage, they turned into rude people, who in concrete situations are completely clueless on what to do. Hence, emotions turn out to be necessary to make concrete practical and moral judgments and to act accordingly. These ideas are supported by theories from other psychologists and philosophers who emphasize that emotions are not contrary to knowledge and cognition but that

they are themselves a form of cognition and intentionality, so-called cognitive theories of emotions.

A well-accepted cognitive theory of emotions is appraisal theory, which purports that all emotions are elicited by an appraisal (Roseman 1991), an evaluative process that serves to "diagnose" whether a situation has adaptational relevance to the individual and, if so, to identify the nature of that relevance and produce an emotion and an appropriate behavioral response (Lazarus 1991). Someone who is confronted with a fire alarm will most likely experience fear with a corresponding tendency to flee because the fire alarm signals a potentially harmful situation with particular behavioral consequences. This example illustrates that appraisals are inherently relational (e.g., Scherer 1984). Rather than exclusively reflecting either the properties of the stimulus (e.g., a fire), the situation (e.g., the office), or the person (e.g., asthmatic condition), appraisal represents an evaluation of the properties of the stimulus and the situation as it relates to the properties of the individual (Smith and Lazarus 1990). In short, appraisal is an evaluation of the significance of a stimulus for one's personal well-being.

Cognitive theories of emotion especially emphasize the importance of emotions when it comes to our appraisal of personal values. They "pull us toward" ideas, objects, and people that we appraise as favorable and "push us away" from those we appraise as threatening or harmful (Frijda 1986). One's personal values (or "concerns" in the terminology of appraisal theorists, see Frijda 1986) serve as the point of reference in the appraisal process.

These insights from appraisal theorists can shed important light on design for values as follows. An appraisal of designed technology has three basic possible outcomes: the technology is (potentially) beneficial, harmful, or not relevant in relation to our personal values (and thus for personal well-being). These three general outcomes result in a pleasant emotion, an unpleasant emotion, or the absence of an emotion, respectively. Note that in the case of emotional responses to technology, the emotion is not necessarily evoked by the technology itself but can also be elicited by the (imagined, expected, experienced) consequence of the technology or an associated object or person, like the manufacturer or the typical user. Moreover, because appraisal mediates between technology and emotions, the emotion is evoked by the relational meaning of the technology instead of by the technology itself, and different individuals who appraise the same technology in different ways will experience different emotions.

Emotions can reveal personal values and moral values, and the two do not necessarily coincide. One's personal values can be, but are not necessarily, moral values. Indeed, besides moral values, the values that serve as the point of reference in one's emotions can range between values that are morally fully acceptable and values that are morally fully unacceptable. To take an extreme example, a hunter who enjoys hunting for endangered species like elephants may experience positive emotions in his actions because these match his personal values ("freedom to hunt"), even though other people may feel that these are morally intolerable.

Even though the hunter's pleasure reflects a personal value that is not a moral value, he may experience additional emotions in relation to his activity that do serve

moral functions. For example, if his friends or family respond with contempt instead of pride to his hunting trophies, he could feel embarrassed, and this emotion can stimulate him to rethink the moral qualities of his hobby. This example illustrates that emotions can not only result from cognitions, as is emphasized by appraisal scholars, but they can themselves be a source of cognition. According to some forms of cognitive theories of emotion, emotions are affective and cognitive at the same time (Zagzebski 2003; Roberts 2003). Emotions let us see the world in a specific light and let us focus on morally salient features (Little 1995). Emotions draw our attention to what matters, in our own lives but also in those of other people (Little 1995; Blum 1994). By drawing our attention to our personal values, emotions can stimulate us to reflect on the moral implications of these values. For example, emotions like guilt can increase our awareness of how our actions conflict with moral values. Likewise, such emotions can make us aware that a personal value may be morally unacceptable (Camacho et al. 2003). Social emotions such as compassion help us to extend our "circle of concern" from near and dear ones to people far away (Nussbaum 2001). Feelings of sympathy, responsibility, and care help us to understand that we should help others and what their needs might be. Emotions are an important source of moral knowledge, understanding, and awareness (Roeser 2011).

The Role of Emotions in the Experience and Evaluation of Technology

If we combine the insight that technology is value laden with the insight that emotions are a prime source of knowledge and understanding of values, it follows that emotions can and should play an important role in understanding values involved in technology.

Technology can affect our well-being, for better or worse. Traditional approaches to assess the desirability of a technology are based on risk-benefit analysis. According to such an approach, the benefits of a technology are measured in, for example, economic terms and balanced against possible negative side effects or risks. Risk is defined as the probability of an unwanted effect. This approach to risk has been severely criticized by social scientists and philosophers, who have pointed out that this approach is too narrow (Slovic 2000; Krimsky and Golding 1992). It is difficult or even impossible to express all moral considerations about technologies in terms of risks or costs and benefits and to compare them on one scale (Espinoza 2009). Risk-cost-benefit analysis leaves out important ethical considerations such as responsibility, autonomy, justice, fairness, and equity (Asveld and Roeser 2009). Moral emotions related to risk such as indignation, compassion, and feelings of responsibility can point out such moral considerations that cannot be captured in a traditional risk-cost-benefit analysis (Roeser 2006, 2010).

Conventional approaches to risk assessment leave out important values, but they also ignore emotions, as they are seen as a threat to rational decision

making about technologies. Even scholars who emphasize the importance of a broader perspective to risk, including moral values, struggle with the role emotions might play in assessing risky technologies. Based on Dual Process Theory, Slovic et al. (2004) think that risk emotions should be corrected by quantitative methods. Loewenstein et al. (2001) argue that the emotions of the public have to be respected simply because we live in a democratic society, even though they might be irrational. Sunstein (2005) argues that we should even avoid emotions in risk judgments and use cost-benefit analysis instead.

However, as argued before, emotions should not be seen as contrary to rationality, as Dual Process Theory has it, but rather, they should be seen as a form of practical rationality. This idea can shed completely new light on risk emotions. They are not an obstacle to decision making about risky technologies; rather, they are a source of awareness of moral values that are involved in risky technologies. Risk and value-sensitive design can be seen as two sides of the same coin. With value-sensitive design, we try to diminish the potentially negative effects of risky technologies. Emotions such as sympathy, compassion, indignation, and feelings of responsibility allow us to be sensitive to ethical aspects of technologies such as justice, fairness, equity, and autonomy. This awareness is an important first step in critically reflecting about the kinds of values that we want to be included in the design of a technology.

As Papanek (1985) already stressed in his famous book *Design for the Real World*, design has the ability to create well-being, it can embody the principles of good citizenship, and it can challenge, engage, and nourish culture and identity. Over the last few years, a growing group of designers and engineers in both industry and academia has been inspired by the possibility to increase the subjective well-being of individuals and communities. Seligman and Csikszentmihalyi (2000), p. 5, purport that the social and behavioral sciences can play an enormously important role in nurturing human welfare: "They can articulate a vision of the good life that is empirically sound while being understandable and attractive. They can show what actions lead to well-being, to positive individuals and to thriving communities." We propose that in line with this thought, the design discipline can play an equally important role by materializing the vision of the good life, enabling and stimulating actions that lead to well-being and thriving communities (cf. Desmet et al. 2013). But then emotions should play an important role in design, as they help us to draw our attention to what matters to our own well-being and that of others.

Because emotions can facilitate and stimulate but also discourage or obstruct technology usage, they can, do, and should play an important role in the process of developing technology. In product design, measuring emotions elicited by existing products has been proven an adequate means for uncovering relevant (and often unanticipated) values that drive the emotional responses of users toward existing products. These insights can be used to formulate value profiles that direct new technology development. An example is a wheelchair design for children (see Desmet and Dijkhuis 2003). The emotions experienced by children in response to existing wheelchairs were measured, and negative emotions served as cues that the design threatened user values. One of the findings was that children experience

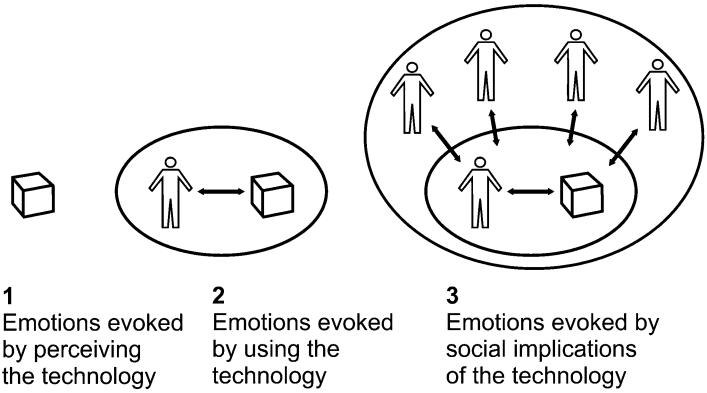

Fig. 1 Three main sources of technology emotions (Adapted from Desmet 2012)

contempt in response to wheelchairs with big handles. Interviews revealed that the cause of this emotion was that the big handles conflict with the personal value of "being independent" (i.e., having big push handles expresses dependency). This was a relevant insight for a redesign in which the children can freely slide the handle behind the back side when using the wheelchair individually. By not being recognizable, the handle no longer expresses dependency. This example illustrates that emotions can operate as portals to relevant personal values. User emotions should therefore play an important role in design processes, and because these emotions are valuable sources of moral knowledge, they should be taken into consideration in the evaluation of ethical aspects of technology. Note that technology often evokes mixed emotions because emotions are evoked by different levels of interaction. Figure 1 visualizes three main sources of emotions experienced in relation to designed technology (Desmet 2008, 2012). The first represents emotions experienced when perceiving (seeing, touching, tasting, thinking or hearing about, etc.) technology; these emotions are "about" the design of the technology as such. The second represents emotions experienced when using technology to fulfill its purpose; these emotions are "about" the activity of using the technology. The third represents emotions experienced in relation to the social implications of using and owning the technology; these are emotions "about" one's relationship with other people. Below, we discuss these three sources with the intention to illustrate that technology tends to have a multifaceted rather than a single emotional impact. This multifaceted nature is particularly interesting because each of the sources can evoke emotions that are an expression of moral values and/or a source of moral knowledge.

Each of these three sources can be detailed in at least two subordinate sources. Table 1 gives an overview of the various sub-sources of emotions, with a simple black pen as an example. The sources differ in terms of the trigger cause (or focus) of the emotion: the emotion can be evoked by (1) the design of the technology as such, (2) the symbolic or associated meanings, (3) the behavior of the technology when in use, (4) the activities that are influenced or enabled by using the

Table 1 Emotions in response to design (or designed technology) (Adapted from Desmet 2012)

Perceiving the design (or designed technology)	Using the design (or designed technology)	Social implications of (using or owning) the design (or designed technology)
(A) Object-focus	(C) Usage-focus	(E) Relationship-focus
Emotions evoked by the material qualities of the design	Emotions evoked by the interactive qualities when using the design	Emotions evoked by the influence of the design on one's relationships with other people
What do you see when looking at the design?	How does the design respond to you when using it?	What effects does the design have on your social relationships?
"I enjoy looking at this unique pen that is made of sustainable bamboo"	"I enjoy the ease of using this pen because the weight distribution is perfectly balanced"	"I feel reluctant when people ask me if they can borrow my pen because it is fragile and I would not like it to be damaged"
(B) Association-focus	(D) Activity-focus	(F) Identity-focus
Emotions evoked by something (or someone) that is represented by the design	Emotions evoked by the consequences of using the design	Emotions evoked by the influence of using or owning the design on one's social identity
What do you know about the design?	What does the design enable you to do?	What does owning or using the design say about you?
"I cherish this pen because it represents my passion for the combination of beauty and sustainability"	"Drawing is an activity that makes me energetic"	"I am proud of being person who takes good care of his belongings"

technology, (5) the social implications of using the technology, and (6) the impact of using or owning the design on one's personal identity.

Emotions Evoked by Perceiving Design

Emotions can be evoked by the perceivable manifestations of technology. An individual can, for example, love an advanced computer for its beautiful design. Or one can be curious about a novel design or fascinated by a complicated design or feel sympathetic toward broken-down or obsolete technology. Appearance is used in the broad sense of the word, involving not only the visual appearance but also the taste, tactile quality, sounds, and fragrances.

Sometimes, the emotion is not directly evoked by the technology's appearance but by some associated object, person, event, or belief. One can, for example, admire the manufacturer of an innovative technology (in this case the object of the emotion is the manufacturer) or love a design because it reminds one of a loved person (in this case the object of the emotion is the loved person). Designed technology often represents or symbolizes intangible personal (moral) values or beliefs. Some products are deliberately designed to represent such values or beliefs.

Examples are spiritual and religious objects, tokens, mementos, souvenirs, keepsakes, talismans, and mascots. In other cases, technology is not intentionally created to represent values or beliefs and obtains its symbolic value in user-technology interaction or in the cultural discourse. Note that a special type of emotions evoked by technology are those that are related to anticipated usage or anticipated consequences of usage. When being introduced to new technology, people anticipate on how it will be to use or benefit from this technology. Or one can experience hope in response to a mobile phone because one anticipates that it will support one's social life or fear in response to a new technology to produce energy because one anticipates that it will harm their moral norm of being energy efficient.

Emotions Evoked by Using Technology

We use technology with the purpose to fulfill needs or achieve goals. This can be to drill a hole in a wall, to listen to music, to cook a meal, etc. The activity of using technology can evoke various kinds of emotions. These can be emotions evoked by the interaction with the technology as such (usage-focus) or by the activity that is enabled or facilitated by using the technology (activity-focus). In the first case, the emotion is evoked by how the technology responds to us when using it. For example, the technology can be easy to use or complicated and challenging. It can behave unexpectedly or predictably. This "quality of interaction" can evoke all kinds of emotions. One can become energetic by technology that requires physical effort to use and experience joy when technology is unexpectedly easy to use or pride when successfully operating complicated technology.

In the second case, the emotion is evoked by the activity that we engage in when using technology. Technology is used to enable or facilitate all kinds of activities; it provides us with instruments that are used to "get something done" in some situation: activities that can be useful (e.g., organizing my documents) or pleasurable (e.g., ice-skating with friends) or morally commendable (e.g., helping out a neighbor). Individuals will respond emotionally to these activities because they have personal values related to the activities. The emotion is not directed to the technology as such, but the technology does play a role because it enables the individual to engage in the activity that evokes the emotion. Examples are I am excited by making a hiking trip in the snow (which is facilitated by my GPS system to keep me safe); I enjoy talking to my friends (which is facilitated by my mobile phone); and I am satisfied with the stack of clean laundry (which is facilitated by my washing machine).

In many cases, users do not have a direct emotional intention when using designed technology. In those cases, emotions are "side effects," like unexpected sensorial pleasures of using the technology. In other cases users do have a deliberate intention to affect their emotions when using technology. Examples are computer games and relaxing chairs. We use computer games because they amuse us, and we use relaxing chairs because they relax us and ride a motorcycle because it excites us.

Emotions Evoked by the Social Implications of Technology

Technology is always used in some social context. We use technology in our interactions with other people (e.g., communication devices and gifts), and the technology that we use and own affects our social identity. In the first case, the emotion is evoked by social interactions that are influenced or facilitated by the technology. One can enjoy talking to a friend (facilitated by a phone), be proud of being able to help someone (facilitated by a city map on one's smartphone), or enjoy drinking a glass of wine with a group of friends (facilitated by an online event planner).

In the second case, the emotion is evoked by our identity, as affected by using or owning technology. As was mentioned by Belk (1988), products are extensions of their owners, and they affect an individual's self-perception and how they are perceived by others. An expensive stroller might support someone in their self-perception of being a good parent, crayons enable someone to be a creative person, and an SUV car makes someone look cunning or irresponsible, depending on one's personal values. People are emotional about who they are and how others perceive them and thus also about the effects of the technology they use and own on their identity. Examples are I feel insecure because I have to use hearing aids (which conflicts with my personal value of being independent) and I feel confident when driving my new electric car (which matches with my moral value of not wasting fossil energy).

Design for Values

The insights on how emotions play a role for the users of technology can help the developers of a technology in their design. In line with the three sources of emotions elicited by technology, we propose that there are three levels of emotional appeal: an object appeal (the degree to which the technology is appealing), an activity appeal (the degree to which my activity is appealing), and a self-appeal (the degree to which I am, or my life is, appealing). In this context, the word "appealing" is used for technology that is appraised as beneficial to our personal values. To design for each level of appeal requires different considerations because different values will be involved. Personal values and emotions are interrelated: Emotions experienced by users reveal the personal values of these users, and when designers have the intention to deliberately design for particular emotions, they should have an overview of the users' personal values that can be affected by the design. This means that emotion-driven design is actually value-driven design.

The first step is to identify the user group and the situation in which the technology will be used. This can be formulated in the form of a design theme, expressing a user group engaged in an activity in some situation. Examples are police officers using a communication device when at work in the streets or caretakers using a bottle when feeding a toddler at home. The second step is to

formulate a value profile that represents this design theme. Because many personal values can be at stake in a given situation, the challenge is not to aim for completeness but for a concise value profile that is both relevant and inspiring. In line with the three levels of appeal, the profile includes values related to the technology itself, to the activity facilitated by the technology, and to the social impact of using or owning the technology. Key questions in formulating values related to the technology itself are: what are the users' expectations and standards about this technology, and what kind of properties do they enjoy? Examples are a phone should be strong enough not to break when I drop it, and I want my table to be made of honest materials. Key questions in formulating activity values are: what do the users want to accomplish in the usage situation, and what do they expect from themselves? Examples are I should be patient with my clients at work, and I want my son to enjoy himself at school. Key questions in selecting values related to the social impact of the technology are: what do the users expect from themselves in life, and what are the general life goals and aspirations they pursue? Examples are I should be fit and I want to be autonomous.

Once the value profile is defined, a design profile can be formulated that represents the designer's vision on how to align with the value profile, specifying three qualities: the product's significance, intentions, and character. Significance represents the key consequences that we want to design for; e.g., I have many friends, I am relaxed, my baby is happy, or I am inspired. The intentions represent the purpose it will be designed to have, such as the technology enables me to talk freely and enables me to meet people, to be spontaneous, or to be at work on time. The character represents the technology's appearance, such as the design is rough, inviting, delicate, natural, or colorful. The design profile is used to formulate a product statement. Some examples are a delicate product that enables me to have a relaxed life by seducing me to talk freely and a tough product that enables me to have many friends by forcing me to open up to others. The value profile and product profile can be used as a reference in all stages of the design process in order to safeguard the emotional fittingness of the final design.

The Role of Emotions in Design for Values

So far we have discussed how designers can incorporate the personal values and emotions of the users. However, the emotions and personal values of the users or clients might be morally contentious, or these users might not be aware of the potentially morally problematic implications of a technology. As was mentioned earlier, not all personal values are necessarily moral values, and some can even be morally unacceptable. This means that it is necessary to include critical reflection on these emotions and values in order to make sure that we do not design for any values, but for moral values, or at least morally acceptable values. Here, however, emotions can also play an important role, as they endow us with the capacity to critical moral reflection (Roeser 2010). Emotions such as compassion and feelings

of responsibility can entice us to counteract selfish emotions. For example, our care for the environment can entice us to design, buy, and use a more sustainable but slower car (Roeser 2012). Several methods have been developed to enable reflection about technology, for example, scenarios that describe situations in which the use of a technology gives rise to moral considerations (cf. Boenink et al. 2010). These methods involve narratives that directly engage the imaginative capacities of people. These methods can be further developed to explicitly encourage emotional engagement and emotional reflection. This enables critical reflection about one's own lifestyle and considerations of justice toward others. By providing people with concrete narratives, distant others that can otherwise easily be neglected come uncomfortably close by and force oneself to critically assess one's own behavior.

However, emotions can play yet another role in technology design. The developers of the technology themselves presumably have emotional responses to their designs. They should take these emotions seriously as they can draw their attention to important values that can be potentially incorporated in the design. These can be positive values, that should be maximized, and negative values, that should be minimized. The designers can oversee and influence the properties of a technology more directly than anybody else, which gives them a special responsibility (Van der Burg and Van Gorp 2005). Experts might be concerned about unpredictable consequences of a technology. However, even if the consequences of a technology are fairly well known, there can be remaining emotional-ethical concerns that should be taken seriously, such as potential misuse of a technology or potentially or even explicitly immoral requirements set by the client or user. Designers should use their imaginative capacities, for example, by empathizing with possible victims of a technology, in order to come to a more active appreciation of their moral responsibility in designing risky technologies. Designers can take on stronger responsibilities if they cherish their imaginative, emotional capacities. This will make them feel more involved, responsible, and prone to take action. Designers should take on this responsibility to which their emotions can draw their attention (Roeser 2012). Drawing on the reflective, critical capacity of emotions can make an important contribution to design for moral values.

Future Research

In the section "Design for Values", we have discussed design for emotional experience; in sections "The Role of Emotions in the Experience and Evaluation of Technology" and "The Role of Emotions in Design for Values", we have discussed emotional evaluation of technology. Now these perspectives can be combined in future research, through the idea of reflective technologies, in other words, technology as a means for meaningful activities. The idea is that technologies themselves can give rise to, entice, and encourage critical reflection on what are desirable activities enabled through technology. Here emotions and values play an important role again. On the conventional view of emotions as opposed to rationality, design that appeals to

emotion entails evoking unreflected gut reactions. However, based on the novel theories of emotions sketched in the section "New Approaches to Emotion", appealing to emotions through design can endow us with the capacity to take a critical stance toward a technology and the kind of behavior it invokes.

Let us first take a look at how technological design might entice critical reflection about our personal values. A lot of work has been done recently on the way technological, institutional, and other designs can "nudge" people to do certain things that are ethically desirable (Thaler and Sunstein 2008). However, nudging might lead to manipulation. One might argue that as long as it is for a greater good, manipulation is justified. However, this is a very consequentialist way of reasoning that is ethically dubious, as it might not respect the autonomy and reflective capacities of people. Thaler and Sunstein (2008) argue that manipulation cannot be avoided. Any presentation of options steers our choices and behavior. Based on this, they argue that choice options ("nudges") should be provided that let us do things that we would endorse. However, technology design does not only need to work as simple nudge, but it can also be a vehicle for reflection.

Indeed, the design discipline has a rich tradition in using design as an instrument to stimulate discussion and reflection. In the 1960s and 1970s, for example, designers and architects in the Italian "Radical Design" movement used design to embody their critical views on prevailing material culture and technology values. More recently, Dunne and Raby (2001) proposed the concept of "design noir" as a reaction to the (in their view) impoverished experiential value of mainstream consumer technology. Design noir was offered as a new genre of design to explore how technology can be designed that expands our experience of everyday life. Using design as a means for reflection was coined "critical design" in 1999 by Dunne in his book *Hertzian Tales*. Critical design aims to provoke users in reflecting on their values and practices by challenging preconceptions and expectations. In that way, critical design can stimulate new ways of thinking about technology, its usage and meaning.

Emotions can play a role in this critical design, by, for example, making users feel uncomfortable while using a certain technological product, presenting them with surprising, disgusting, and frightening experiences that force them to reflect on their behavior, value patterns, and responsibilities. Demir (2010) described "Poor Little Fish" designed by Yan Lu (Fig. 2; see www.yanly.com) as an example of such design. The product combines a fish bowl and a water tap and challenges people to reflect on how their behavior touches upon their personal values of sustainability.

While using the tap, the level of the water in the bowl gradually falls (but does not actually drain out); it will return to the original level once the water stops running. The combination of a tap and a fish tank draws a parallel between water consumption and damage to natural life. Emotions such as sympathy for the fish, the fear of killing it, or shame to disturb its home can stimulate a direct tendency to reduce water consumption and a more indirect behavioral effect mediated by reflection. Although critical design generally provokes an unfavorable view on the existing role of technology in our daily lives, we believe that design can also

Fig. 2 "Poor Little Fish" water tap, by Yan Lu

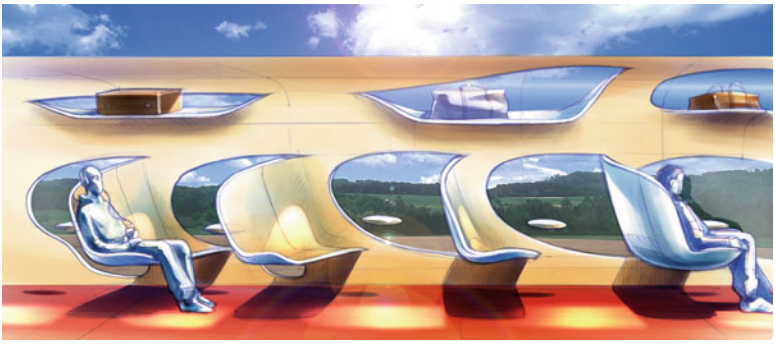

Fig. 3 Connecting Europe, concept high-speed train by Doeke de Walle

be used to stimulate discussion and reflection on opportunities and possibilities of newly conceived technology. This "constructive design," which embodies manifestations of future technologies, can be provocative too, expressing possibilities previously thought not realizable and stimulating discussions on future rather than current material culture and technology values. Here again is an important possible role for emotions. Constructive design can trigger our imagination and compassion and endow us with inspiration and motivation to try something new that might make a difference. Desmet and Schifferstein (2011) presented a collection of 35 experience-driven design projects that illustrate the inspirational quality of constructive design. An example is a concept for a trans-European high-speed train, designed by Doeke de Walle for Pininfarina; see Fig. 3.

The train was designed to express new possibilities of novel layered construction methods and materials. This enabled a design that offers unobstructed views of the

external surroundings, connecting the outside to the inside world, which stimulates the value of "freedom of movement" and evokes emotions like anticipation and delight.

We can think of the role that social media such as Facebook have played in recent political movements against oppressive regimes, as a platform for sharing both negative and positive emotions, such as frustration, anger, hope, and relief. Social media enable people to build relations and feelings of connectedness with a large number of people whom they cannot reach easily via other means. This can endow them not only with the practical tools to reach out to large groups but also to build a feeling of community, trust, and shared interests. Future research should investigate the many possible ways in which emotions can play a role in reflective design. The frameworks sketched earlier on in this chapter, i.e., cognitive theories of emotions and emotion-driven design, can provide for a basis from where to explore these possibilities.

Conclusion

Emotions should play an important role in design for values because the emotions that people experience in response to design and technology are an expression of their personal and moral values. In other words, emotions are the gateways to value: We are only emotional about things that touch upon our personal and moral values. This implies that negative emotions are just as relevant as positive emotions, because both indicate underlying values. We can distinguish different layers of emotions in response to technology. When aiming to understand an emotional response, we should be aware that this emotion can be evoked by the technology itself, but also by activities that are enabled and supported by the technology, or by the impact of technology on one's social identity. The ability of designing technology that evokes positive (and prevents negative) emotions can be increased by formulating value profiles that represent a particular user group and a particular usage situation; it is a combination of general values and contextualized values that drive emotional responses to technology in everyday life. Technology and design have an enormous potential for promoting well-being. Emotions can play an important role in pointing out the values that matter for our well-being and that of others. Emotions are elicited by all aspects of design and technology that are perceived as good or bad, desirable or distasteful, effective or useless, and meaningful or pointless – they are both an expression of personal and moral value and an entry point to these values. That is why, rather than being a distorting factor in the design of technologies or the "cherry on the cake," a finishing touch that is added to a design that has already been optimized on all other aspects, emotions should be considered to be a valuable source of information and indicator of success and failure in any value-driven design process. Our emotions reveal what we value, to ourselves, to the people we encounter, and ideally also to those who design the technologies that we live with.

Cross-References

- ▶ Conflicting Values in Design for Values
- ▶ Design for the Value of Human Well-Being
- ▶ Design for the Value of Safety
- ▶ Design for the Value of Sustainability
- ▶ Design for the Values of Democracy and Justice
- ▶ Design for Values in Engineering
- ▶ Design Methods in Design for Values
- ▶ Participatory Design and Design for Values

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