



**The Tacit Dimensions of Design  
(Paper)**

**Topic: (Design)**

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**Abstract**

Most of the countless interactions with physical objects that happen every day flawlessly dissolve in our usual behaviour, so we are hardly aware of these interactions. Brushing teeth, making a phone call, eating, washing our hands, driving a car, riding a bicycle, using public transport, working on a computer, writing texts – the only occasions when one of these interactions surfaces in our conscious awareness is when the interaction is either unexpectedly joyful or when there is an interruption in our intended flow of actions: a bottle seems impossible to open, an automatic door does not slide open as expected, I cannot operate the elevator because I am carrying groceries in both of my hands, buying a ticket at the ticket machine is so complicated or takes so long that I miss my bus. Most of the time the user knows what she is expected to do with certain objects, she can read the Affordances (Norman 1988, Gibson 1973) in her surroundings. But how is this kind of communication possible? How come I seem to understand what things are trying to tell me? In my dissertation I wanted to show on the one hand how these Affordances are designed into objects, on the other hand this concept needs the responding human being to be able to read or perceive what things are able to tell us. Therefore, ways of knowing and forms of (tacit) knowledge are of great interest for these questions. How is knowledge “distributed” between objects and users? And last, but not least, I will discuss the possibilities for and responsibilities of designers, who are able to design that process of „Translation“ (Latour).

The research process drew on the concepts of Grounded Theory (Strauss et al. 1970, 1994). 19 interviews were conducted with designers from London, Vienna, Graz and Salzburg. Complementing this research, I collected observations, short videos and photos of everyday interactions that would help me discuss certain aspects of the phenomenon under investigation. In the end, all the material was once more revisited and processed into a quite unusual shape: a virtual exhibition on “Implizite Vermittlung”, taking place in a conceived room enabled me to convey my findings and allows for further insights.

Questioning our everyday interactions is important for designers. However, trying to understand the fundamental mechanisms of how the communication between humans and things actually happens is essential for everyone who is designing in the broadest possible sense of the word. By conceptionally grasping such an intangible but astoundingly common everyday phenomenon, I aim to facilitate fellow designers of all fields with conceptual tools that allow them to better think about, talk about and argue their work.

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**Key words:** perception and design, interface, Implizite Vermittlung, forms of (tacit) knowledge

**Main References:**

[1] Michael Polanyi: “*The Tacit Dimension*”, University of Chicago Press, Chicago, 1966

[2] Bill Moggridge: “*Designing Interactions*”, MIT Press, Cambridge, 2007

[3] Bruno Latour: “*Technology is society made durable*”, The Sociological Review, 38, Wiley Online Library, 1990

## **The Tacit Dimensions of Design**

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### **1. Abstract**

Most of the countless interactions with physical objects that happen every day flawlessly dissolve in our usual behaviour, so we are hardly aware of these interactions. Brushing teeth, making a phone call, eating, washing our hands, driving a car, riding a bicycle, using public transport, working on a computer, writing texts – the only occasions when one of these interactions surfaces in our conscious awareness is when the interaction is either unexpectedly joyful or when there is an interruption in our intended flow of actions: a bottle seems impossible to open, an automatic door does not slide open as expected, I cannot operate the elevator because I am carrying groceries in both of my hands, buying a ticket at the ticket machine is so complicated or takes so long that I miss my bus. Most of the time the user knows what she is expected to do with certain objects, she can read the Affordances in her surroundings. But how is this kind of communication possible? How come I seem to understand what things are trying to tell me? In my dissertation I wanted to show on the one hand how these Affordances are designed into objects, on the other hand this concept needs the responding human being to be able to read or perceive what things are able to tell us. Therefore, ways of knowing and forms of (tacit) knowledge are of great interest for these questions. How is knowledge “distributed” between objects and users? And last, but not least, I will discuss the possibilities for and responsibilities of designers, who are able to design that process of „Translation“ (Latour).

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### **2. Introduction**

Questioning our everyday interactions is important for designers. However, trying to understand the

fundamental mechanisms of how the communication between humans and things actually happens is essential for everyone who is designing in the broadest possible sense of the word. By conceptually grasping such an intangible but astoundingly common everyday phenomenon, I aim to facilitate fellow designers of all fields with conceptual tools that allow them to better think about, talk about and argue their work. For this research 19 interviews have been conducted, and countless photographs have been taken so far.

In this talk, I will first introduce Polanyi's concept of tacit knowledge and elaborate a little on what it has to tell designers in terms of using tools.

Then I will talk about how I used the metaphor of an exhibition as a method in my dissertation.

And finally, in the third part I will explain the concept of "Implizite Vermittlung", why and how I use the term and how it is different from other concepts that seem to describe similar phenomena, and how it can help designers of all fashion to think about and talk about their work.

### **3. Research interests**

Although there are several ideas around for how to call phenomena like the ones I described before, still there is a bit missing in every single concept, of which I would like to talk about later, because first I would like to list the questions that inspired my work:

The main research question is:

- What is "Implizite Vermittlung", and how is it facilitated by designers?

The three sub-questions are:

- How can you grasp this kind of mediation, "Implizite Vermittlung", conceptually? How does this non-verbal communication between people and things work at all?

- How is this kind of access to knowledge between people and things possible? What kinds of knowledge are involved? (What kinds of body-bound knowledge play a significant role? In which ways are tools used as tools for perception and thinking?)

- How can you find out as a designer the things that cannot be talked about? (Like for example: What would be perceived as a more "elegant" version of the prototype? How can I design this tool so that it can be used intuitively?) How to investigate all which is not accessible on a conscious level, but still is of vital importance for the design process?

### **4. Tacit Knowledge**

I shall introduce this concept along the lines that Michael Polanyi used in his lectures in 1966, when he coined the term "tacit knowledge".

"We can know more than we can tell" is the most famous phrase in Polanyi's work, but what it means exactly is of highest interest for designers. I would like to add here already that things have a way of telling us much more than we know to talk about.

It is just like in this title of a book: "Watches Tell More Than Time" – there is a certain image I get of the person I just met, when I ask them what time it is, depending on whether they look at their mobile display, at their wrist or draw out a pocket watch.

#### 4. 1. The two terms of tacit knowing

Polanyi, as mentioned before, "reconsiders human knowledge by starting from the fact that we can know more than we can tell." [4] Tacit knowledge is the basis of all human knowledge and it combines two kinds of knowing. One is specifically known, you can tell explicitly what you know and the other one stays subconsciously below all levels of speech.

Polanyi calls the first one the *distal term*: it is the thing or the meaning of a thing that we recognize based on other things we are not aware of (The *distal term* is the part of knowing which is conscious and can be talked about). The *proximal term* describes the single features which we rely upon in order to recognize the specific face or concept. (This part is not conscious!)

"Such is the functional relation between the two terms of tacit knowing: we know the first term only by relying on our awareness of it for attending to the second." [5]

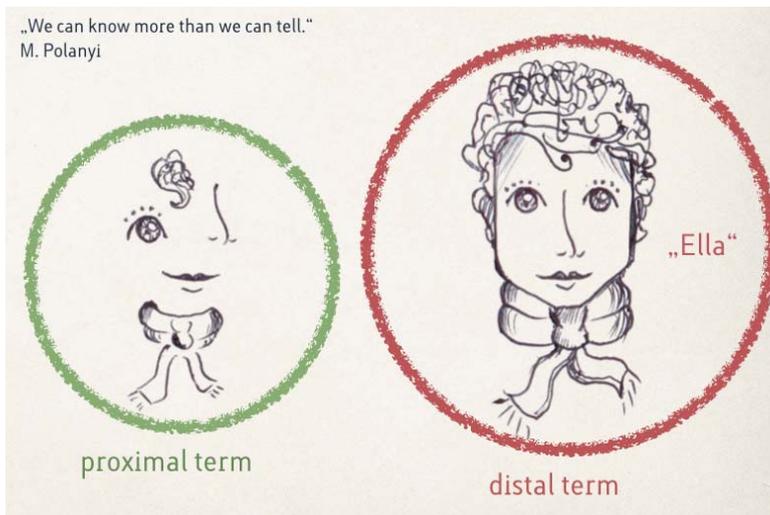


Image 1: Drawing of the relation between the proximal and the distal term of tacit knowledge

Polanyi gives the example of recognizing a face: We know a person's face and can recognize them among thousands, even millions of other faces. But exactly how we know them we usually cannot put into words. The exact parts of the face by which we know the person are an example of the *proximal term* of tacit knowledge. The *distal term* is the meaning, the recognition of the face or of a certain expression on the face, which we can only grasp by relying on the *proximal term* discussed before. To sum it up: The part that stays subconscious is called the *proximal term* and the part that you can talk about is called the *distal term*.

#### 4. 2. Tools within Polanyis Concept

In Polanyis way of thinking and what he introduces as the two terms of tacit knowing there is an interesting twist for designers when it comes to tools. I will build upon this the concept I call

1. p. 4; Polanyi, Michael (1966): *The Tacit Dimension*. Gloucester, Massachusetts: Peter Smith Publishers
2. p. 12; *ibid*.

"Implizite Vermittlung".

## 5. Implizite Vermittlung

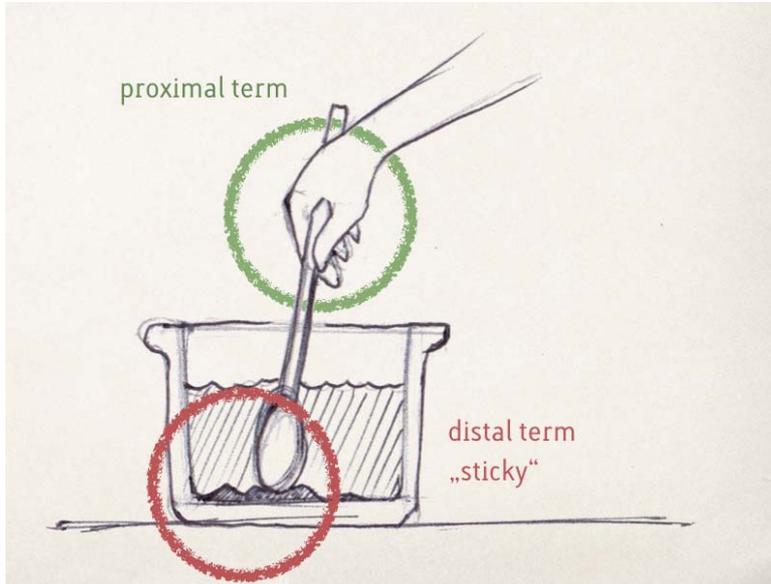


Image 2: Tools within Polanyi's concept

When I am stirring a pot of soup, I can "feel" – with the help of a wooden spoon – the consistency of the soup. In this case, Polanyi talks about the "incorporation" of a tool within our body. Whenever we use tools for attending *from* them to other things, like in this case we use the spoon to attend to the consistency, the tools change their appearance. They somehow become a part of our body insofar as they suddenly seem *transparent*. Let me explain – what is striking about this notion of "incorporation" is the following:

What happens when I notice that there is something burnt on the ground of the pot? I can feel the burnt stuff not where the actual sensation is happening – in the palm of my hand, where I grip the spoon and the signals are transmitted to my brain – but I feel it as if I could feel it at the top of the spoon, where (as Polanyi would say) the meaning "solidifies". I actually sense the meaning at the tip of the spoon.

This phenomenon is comparable with the sensation I have when wearing glasses. The glasses become part of my body, I look at the world *through* the glasses as if they were part of my body. Such is the meaning of the term incorporation in Polanyi's sense.

Now what designers do is creating, designing most of the "glasses" we look through in order to make sense of the world. Therefore, they are at a pivotal point of creating a view onto the world. Designers are designing how we all handle, treat and manipulate our world. And this is exactly because they design the tools that become quasi "part of our body".

## 6. Methods: Interviews

The interviews I conducted were a good starting point but only served as a way of refocusing the research interests, in order to reformulate the research questions and getting from original first

questions that were more about learning in design to the tacit dimensions and the research questions mentioned above.

## 7. The Exhibition Metaphor

### 7. 1. A virtual Exhibition

The whole dissertation is a text in the shape of an exhibition – a conceived exhibition I guide my readers through. There are three rooms, each one dedicated to a certain sub-topic, within the rooms there are exhibits, each of which is a good starting point for the narrative, the "guided tour" through the rooms.

### 7. 2. room\_1

Perception, cognition and creativity happen *with* and *through* the objects and technologies we use. Exhibits in room\_1 are all about different forms of knowledge and possible explanations of



phenomena like in this one example of an exhibit in room\_1:

*Image 3: room\_1: Example exhibit – where is the knowledge located?*

In case you know how to type very fast, it is no problem for you to easily shape words with your hands and fingers on your keyboard. But if the keyboard were cleaned of all the letters, how long would it take you to re-place them on the keys where they belong? The question that arises here is: Do your fingers know something different than you do? Is the knowledge of "letters-on-keyboard" all the same and is there only a different kind of access to the same knowledge? Or does this exercise show us different kinds of knowing?

Exhibits in room\_1 explore how tacit knowledge and design are to be seen in different constellations. The bridge to room\_2 leads through "understandable things" and "intuitive usability".

### 7. 3. room\_2

Things tell us more than we can talk about. This room is filled with exhibits that show examples as well as elements of this hypothesis. The narrative way leads from analysable single elements such as color, material, shape via temperature sensations and sound experience to complex situational settings and design research in general. Things "tell us more than words could ever say" and far more immediate than words. As an example exhibit I will present "NID – non intentional design".

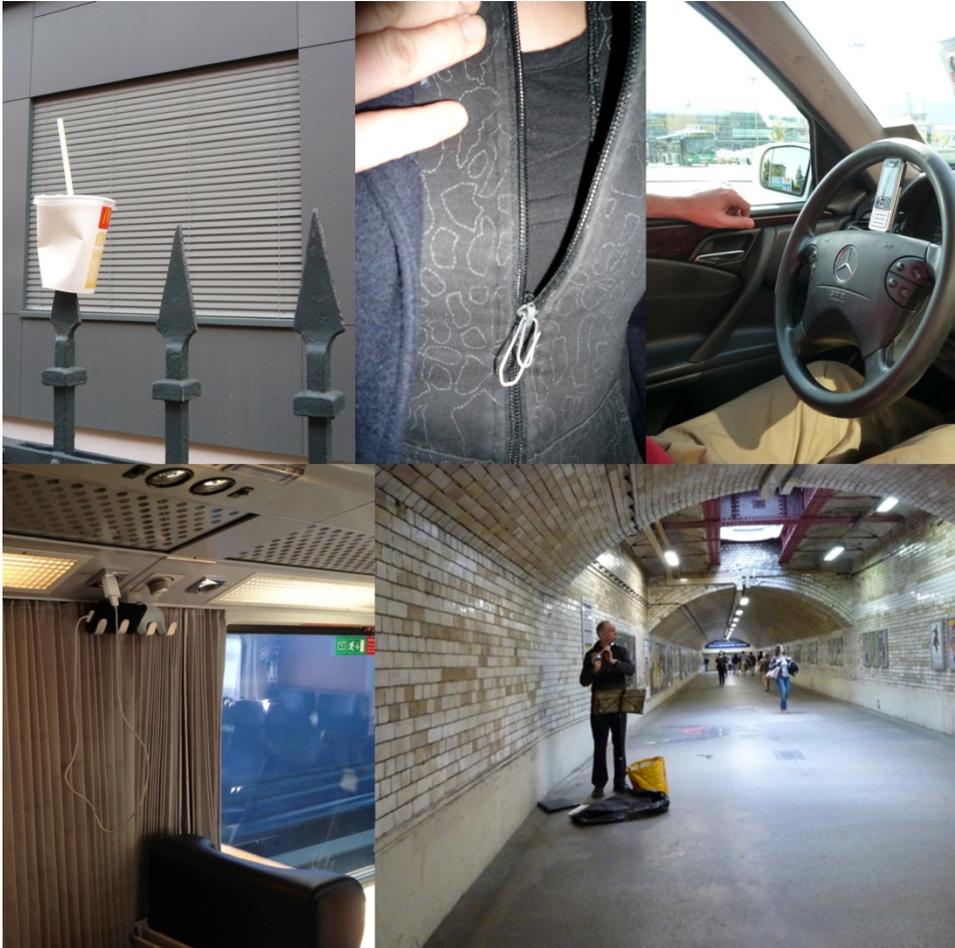


Image 4: Examples for "Non-intentional-design"

In the examples above you see a paper cup that is skewered on a fence, in the picture in the middle of the above row you can see how my colleague helped herself to a zipper substitute when it was suddenly broken by using a paper clip. The picture above right shows a kind of hands-free-kit, practically built into the steering wheel. In a train I once saw how a telephone was charged – the problem was that the electrical socket was built into the panel with the ceiling lights and the cable of the charger was to short for charging the phone while it lies on the table or seat. So the clever girl used the coat hangers as a support for the phone while it was charging. In the picture below right I see a musician who makes use of the special acoustics in a subway in London.

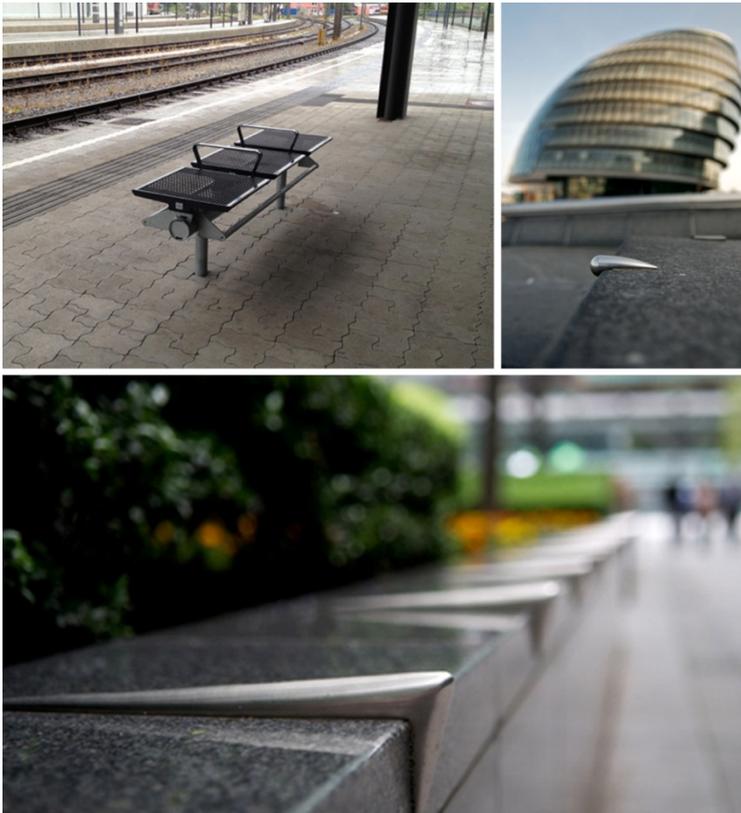
All these "workaround-solutions" show how creative most people are when it comes to substituting one thing with another or fulfilling tasks with whatever material is at hand.

#### 7. 4. Atrium

In the course of the exhibition, after room\_2 follows the atrium, where everything about "Implizite Vermittlung" can be found. It is about familiar terms and related concepts, about what is missing in some of the concepts and what needs to be added or combined. In the logic of the exhibition, the atrium comes before the third room, but for the logic of this paper, the atrium will be described after the three rooms.

## 7. 5. room\_3

What is to be seen with all the arguments so far, is that one cannot *not* design. We *can* design things consciously, but in fact we *have to* design them consciously. Everything that has been explained so far leads to the conclusion that our relationship with things is shaped by the things we use and that phenomena such as power relations are built into the objects we use and that in using them, our relationships are shaped in return, just like in Winston Churchill's famous saying: "First we shape our buildings and afterwards, they shape us." He said that in a speech in 1943 in order to illustrate that when the House of Commons was to be rebuilt after heavy bombing during World War 2 that he was influenced by the shape of the building as it was before it was destroyed. He



said that there was a special atmosphere when it was crowded and that there was a special density due to the lack of space in the building.

In the examples below I can see certain orders or even bans integrated into objects.

*Image 5: A) bench on a train station, B) benches in front of the Mayor's building in London, C) seat dividers on the framing of a park in London*

In picture A) I see a bench as they are provided on almost every train station in Austria. They are made of metal which makes them very often unpleasant to sit upon, because in winter they can get very cold and when it is summer, they can easily get too hot for sitting on them. Unfortunately, the elbow rests divide the seating area in three parts, which make it difficult for big people to sit on it, and it also makes it impossible for children – let's say five of them – to share the bench. As for the other two benches in pictures B) and C): the same conditions apply – it is hard to sit there for people of more than average weight and it is quite unpleasant to sit there in the hot sun or on a cold winter's day. But what is also important: these two benches are prone to be used as skater's facilities. People with inline-skates or skateboards would probably love to use them as slides, but in fact they cannot – because of these small elements of metal on top of the walls. So we see here a ban built into the environment.

## 8. Atrium

In the atrium I have collected several concepts which basically adress the same phenomena that I want to describe, but some tiny elements are missing in each one of them or at least need to be combined.

### 8. 1. Affordances

The psychologist James Jerome Gibson discusses in his 1970s Book [6] *The Ecological Approach to Visual Perception* his concept of *Affordances*. He says: "The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. The verb to afford is found in the dictionary, the noun affordance is not. I have made it up. I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment." [7] He continues to stress the relationality of affordances, meaning that the deciding part can neither be found in the world nor in the animal alone. Perception, also human perception, is highly relational also in terms of measuring. For example if there is a small river and it is for me to decide whether I am able to jump over it, it would not be of much help if my perception would allow me to tell if the river measures 1,5 or 2 meters exactly. But instead I have a feeling of my own jumping ability, so that I can decide for myself if the river "affords jumping over".

### 8. 2. Closure

Closure appears in the literature in different meanings, e.g. Trevor Pinch and Wiebe Bijker talk about closure as a stabilisation mechanism of *interpretative flexibility*: as soon as a new invention occurs, different versions of the invention occur which can look very different, but after some time, a certain shape becomes the dominant one – as it was for example with mobile phones before the iPhone occured. After that, smartphones started to appear pretty much in just one shape. That kind of stabilisation is what they call "closure".

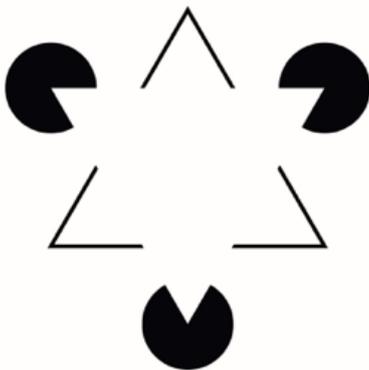


Image 6: Kanisza-Triangle

In gestalt theory, the phenomena of seeing some parts but perceiving a whole is called closure. When you see more than the sum of some parts, closure occured. A famous graphical example by Gaetano Kanisza is his "Kanisza Triangle" which he developed in the 1950s – see image above. The triangle whose tip points downwards can only be seen because the individual fills in the rest of the

3. see: Gibson, James J. (1979): *The Ecological Approach to Visual Perception*. Hillsdale, London: Lawrence Erlbaum Associates.

4. see: *ibid*.

implied triangle.

### **8. 3. Interface**

Interface is probably one of the most important metaphors in design. Originally derived from the natural sciences it describes the surface where two phases of different states meet, e.g. water in liquid state and air in gaseous condition. The exact surface where these two states of aggregation meet is called "interface". The literal translation into the technical sciences describes the point where two hardware or software components meet: the point of interaction between a printer and my computer for example. But in design roughly the point where user and hardware meet is called an interface. Gui Bonsiepe talked about interface as a central topic of design in the 1990s [8] and described "interface" as a triangled space: He said that there is a "user", or a "social agent" wanting to complete a certain task. Second, there is the "task" at hand, wanting to be executed. And third, there is a "tool" which is used to complete the task at hand. In this described triangle, design interferes. It is important for Bosiepe, that design is not concerned only with the elements of the triangle but with the space that opens up in the middle and what happens there in between the elements.

### **8. 4. Translation**

Bruno Latour describes in a lot of his papers on Actor-Network-Theory the process of "Translation" as a process that allows a network to be represented by a single entity. The process of "Delegation" can be shortly described as what happens when a certain set of actions is delegated to an object. He brings the example of the "sleeping policemen", or "road bumpers" [9]. The desired call to action – in this case: "drive slowly" – is delegated to a non-human actant, in this case a road bumper.

### **8. 5. Scripts**

Very closely related to this concept are "scripts", as Madeleine Akrich calls them [10]. She says that the designer has a certain vision of how an object is going to be used. They kind of describe this vision like a director describes how the single person is going to act in a certain situation. She talks about "inscribing" this vision into objects.

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5. p.14; Bonsiepe, Gui (1994): *Das Interface Im Design-Dreieck*. Hochparterre: Zeitschrift für Architektur und Design, 7|3

6. p. 241: Latour, Bruno (1992): "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts." *Shaping Technology-Building Society. Studies in Sociotechnical Change*. Eds. Wiebe Bijker, and John Law. Cambridge, Mass.: MIT Press, 225-59.

7. see: Akrich, Madeleine (1992): "The De-Scriptio of Technical Objects." *Studies in Sociotechnical Change: Shaping Technology/building Society*. Eds. Wiebe E. Bijker, and John Law. Inside Technology. Cambridge, Mass.: MIT Press, 205-224.



Image 7: "Lucerne key" – key to a bathroom in a bookshop in Lucerne

The example above, the "Lucerne key" is an object I encountered in 2015 in a bookshop. When you need to go to the bathroom you are given this key and of course you are expected to return it afterwards. So, like in the example of the hotel keys of Bruno Latour [11] a certain weight is added, so that it would buldge my bag in an unpleasant way if I were to carry it with me accidentally, also the weight itself adds to the likeliness that it will be returned. But there is another special feature about this key: it has a kind of stand-up mechanism, so that the key, when placed on the side of the washbasin, will not get wet.

## 9. Outcomes

*Implizite Vermittlung* is

- situated
- immediate
- processual
- relational

By situated I mean that *Implizite Vermittlung* always happens in a situation and can hardly be described on its own. By immediate I refer to the effects of *Implizite Vermittlung*, for example how a loud sound signal like a siren affects me, there is no way for me to not get the meaning (as long as I can hear at all). By processual I mean that all important knowledge is embedded in processes, for example in certain scripts like how to use a rotary-dial telephone. Relational means that the important elements of *Implizite Vermittlung* can neither be found in the person or the object alone. Just like when a violinist and a violin meet – the music happens through both of them, not just one of the elements would suffice to describe the magic.

I'd like to end with words of the Australian design researcher and philosopher Cameron Tonkinwise: "Whether they are conscious of it or not, designers do have the power to influence how people relate to things. Design semantics constrain, map and afford not just the instrumental use of what is designed, but how the designed is perceived and valued. Designers can, do and should design

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8. see: Latour, Bruno (1991): "Technology is Society Made Durable." *A Sociology of Monsters Essays on Power, Technology and Domination*. Ed. John Law. Sociological Review Monograph N°38. Wiley Online Library, 103-132.

patterns of behaviour like rituals of care. They cannot design these in the way they specify materials and components, but they do, every time they design, emphasise, promote, and foster certain practical dispositions toward what they have designed." [12]

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9. p. 76; Tonkinwise, Cameron (2003) "Beauty-in-use." *Design Philosophy Papers* 1.2: 73-82.