Chapter 4
Abort, retry, fail: scoping techno-regulation and other techno-effects

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> *Questions about the way that code regulates, and about its role within systems of social ordering more generally, are systematically overlooked.*
>
> (Cohen 2012: 20)

4.1 Introduction[1]

Regulators and designers have long since realised that (technological) artefacts can be deployed in various ways to influence, steer and/or change human behaviour. Architects know that the design of a space directly affects the behaviour of individuals in that space. Using the placement of, for example, barriers, doors, passageways and staircases they can predict and affect the way individuals move through or use a space. Similarly, when designers create new technologies, their design choices have a bearing on the way in which these products are used: they can steer the behaviour of users by facilitating some forms of use, while inhibiting others (cf. Dommering 2006: 7; Norman 1988; Van den Berg 2010b). What is more, regulators sometimes use artefacts to directly influence the behaviour of citizens as well. For example, using speed bumps is a very effective way to ensure that drivers adhere to a speed limit set in a specific area – it leaves drivers much

[1] The authors wish to thank Martin Pekárek and Mireille Hildebrandt for their willingness to challenge and debate the ideas put forth in this chapter.

less room to drive too fast than, for example, the placement of traffic signs does (Brownsword 2008; Latour 1992; Leenes 2010, 2011; Yeung 2008). At Underground and train stations one way to ensure that travellers obtain a valid ticket is to install entry gates to the tracks that only open if the passenger has such a ticket. This, too, is a form of enforcing a legal norm through the use of artefacts (cf. Morgan and Yeung 2007; Yeung 2008). But it is not just government or state regulators who use technologies to influence individual behaviour – private parties may choose to do so as well. The DVD industry, for instance, implemented region codes into DVD players, to make it impossible for users to play DVDs bought in other regions than their own (Leenes 2010, 2011) – a way to protect regional DVD markets and undermine global competition.

All of these forms of guiding and affecting human behaviour have come to be known as 'techno-regulation' (Brownsword 2008; Leenes 2010, 2011; Van den Berg 2011), 'design-based regulation' (Brownsword and Yeung 2008) or 'code as code' (Lessig 2006). Techno-regulation revolves around the idea that technologies may be used as *regulatory tools* (Brownsword and Yeung 2008).

4.2 What is techno-regulation?

In studies on techno-regulation, and on regulation in general, scholars tend define regulation as 'the *intentional* influencing of someone's or something's behaviour' (Koops 2010: 309, italics BB and RL) or '*deliberate* state influence' (Baldwin et al. 2010: 12, italics BB and RL). The former definition allows for both state and non-state – e.g. private enterprises – actors engaged in regulation, whereas the latter is restricted to only state regulators. By extension, *techno*-regulation, is generally discussed as the *intentional* influencing of individual behaviour by building norms into technological devices. In short, the focus of debates on (techno-) regulation is on efforts to steer or affect human behaviour through intentional, deliberate means, either in general or through the use of technological artefacts. In and of itself, this is not surprising: the legal domain sets out to provide citizens with both positive and

negative boundaries within which their behaviours should stay, and to do so on legitimate and deliberate grounds. Hence it is understandable (and commendable!) that the means through which the creation and implementation of such boundaries are enacted, are intentional, deliberate, purposeful and the result of forethought – rather than accidental, random, unintended, or without a purpose.

4.3 The limits of the debate on techno-regulation

However, unfortunately there are two shortcomings to the current conceptual understanding that we have of techno-regulation. First of all, by focusing exclusively on *regulation* through the use of technologies, this domain excludes other, 'softer', less 'legal' forms of influencing, simply through the choice of its terminology. The fact that technologies may also be used to *persuade*, or to *nudge*, for example, is left un(der)addressed. While some scholars in the field of Law & Technology do mention such softer forms of (intentional) technological influencing (cf. Hildebrandt 2011; Leenes 2010, 2011), all too often techno-regulation is understood to refer only to the enforcement of legal norms enacted by (state) legislatures and rules through the use of technological artefacts. The practical examples of techno-regulation discussed in the literature, which we have also mentioned above,[2] are telling in this respect: they all refer to hard-coded, (almost) unavoidable legal rules that are enabled, or inhibited, through the technology. Nudging, or other forms of more gentle persuasion, and all of the technological possibilities these entail, largely falls outside the scope of the current debate on techno-regulation, because of its emphasis on (legal) *regulation* alone.

Moreover, the focus on *intentional* influencing, with or without the help of technologies, has a serious downside as well: it overlooks the fact that technologies, and artefacts in general, may also influence users in all sorts of *un*intentional and rather implicit ways. The design of technologies, at times, has unintended

[2] I.e. the use of speed bumps to regulate driving speeds, entry gates to exclude travel(lers) without a valid ticket, and region codes on DVD players.

consequences in use – what we call side effects. Moreover, research reveals that technological artefacts often evoke strong (unintended!) emotional responses in users, and that users anthropomorphize (some of) these artefacts. These forms of unintended and implicit influencing also fall outside the scope of techno-regulation – this time because of its focus on intentional influencing alone.

Both of these shortcomings to the investigative repertoire of the domain of techno-regulation are quite serious. By overlooking, or downplaying, the unintentional and implicit responses that technological artefacts may invoke, (techno-)regulators run two, quite contrary, risks:

1) they may not use the power of influencing, steering and affecting human behaviour to its full extent, thereby missing out on opportunities to regulate or steer the behaviour of individuals through technologies; and

2) they may fail to notice the unintended and implicit consequences of the techno-regulatory measures they *do* implement, thereby jeopardizing, at least in part, the intentionality, and by implication ultimately the legitimacy, of such measures.

What is more, by overlooking the entire scale of possible responses that can be evoked by means of, or through technologies, citizens run certain risks as well. Most importantly, when norms are embedded into technological artefacts they may become obfuscated to users, hence making it harder (if not impossible) for users/citizens to criticize the norms they are made to adhere to, or use their democratic ability to challenge such norms in a court of law.[3] Again,

[3] Note that merely *automating* procedures to prevent or detect violations of rules and regulations does not necessarily entail that these rules become obfuscated, nor that proper procedures cannot be developed to ensure that citizens have a possibility to contest these rules or their application. Think, for example of the use of speed cameras in traffic, for which there are proper procedures to 'seek redress in the courts if [citizens] disagree with the content of the decision or the procedural aspects of the decision-making. All this has become part of the routine of the rule of law in our democracies' (Dommering 2006: 8). The difference between merely automating (instances of) crime prevention and detection and techno-regulation is twofold: (1) systems of the former deliver *ex post* punishment for violations of the law and (hence) leave room for disobeying the rules, whereas in techno-regulation the technology delivers *ex ante* prevention and there is no room for violating the law; and (2) the technologies used for former, e.g. cameras

this entails that techno-regulation and its related manifestations may raise questions of legitimacy. Obviously, this problem is all the more urgent when regulators unintentionally implement norms into technological artefacts.

In this article, we will carve out the landscape of techno-regulation and its adjacent areas, by investigating the boundaries of intentional influencing and exploring what lies beyond. By developing a clearer understanding of the full scope of influencing-through-technology – both intentional, regulatory, non-regulatory, and unintentional – we may get a better grasp of techno-regulation as one of its manifestations, and hence consolidate the scientific enterprise of Law & Technology.

4.4 Beyond the limits of techno-regulation, part 1: persuasion, nudging and affordances

As said, the first shortcoming in the current debate on techno-regulation is its (almost) exclusive focus on the implementation of *legal* norms into technologies. 'Softer' forms of regulation, such as the embedding of social norms into artefacts, thus falls outside the scope of the current debate. This is unfortunate, since there is a wide array of research that suggests that such 'soft' forms of regulation are abundant, and have profound effects on the ways in which users interact with, and are affected by, the technologies that surround them. We will briefly discuss three examples of such research. First, in his research on what he calls 'captology', B.J. Fogg shows that information and communication technologies can be used in effective ways to persuade individuals to do (or abstain from doing)

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that detect flows of traffic, generally provide cues *that* a rule is being enforced in a certain location, and *what* rule this could possibly be. In the case of techno-regulation oftentimes this clarity is lacking – think of the example of entry gates to the Underground: many people will undoubtedly be unaware of the fact that this barrier enforces a rule regarding the contractual relationship between a traveller and a transport company. Both differences contribute to the claim that it is more difficult for citizens to contest norms and rules when they are implemented by means of techno-regulation.

certain things, to adopt (or reject) certain beliefs, or to change certain attitudes or behaviours (Fogg 2003). According to Fogg, examples of the persuasive capacities of ICTs are everywhere around us. For instance, captology techniques are used extensively on websites to persuade users to buy products or services – think of Amazon.com, which gives suggestions of books that readers may find interesting, or eBay, which uses ratings to persuade users that certain sellers are trustworthy.

Moreover, several ICT systems have been developed over the past decades to confront individuals directly with the (possibly) negative consequences of certain behaviours, thus attempting to convince them to avoid such behaviour. For example, drunk driving simulators are designed to change teenagers' attitudes to drinking and driving. Such simulators respond with a delay and exaggerate steering behaviour, so that youngsters can experience directly what it is like to drive under the influence of alcohol. By exposing teenagers to such an immersive, technologically facilitated experience, the designers hope to convince them to avoid drunk driving. A second example of persuading teenagers of risky or undesirable behaviour through the use of technology is that of a highly sophisticated robot doll, which aims at raising young girls' awareness of the effects of teenage pregnancies. Teenage girls are asked to take care of this doll for a set period of time in their own homes, thus experiencing the practical consequences of having to take care of an infant.

All these examples show that computers and other ICTs offer unique opportunities to alter human behaviour, to persuade users to change their attitudes or beliefs. But why is this so? For one thing, computers allow for what Fogg calls 'tunnelling': they can take users through a predetermined path of steps, persuading them to follow this path. Installing software is a good example of this kind of process. Tunnelling narrows users' scope of behavioural choices, and in the process their sense of *having* choices as well. Thus, it enhances the chances of persuasion: once a given sequence is set in motion, the user is tempted to follow through until the end, because he wants to get the task done (Fogg 2003).

Moreover, ICTs may also persuade in the sense that they may 'condition' individual behaviour (2003: 49):

> A conditioning technology is a computerized system that uses principles of operant conditioning to change behaviors. (...) operant conditioning (…) is a method that uses positive reinforcements – or rewards – to increase the instances of a behavior or to shape complex behaviors).

A good example of operant conditioning can be found in games: when users play a game correctly they are rewarded with points and all kinds of bonuses, such as gaining extra lives, getting extra capabilities, tools or weapons etcetera.

Finally, computers and other ICTs can play a role in what Fogg calls 'self-monitoring': these kinds of technologies allow users to monitor some aspect of themselves (for example their heart rates or their calorie intake), and by providing them regular feedback on the monitored parameter, they may persuade users to adjust their behaviour in such a way as to work toward a predetermined goal.

All of these forms of persuasion, brought about by means of computer technologies, revolve around the idea that the behaviour, beliefs, or attitudes of users can be influenced, steered or guided. Note that when technologies are used to persuade individuals as described here, i.e. to change their behaviour, this is done *intentionally*, not accidentally. However, none of the examples discussed here involves 'regulation' in a traditional, or legal sense. Moreover, note that the behavioural changes that the intentional design of a persuasive technology seeks to bring about are *optional* to the user – an (intentional) attempt is made to convince the user to adopt a certain behaviour, but (s)he has a clear and free choice in adopting or rejecting this behaviour. In this respect captology differs from the second example we wish to discuss in this section: nudging.

In their book *Nudge: Improving decisions about health, wealth and happiness* Thaler and Sunstein introduce the principle of 'nudging' to help improve the choices individuals make and the behaviours they display. They argue that human behaviours and human choices may be intentionally affected by, for example, the

design of spaces, technologies, institutions and systems (Thaler and Sunstein 2008). Building on findings from behavioural economics, Thaler and Sunstein introduce the concept of a 'choice architecture', the idea that designers have a 'responsibility for organizing the context in which people make decisions' (Thaler and Sunstein 2008: 3). Some contexts invoke choices that are qualitatively better than others, according to Thaler and Sunstein, for example because they promote human beings' health, improve their quality of living, or otherwise promote their happiness. Other contexts inhibit such choices, undermine them, or obliterate them. Politicians, regulators, designers and developers have an obligation to create options to meet the choice criteria of the first, rather than the second category, adopting an attitude that is designated 'libertarian paternalism' (Burgess 2012; Thaler and Sunstein 2008). In their book, the authors discuss numerous examples of the ways in which existing systems 'nudge' individuals toward making 'good' choices – ranging from the toilet bowls equipped with a fly at Schiphol Airport in Amsterdam (to nudge men to aim better), to pension plans that send annual reminders with advice about the best way to improve the long-term output of the individuals' eventual monthly retirement payment, to alarm clocks that jump off the nightstand and wheel around the room until their sleepy/lazy owner gets out of bed to switch them off, thus nudging them to get up.

Nudging, obviously, is a form of intentionally influencing human behaviour, of shaping attitudes or choices. Designers and regulators may use this form of influencing to intentionally regulate the behaviour of individuals without intervening in an all too direct, and obvious, way. Hence, Adam Burgess writes (2012: 9)

> nudging is precisely intended to represent an alternative to clear interventionist approaches; an attempt at a 'third way' between the regulation associated with the left, and 'leave it to the markets' approach of the right.

This is why it has become a popular regulatory strategy for both the US government and some European governments, most notably the current UK administration.

However, while nudging does fall into the category of intentional influencing, it doesn't have much to do with regulation in the strictly legal sense, nor does it involve the enforcement of (legal) norms. It has to do with creating 'good' default settings in the range of choices that individuals have in various contexts, building on the idea that most individuals will not deviate from those default settings and hence will automatically adhere to the option that is deemed best for them by the designers/regulators involved in shaping a system. Nevertheless, nudging *does* leave some room for alternative choices. If a user does not want to go in the direction in which (s)he is being nudged by the choice architect, (s)he has the possibility to choose otherwise. This may lead to behaviour that (arguably) could be labelled unwise, unhealthy or considered detrimental to the personal wealth or happiness, but room for manoeuvring is exactly what distinguishes nudging from outright techno-regulation, in which no form of opting out, or 'being bad' is available. However, note also that in the case of nudging an individual's manoeuvring room is considerably smaller than in the case of persuasive technologies. In the latter, users may be tempted to follow the intended behavioural pattern, yet they may equally easily choose not to do so. In contrast, the behavioural pull exerted by a default option, as is envisaged in nudging, is much stronger. While the choice to deviate still exists, the chance that users will actually do so in practice is a lot slimmer.

Taking this idea one step further it is not hard to imagine that while designers or regulators would sometimes intentionally design a feature of use into a technology, or would strive to deliberately alter or affect behaviour trough (the design of) a technological artefact, the *users* of such an artefact need not be aware that this is the case. This idea is captured in the last concept we will discuss in this section: that of *affordances* (Gaver 1991, 1996; Gibson 1986; McGrenere and Ho 2000; Norman 1988). The term affordance was coined by the American psychologist James J. Gibson, who used it to describe the way an environment has a bearing on animals' being by providing them with opportunities and means of sustenance. Gibson writes (1986: 127):

> The affordances of the environment are what it offers to the animal, what it provides or furnishes, either for good or ill. (...) [The term] implies the complementarity of the animal and the environment.

Donald A. Norman translated the notion of affordances to the human use of technologies, turning it into one of the central concepts of (research into) Human-Computer Interaction (Norman 1988). In doing so, Norman aimed to draw attention to the automatic and implicit responses that technologies may call forth in their human users. He argued that when designing new objects or technologies, designers ought to consider what their products will offer to users, what uses they will afford, and by implication, what uses they will constrain. Consciously thinking about the affordances of their products, Norman argued, would greatly improve the quality and usability of products. In a well-designed product the affordances of the object (1988: 9):

> provide strong clues to the operations of things. (...) When affordances are taken advantage of, the user knows what to do just by looking: no picture, label, or instruction is required.

The argument here is one that is very similar to what we have seen above in Fogg's persuasive technologies and Thaler and Sunstein's nudging: designers (ought to) intentionally create products in such a way that certain types of behaviour are invoked, encouraged or facilitated, while others are inhibited or discouraged. And again, the invocations and elicitations rendered thus are not of a legal nature, yet they do clearly steer the behaviour of users. However, there is a marked difference between captology and nudging on the one hand, and affordances on the other, and this difference can be found in the level of user awareness. While users have a clear choice in their interactions with persuasive technologies, and a limited choice when being nudged, no real choice is available to them when artefacts (or architectures, for that matter) afford them behaviours and constrain others. What technologies afford us is often perceived in such an implicit and automatic way that we can hardly speak of having a choice to behave differently.

What the discussion in this section reveals is twofold. First and foremost, it shows that persuasion, nudging and affording are more subtle, yet clearly intentional, forms of affecting human behaviour, through the use of technologies, which are overlooked in the current debate on (techno-)regulation. In the former two cases the regulatees still have a (clear) *choice* to follow or reject the technology's invoked effect – to use a concept proposed by Hildebrandt (Hildebrandt 2008, 2009, 2011), captology and nudging are both examples of situations in which 'regulative rules' are embedded into technology: rules that influence behaviour, yet not in a deterministic manner – people may still choose to act otherwise. However, in the case of affordances, the intentional behavioural effect is such that opting out, or following an alternative choice, is no longer really possible. Thus, to return to Hildebrandt's terminology, in the case of affordances, the technology contains rules that leave people no (or very little) choice. The embedded rule's consequences are (almost) inevitable once triggered.

Of course, as the level of choice for regulatees decreases, the level of compulsion generated through the intentional choices of the regulators and designers increases. As said, while there is still room for manoeuvring in the case of persuasive technologies and nudging, hardly such room exists in the case of affordances, and as we have seen above in the case of techno-regulation the regulator's control over the regulatees' behaviour is, in fact, complete.

Second, this discussion reveals that while persuasion, nudging, affording and techno-regulation are all forms of intentional influencing on the part of *designers*, the reception of such influencing on the part of users is marked by a gradual decrease in *awareness*. When using persuasive technologies designers and/or regulators use technical means to convince users to change their behaviour, most often by making them experience the consequences of 'bad' behaviour. Users not only have a clear choice in following or rejecting the suggested behaviour change, but are also aware of the fact that the designer/regulator is attempting to persuade them in the first place. In nudging this level of awareness may be much reduced already. By offering users a 'good' default choice, designers/regulators build on the fact that most users tend not to invest too much time in checking and altering the default choices

offered to them in products, services and software, thus banking on their willingness to follow this default. Some users may still choose to change the default, and hence may be aware that there is such a possibility, but in most cases the majority will not do so, or even be aware of that possibility. What is more, in the case of affordances and techno-regulation, as we have seen, there is no (real) choice to opt out or behave differently. These two forms of steering users' behaviour take place largely outside of their awareness, and in the case of techno-regulation this is precisely one of the reasons why it may be legitimately risky to steer behaviour in this way.

Figure 3.1 summarizes both aspects – the level of choice/compulsion on the one hand, and the level of user awareness on the other – in relation to the four concepts we have discussed so far.

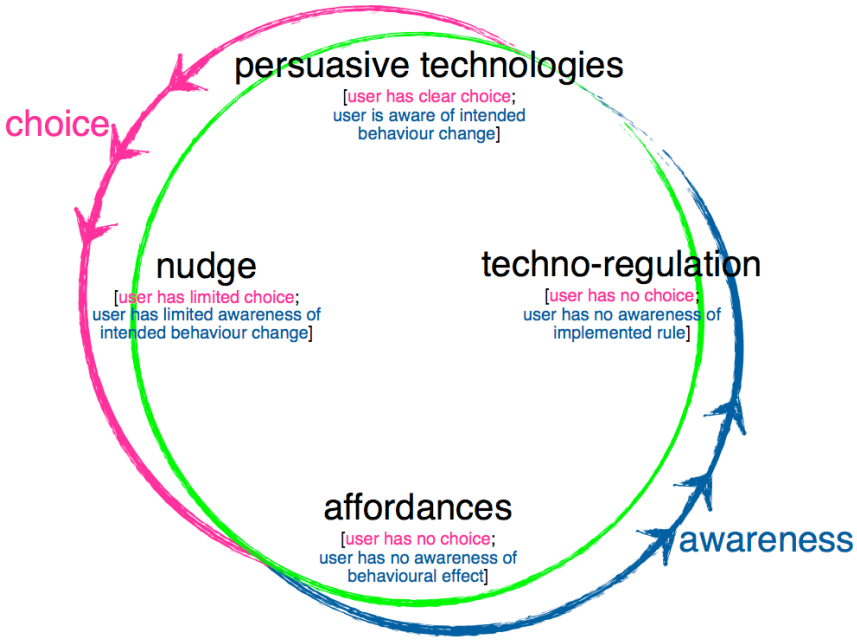

Figure 3.1 From persuasive technology to techno-regulation: decreasing choice, increasing compulsion, and decreasing user awareness

4.5 Beyond the limits of techno-regulation, part 2: unintentional and implicit influences of technology

In the previous section we looked at the limits and limitations that the debate on techno-regulation has known so far based on its focus on *regulation*. We showed that there are a number of varieties of intentional influencing through the use of technologies that fall outside the scope of techno-regulation. In all of these forms regulators and/or designers deliberately steer, guide or influence the behaviours of users in non-legal (and progressively more implicit) ways.

Now we will turn to our second critique, relating to its focus on *intentional* influencing alone. Over the past decades, a significant corpus of research in engineering, computer science, human-computer interaction (HCI), Science and Technology Studies (STS) and philosophy of technology has consistently revealed how ubiquitous and important the *unintended*, *implicit* and *automatic* elicitation of human behaviour is in relation to technological artefacts.

We have already seen a first example of the evocation of automatic and implicit responses at the end of the previous section, when we discussed the idea of affordances. However, while affordances may elicit implicit and automatic responses in users, they are still explicitly, deliberately designed into artefacts by their creators. However, research has revealed that oftentimes designers also implement all sorts of *unintended* cues into their artefacts.

In recent years, much research has been done in Science and Technology Studies on the *scripts* embedded into technological artefacts (Akrich 1992; Gjøen and Hård 2002; MacKenzie and Wajcman 1999; Oudshoorn and Pinch 2003; Oudshoorn et al. 2004; Van den Berg 2008, 2010b). Madeleine Akrich explains that throughout the design process of new technologies, designers use certain images or representations of their 'target audience'. These images and representations help shape the design itself, because the (presumed!) 'specific tastes, competences, motives, aspirations, political prejudices' of users become inscribed into the artefact

(Akrich 1992: 208). This is what Akrich calls a *script*. Scripts have an active role: as Van Oost argues these implemented user images will eventually steer, guide, and limit the behaviour of the user (2003: 195):

> artifacts contain a script and this script prescribes (in a more or less coercive manner) what users have to do (or not do) to produce the envisioned functioning of the technological artifact.

Her work on the design of male and female shavers by the multinational electronics company Philips shows just how this works. Van Oost compared the male and female shavers developed by Philips to see how they differed, and what the effects of their differences could be on the ways in which users perceive and use them. She concluded that there is a clear set of values embedded into these shavers, which tacitly reflect ideas on gender differences. Male shavers are grey and black, contain dials and screws, and can be opened up by the user to take a look 'under the hood'. They are truly 'technological' artefacts – men can tinker with them and fix them when they are broken. Female shavers, by contrast, are smooth, come in pastel colours, have no dials and screws, and cannot be taken apart because their separate parts are clicked (rather than screwed) together during the production process (Van Oost 2003). Moreover, they are sold as cosmetic devices, and not as electrical appliances (Van Oost 2003: 202). These differences reflect designers' perceptions of female and male users as being afraid of technology and being gadget-lovers respectively.

What is interesting is that several separate strands of research, including Science and Technology Studies (Akrich 1995; Gjøen and Hård 2002; Haddon 2003; Oudshoorn and Pinch 2003; Oudshoorn et al. 2004; Silverstone and Haddon 1996; Van Oost 2003), value-sensitive design (Friedman 1997; Friedman and Kahn Jr. 2006; Friedman, et al. 2002), and philosophy of design (Kroes et al. 2009; Verbeek 2005) consistently reveal that designers are often *unaware* of the values, norms and stereotypes they embed into the artefacts they create, for example through the embedding of scripts. One possible explanation for such tacit value-embedding by designers is called 'I-methodology' (Akrich 1995; Oudshoorn et al.

2004): designers' tendency to take themselves, their own needs and capacities, as the main point of reference in design (Van den Berg 2010b). Needless to say, the designers' needs and capacities, and the accompanying values, need not necessarily align with those of ordinary users. Nevertheless, as we have seen in Van Oost's research on shavers, the values that get embedded into artefacts because of this do actively shape and limit the behaviour of users – or at least the behavioural repertoire an artefact facilitates or allows.

So do users have a *choice* in relation to scripts? Should we label scripts as regulative or constitutive rules, to return to Hildebrandt's distinction? The answer is: both. Scripts are constitutive, in the sense that once users choose to use a specific artefact, it is very likely that they will be strongly affected by the values embedded into them. As Van Oost explains (2003: 207):

> the gender script of the Ladyshave inhibits (symbolically as well as material[ly]) the ability of women to see themselves as interested in technology and as technologically competent, whereas the gender script of the Philipshaves invites men to see themselves that way.

However, at the same time scripts are also regulative – i.e. they leave some room for manoeuvring, if only a little – in the sense that users can choose to *not* use an artefact, or to counter the embedded scripts they uncover in an artefact. Again, Van Oost provides a good explanation (2003: 207):

> Clearly, the gender script of the shavers cannot force users to invoke these gendered identities: women can reject the script (e.g. by shaving with a men's shaver or not shaving) or even modify the script (e.g. see it as a technological challenge to open the clicked Ladyshave).

That users may also create their *own* scripts when using technologies has been the subject of extensive research in Science and Technology Studies and domestication theory (Frissen 1994, 2004; Haddon 2003; Lehtonen 2003; Silverstone and Haddon 1996). For example, when investigating scripts surrounding the electric car and its use and social acceptance in Norway Gjøen and Hård found that users sometimes come up with their own scripts (aptly called

'user scripts') to complement or alter those embedded by designers (Gjøen and Hård 2002). In the case of the electronic car they found that one of the users had named the car 'Barbie' because it is small and cute. With this feminine name, Gjøen and Hård argue, this user turned existing cultural scripts concerning cars – labelling them as gendered, masculine vehicles – upside down. She turned it into 'a distinctly female automobile, even a girlish toy' (Gjøen and Hård 2002: 268). The authors conclude that user scripts such as these may eventually lead to 'another cultural understanding of what a car is' (Gjøen and Hård 2002: 272). Although this claim is tenuous, to say the least, since it is based on this one example only, other examples from research into the domestication of ICTs and household appliances supports the idea that users do, in fact, regularly create their own scripts, as a way to 'domesticate technology by assigning new meanings to an artifact' (Gjøen and Hård 2002: 278).

In sum, we may conclude that scripts are yet another an example of technological influencing, or influencing-through-technology, that falls outside the domain of techno-regulation. This is so because their workings not only do not revolve around the enforcement of legal norms through technologies, but also because their influence emerges largely outside the intentions and deliberations of the designers of technologies. As we have seen scripts are not deliberately designed into technologies by designers, but rather the result of (implicit) images and representations of users. When looking at the level of choice these scripts leave to users – or the level of compulsion they (unintentionally) provide designers (and potentially regulators), we see that some room for manoeuvring is available to users, yet it is very limited. Users can challenge scripts or devise their own scripts, but the former, at least, requires that they be aware of the existence and behavioural pull of the scripts embedded into artefacts to begin with. This is dubitable, at least in many cases, and for many users.

A second, clear example of the ways in which designers can unintentionally evoke certain types of responses in users comes from Human-Computer Interaction. Studies have consistently shown

that (some) technologies induce tendencies to 'anthropomorphize'[4] them, i.e. that human beings are inclined to ascribe intentions and agency to these inanimate objects, and to respond to them in social and emotional ways (Duffy 2003; Nass and Moon 2000; Nass, et al. 1993; Reeves and Nass 1996; Turkle 1984, 2007; Van den Berg 2010a; Weizenbaum 1966). Sherry Turkle conducted a number of famous studies with small children to investigate whether or not they ascribed lifelike qualities (for instance intentions) to computers and digital toys, and found that they clearly do. She explains this by referring to the fact that computers are interactive machines, that appear to respond to children's behaviours, and by the fact that they may produce irregular responses (Turkle 1984: 30). Turkle's studies have since been repeated in various forms by others, and the findings are always the same: children have strong tendencies to ascribe human, lifelike qualities to certain types of technological artefacts. What is more, even *adults* appear to do so. While the tendency to anthropomorphize does diminish with age, even adults may at times find it difficult to maintain that a machine is *not* a living being like themselves. One of the most convincing examples to support this claim comes from Joseph Weizenbaum, the computer scientist who created ELIZA, a computer program that mimicked the behaviour of a Rogerian psychoanalyst (Weizenbaum 1966).[5] Weizenbaum was shocked to find out how strongly users responded to his simple program. He says (Weizenbaum, quoted in Kerr 2004: 305):

> I was startled to see how quickly and very deeply people conversing with [ELIZA] became emotionally involved with the computer and how unequivocally they anthropomorphized it. Once my secretary, who had watched me work on the program for many months and therefore surely knew it to be merely a computer

[4] In philosophy of technology this has been called 'animation'. See for example Ihde (1990: 98ff.); Verbeek (2005: 126-127)

[5] Computer users could 'communicate' with ELIZA using natural language. The program used a number of quite simple techniques to convert their input into follow-up questions or observations, thus creating the illusion of a real conversation and, what is more, leaving users with the impression that ELIZA actually had the ability to understand them.

> program, started conversing with it. After only a few interchanges with it she asked me to leave the room. Another time, I suggested I might rig the system so that I could examine all the conversations anyone had had with it, say, overnight. I was promptly bombarded with accusations that what I proposed amounted to spying on people's most intimate thoughts; clear evidence that people were conversing with the computer as if it were a person who could be appropriately and usefully addressed in intimate terms.

This leads Turkle to conclude (1984: 39):

> Weizenbaum's students and colleagues who had access to ELIZA knew and understood the limitations of the program's abilities to know and understand. And yet, many of these very sophisticated users related to ELIZA as though it did understand, as though it were a person. With full knowledge that the program could not empathize with them, they confided in it, wanted to be alone with it.

What this example shows is that it is not very difficult to evoke anthropomorphic tendencies in humans, even in adults. Even they can easily ascribe intentions, feelings, and behaviours to machines that are really projections of themselves, of their own human capabilities and faculties.

In a series of experiments Byron Reeves and Clifford Nass showed that humans not only ascribe intentions and lifelike qualities to technologies, but that they also display real *social responses* to ICTs – responses that are normally reserved for interactions with other human beings. For example, Reeves and Nass found that users are very polite to computers when having to evaluate their behaviours, and that they respond as positively to flattery by computers as by fellow human beings. Moreover, they showed that users ascribe personality to interfaces, and that they experience a sense of teamwork when cooperating with a computer (Reeves and Nass 1996). The experiments showed that only very minimal social cues are needed from ICTs to call forth these social responses, and what is more, that users are *unaware* of the fact that they respond socially to these machines. When questioned about their behaviour after each experiment, it turned out that people *denied* displaying such behaviours towards these technologies (Nass and Moon 2000:

87; Picard 1997: 14-15). Reeves and Nass have called this type of behaviour influencing 'the Media Equation'. Apparently, they conclude, our human brains are so deeply hardwired for social behaviour towards others that it is easy, or even almost unavoidable, to call forth such behaviour towards machines as well (also see Nass and Moon 2000; Nass, et al. 1994; Picard 1997). They write (Reeves and Nass 1996: 12-13):

> The human brain evolved in a world in which *only* humans exhibited rich social behaviors, and a world in which all perceived objects were real physical objects. (...) Modern media now engage old brains. People can't always overcome the powerful assumption that mediated presentations are actual people and objects. (...) The default is to automatically and unconsciously ignore fabrication and expect reality, as if the technology itself were invisible.

The authors point out that designers could, and ought to, use this central finding in the design process of the products they create – and we'd add that regulators could use it as well. When designing technologies to meet the social repertoires of human beings, not only would the usability and interactional richness of these artefacts greatly improve, but considering the ease with which these responses are evoked, it could also be yet another means of affecting human behaviour through technology.

Having said that, let us look more closely at the features of anthropomorphism and the Media Equation in terms of choice, intentionality, and legal norms. How do these two forms of technological influencing relate to techno-regulation? First of all, what is most striking about both anthropomorphism and the Media Equation is that users appear to have *no choice* at all in responding to the technologies as they do. Moreover, as the example of ELIZA revealed, users are *unaware* of their own anthropomorphizing tendencies, or at the very least they tend to deny that they have such tendencies – as we have seen users ascribed intentions and humanness to ELIZA despite the fact that they knew full that Weizenbaum's computer program was simply that: a computer program that lacked any real sense of understanding or empathy. Similarly, each of the experiments that Reeves and Nass conducted led to the same finding: users clearly displayed a host of social

responses to the ICTs with which they interacted during the tests, yet fervently denied doing so.

On the side of designers it is clear that much of the findings we have described here fall outside the scope of traditional design approaches and focus. Weizenbaum did not create ELIZA to investigate the anthropomorphizing tendencies of those around him – finding that users responded to his program in this way was a side-effect, and one that deeply disturbed him. He became one of ELIZA's fiercest critics – and of the project of creating Artificial Intelligence more generally – precisely because he was worried about the ease with which humans apparently ascribe intentions, beliefs and lifelikeness to machines. Reeves and Nass approach the matter from a different perspective: they argue that evoking social and emotional responses in humans is an (almost) unavoidable (side-)effect when humans engage with technologies. Therefore, it is something that designers should be aware of, and that they could potentially even exploit in various ways. However, currently most designers are unaware of this potential.

Anthropomorphization and the Media Equation thus differ from techno-regulation in substantial ways. They do not revolve around the embedding of legal norms into technology, and the responses they generate do not fit the realm or traditional regulation. Users have little or no choice when it comes to these two types of implicit, automatic responses, nor are they really aware of having such responses in the first place. What is more, both anthropomorphization and the Media Equation largely take place outside the awareness, and hence the intentionality, of designers themselves – these are automatic, evolutionarily wired side-effects, tacitly called forth, yet they are powerful mechanisms indeed.

In figure 3.2 we have brought together the three concepts that we have discussed in this section – scripts, anthropomorphism and the Media Equation – and plotted them in relation to the level of choice and compulsion on the one hand, and the level of user awareness on the other.

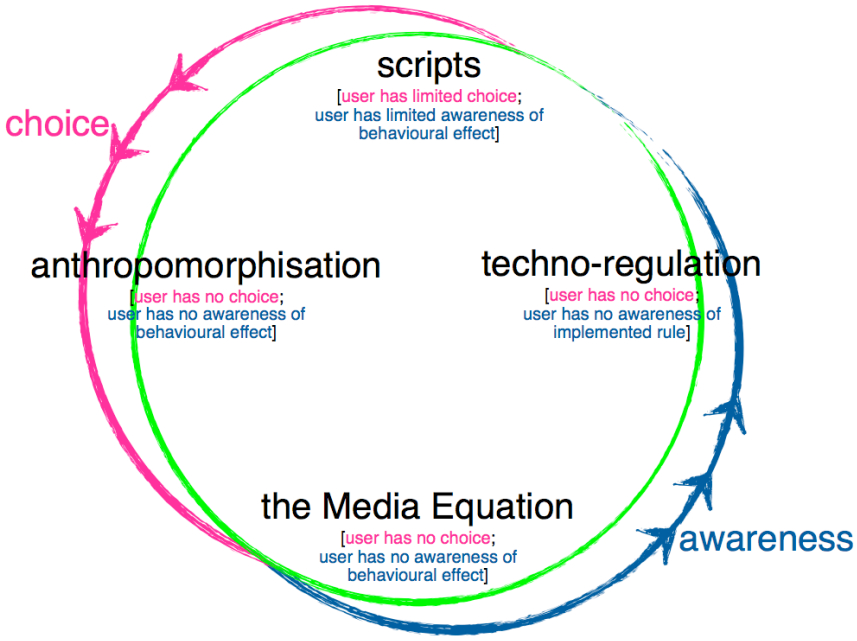

Figure 3.2 From scripts to techno-regulation: decreasing choice, increasing compulsion, and decreasing user awareness

4.6 The full scope of techno-effects

In this article we have argued that techno-regulation in its current form has a focus that is too limited: it overlooks non-legal forms of intentional influencing on the one hand, and implicit, unintentional forms of technological influencing on the other. We have shown that the use of technologies may evoke a range of behaviours that fall outside the current, narrow scope of techno-regulation. Hence, we propose to broaden the debate on techno-regulation by replacing this term with the much broader one of '*techno-effects*': the wide range of behavioural impact brought about in humans by, or through the use of, technologies. Techno-effects cover the full spectrum running from *intentional* and *explicit* evocation on one end (techno-regulation, but also persuasion, nudging and affording), to *implicit*, *accidental* and *unintentional* elicitation on the other (scripts,

anthropomorphism, and the Media Equation). This holds for both the *users* and the *designers* (and regulators) of technological artefacts.

It is important to note that studying techno-effects is no straightforward matter, and that predicting techno-effects always ought to be a contextual, technology-dependant matter. Different technologies have their own medium-specific characteristics, and different technologies are used in different ways by different groups of people. All of these factors entail that very different techno-effects may result from different technologies. That this is so may be deduced from the various examples that we have discussed in this chapter. The techno-effects of Van Oost's gendered shavers obviously differ from those of Yeung's ticket gates at the railway station. They differ on several levels: first, Yeung's ticket barriers are an example of explicit techno-regulation: they are deployed as a means to regulate user behaviour – to ensure that train travellers adhere to the legal rules of obtaining a valid ticket when planning to travel on a train or subway. Van Oost's shavers, we have seen, impact the behaviour of users in non-regulatory, yet nevertheless fairly substantial ways: they steer and guide user's images of themselves as technologically savvy beings (or quite the reverse), and implicitly prescribe ways of use for these products. Second, in Yeung's ticket barriers the enforcement of a rule is the intentional, explicit goal of the designers – these barriers are designed the way they are to ensure that travellers obey the rules. Rather than deploying human officers to check tickets we have now consciously, deliberately and intentionally delegated this task to these barriers – and they fulfil it (almost) flawlessly. In the case of Van Oost's shavers, by contrast, the effect of the values embedded into the technologies was not intentional, as we have seen. Rather, the values that were embedded into these shavers stemmed from the fact that designers used two types of tacit assumptions in the design process: on the one hand, all sorts of stereotypical images of the prospected end users of their products, and on the other hand ideas regarding the designers' own capabilities, wants and needs (I-methodology).

4.7 Abort, retry, fail. Or: liberating the boxed-in concept of techno-regulation

Anyone who worked with computers before the days of icons, graphics and folders, must have encountered the (in)famous DOS error message 'Abort, retry, fail'. This message popped up whenever users typed in a command that the computer could not execute. It has become an icon of poor interface design, because it led exactly nowhere: if the user pressed R for 'retry' the same message appeared again, but if (s)he chose either A for 'abort' or F for 'fail' the program (s)he was running would close, and (s)he would lose all unsaved work.[6] A veritable Catch 22, since the only viable option appeared to be to keep typing R until one was willing to accept that one's work was lost and there was nothing left to do but shut down the program and start anew.

What does the failure of 'Abort, retry, fail' teach us, aside from its lack of user-friendliness and its poor design? This DOS error message is a clear example of technological enforcement that leaves no room for manoeuvring on the side of the user. It is not techno-regulation in the strict sense, since it does not involve the upholding of a *legal* norm. It is, however, a clear example of the way in which technology can be used, for good or for bad, to limit and steer users' behaviours. Admittedly, 'Abort, retry, fail' steered user behaviour in a very poor fashion, generating so much frustration that almost all of us still remember it. 'Abort, retry, fail' is a red flag for how to *not* use technology to influence the behaviour of users. It combines the three concepts that we have addressed time and again in this chapter in the worst possible combination: it provides users with *too little choice*, the level of *compulsion is complete*, and what is worse: users' are fully *aware* that have no choice at all but to leave the program and lose all of their work. This is clearly a design error that should be avoided at all cost.

But should 'Abort, retry, fail' be considered merely an example of flawed interface design, one that we have luckily left far

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[6] Available at: http://en.wikipedia.org/wiki/Abort,_Retry,_Fail%3F, last accessed on April 10th 2012.

behind us with the creation of new generations of operating systems, in which the emphasis on usability and user-friendliness has consistently increased? Have we left the days of full compulsion and no choice for users behind us? As this article reveals quite the reverse is true. We argue that this error message is iconic, rather than an example of an extinct way of steering user behaviour. Designers and regulators know better than ever before that they can affect the behaviour of individuals, of users and citizens, through the abilities and constraints they design into the artefacts that surround these individuals in their everyday lives. And designers and regulators make more use of these forms of influencing than ever before. As we have seen, regulators enforce legal norms through technology (the speed bump, the ticket barrier), and industries enforce their own, non-legal standards (DVD region codes). But this is not where it ends. The means and possibilities for techno-regulation are endless, and as this chapter has shown there is even more potential available to regulators and designers than is currently used: intentionally applying techniques of nudging, persuading, affording, and implicitly building on the effects of scripts, anthropomorphization and the Media Equation. The 'regulatory' potential of technologies – in the broadest sense – is tremendous, and daunting, indeed.

What is striking about the current increasing use of techno-regulation as we are witnessing it in many Western countries today is that it takes place in a social climate of little debate – only a small band of regulators and scientists feel a need to address the legitimacy of these developments, to question whether it is *right* that both industry and governments may use technologies to hold us up to their (democratically endorsed or self-generated) standards. The trickiest part, of course, is that since the norms and values that are embedded into the technologies that are used for techno-regulation are *hidden from view* it becomes very difficult indeed for ordinary users to be critical of them, let alone to resist them (Leenes 2010, 2011). Of course, industry and state regulators have very good reasons to turn to technologies as a means of regulating behaviour: it is an efficient, cost-effective, convenient, fool-proof and safe way to ensure that individuals stay within the norms set by these parties – whether they be adhering to the maximum speed or only buying

DVDs from a single region. But as this chapter has revealed, they are currently overlooking the vast majority of means and possibilities to technologically influence human behaviour. On the one hand, one could argue this is good news: the less regulators know of these possibilities, the less they will use them to steer the behaviour of citizens. However, as especially the second half of this chapter reveals, technologies often contain a host of *unintentional*, *implicit* effects that neither regulators, nor designers, nor even users themselves are aware of. This is the case for any technology, so it may also apply to technologies that are used intentionally by regulators to steer the behaviour of their citizens. The artefacts used in the pursuit of realizing techno-regulation may contain mechanisms to enforce legal norms which were deliberately designed into them, but they may also embody norms of a different kind, viz. ones that no individual or group of people actively, deliberately designed into them (see also Hildebrandt 2011: 246). When there is insufficient insight into the techno-effects of measures taken by regulators to influence the behaviour of citizens through technological means, regulators may come to affect their behaviour in ways that are not intended, thus jeopardizing the legitimacy of their regulatory efforts. In the words of Lodewijk Asscher (2006: 71):

> Using code to replace law could mean that public goods or important values traditionally protected by the law can be compromised by those writing or controlling the code. [Techno-regulation] is not subject to an official system of democratic checks and balances and, therefore, it is all the more important to analyze the regulating qualities of software.
> The very features that make it a viable (and often attractive) alternative to legal regulation can have troubling public effects, at least as compared to legal regulation. Software regulation lacks forms of regulatory 'safety valves' (…).

If this is true for clear and explicit cases of techno-regulation, it is all the more so when the full range of techno-effects that we have discussed in this chapter comes in play.

What is more, the lesson to be learnt from 'Abort, retry, fail' is that users will feel infinitely frustrated when confronted with

technologies that will offer them no choice – and by extension will offer the regulator full control and a perfect mechanism of force – while being fully aware that this is the case. And such frustration would surely over time lead to a rejection of these technologies. Of course, regulators could, therefore, choose the road they now often tend to take: hide the norm and the norm-setting itself from view by obfuscating both in the technological artefact. This way, regulators may gain complete control, and users will be none the wiser. However, since this approach seems to be odds with some of the fundamentals that we, as citizens of free and democratic societies, hold dear, we plead for the opposite approach instead: to leave individuals room for manoeuvring, freedom to choose, and, not unimportantly, have a sense of control over the technological and regulatory forces in their everyday lives. The guiding principle behind new regulatory measures that use technology to influence human behaviour ought therefore always to be that the compulsory pitfall of 'Abort, retry, fail' should be avoided.

As noted above, state and non-state regulators have valid reasons to use technologies' potential to influence human behaviour – and as this chapter has revealed this potential is far greater than the current debate on techno-regulation reveals. However, precisely because technologies can be used to call forth a host of implicit, automatic responses, and because the rules they set remain hidden from view, caution in the application of techno-regulation and its related techno-effects is of the utmost importance.

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