

Successfully Failing to Design the New Unit of Presence: A Design-based Research Exploration in-between the True and the Real.

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Abstract

This paper explores the methodological challenges, paradoxes and possibilities within the process of failing to design a physical, materialized unit of qualitative measurement: the new unit of presence (abbreviated NUP). The unit and its five constituent parts are discussed against the current shift from defining the kilogram through a material artifact to defining it through non-material invariable constants. The original international prototype of the kilogram and the meter are evaluated as designed artifacts and argued to inhabit a hybrid position between the true (the domain of science: abstraction, the universal) and the real (the domain of design: complexity, the ultimate particular). While the redefinition of the kilogram marks a movement towards the true end of this continuum, the NUP explores a counterbalancing move towards the real end. As a constructive design research project primarily aimed at design researchers as well as design professionals, the NUP is an invitation to join the exploration in-between the true and the real. The paper concludes by arguing that the kind of successful failure that the NUP demonstrates helps us navigate this peculiar hybrid space, in theory as well as in practice.

KEYWORDS: design methodology, constructive design research, materiality, successfully failing, qualitative unit of measurement, The International System of Units, presence.

Introduction

For my master's thesis from the Royal Danish Academy of Fine Arts - School of Design in Copenhagen, carried out in spring 2013 across Copenhagen, Denmark and Cape Town, South Africa, I presented myself with the impossible task of designing a new qualitative unit: the new unit of presence (abbreviated NUP). The impossibility in designing a new unit of *qualitative* measurement and the failing to do so was the main goal of the project. In this respect 'presence' (as in being present) seemed like a suitable, relevant field of inquiry. Rather than devising a new mathematical formula, I was interested in exploring the methodological challenges, paradoxes and possibilities within the process of *designing* a physical, materialized unit of measurement, with reference to existing units such as the international prototype of the kilogram (abbreviated IPK) in Paris or the cubit hand in Ancient Egypt. As this is the explicit focus of this paper, deeper discussions around presence, time and temporality in relation to philosophy, post-colonialism and/or anthropology fall outside this scope.

The Art (and Design) of Measurement

Since the Metre Convention in Paris 1875, the metric system has been expanding across nations and people to the level of global adoption it's enjoying today. The Bureau International des Poids et Mesures (International Bureau of Weights and Measures, abbreviated BIPM), founded at the Metre Convention in 1875, continue to refine and redefine our fundamental metric measures, their latest brochure, *Le Système International d' Unités* (The International System of Units, abbreviated SI), dating back to 2006 with a supplement consisting of updates added earlier in 2014. The current redefinition of the kilogram, "the greatest change ever in the world's system of weights and measures" (Quinn, 2012, official blurb), tells the larger story of BIPM's continuous strive toward ever-greater precision. The kilogram is currently the only base unit that is still defined from a material artifact, in this case IPK, kept at BIPM at their office in Pavillon de Breteuil in Sèvres outside Paris, France. In a public draft of the 9th Edition of SI, the following definition is proposed:

"The SI unit of mass, the kilogram

The kilogram, symbol kg, is the SI unit of mass; its magnitude is set by fixing the numerical value of the Planck constant to be exactly 6.626 069 57 10⁻³⁴ when it

is expressed in the SI unit for action $J s = kg m^2 s^{-1}$.” (SI, 2013, p. 13)

Thus, just like the other six SI base units: the meter, second, ampere, kelvin, mole and candela, the kilogram is about to be defined through invariants rather than a material prototype. In a similar way, the second is currently defined as:

“(…) the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the cesium 133 atom.” (SI, 2006, p. 113)

Whereas the design discipline is indeed familiar with the concept of prototyping (Brown, 2009) the prototypes and iteration processes employed by BIPM in their quest for ultimate precision seem somewhat different. Let us proceed by asking ‘why they are different?’ as well as ‘how they are different?’ At this point it’s important to stress that from a short historical introduction, we’re now venturing into designerly reflections on these two questions (for an extensive scientific answer to the very same two questions, see former BIPM director Terry Quinn’s recent book on the history of BIPM and metrology (Quinn, 2012)).

It’s safe to say that design and science have a complicated relationship. As Galle & Kroes (2014) recently concluded, the two disciplines “are relatives, perhaps even siblings; they often enjoy each other’s company, but they are hardly twins, and certainly not identical twins.” Nelson & Stolterman (2012) draw out a continuum between the true (the domain of science: abstraction, the universal) and the real (the domain of design: complexity, the ultimate particular). Although science provides design with a basic foothold of scientific insights, Nelson & Stolterman argue that further confusion between the two domains stems from the historical dominance of the scientific method in the Western world:

“Over time, many different ways of conducting inquiry into what can confidently be considered to be true have been “designed” as opposed to being inherently obvious. These differing forms of inquiry have been sufficiently successful—in the right context, and at certain moments in history—to be championed as superior forms of inquiry, regardless of the situation or need. This is especially true of inquiry based on the scientific method” (Nelson & Stolterman, 2012, p. 32-33)

When considering how the scientific method has been “designed”, BIPM’s work on SI becomes highly interesting, especially if we leave the quotation marks aside. From The Metre Convention in 1875 to the sanctioning of the international prototypes of the meter and the kilogram in 1889, great efforts went into the design of these two material artifacts. One example would be the disagreement between the involved parties over

whether the platinum-iridium prototype of the meter should have a specular or matte finish. On one hand the process of polishing the meter potentially jeopardized the movement of an engraved line, while on the other hand the specular finish was much better for engraving and subsequently viewing said line. In the end the prototypes ended up with a specular finish. Other aspects of the materiality of the prototypes include the testing of different alloys. Finally, there are questions of shape, e.g. the particular X-shaped “Tresca section” on the meter prototype, ensuring maximum stiffness (Quinn, 2012).



Figure 1 shows two international prototypes of the meter. Notice the “Tresca sections”. Source: Wikipedia.

There’s a striking contrast between these 14 years of iterative, material fine-tuning and the abstract, absolute quality the units would attain in the century to come. Following Nelson & Stolterman (2012) we can consider the international prototypes themselves as simultaneously absolute true (universal standards) and very real (e.g. collecting dirt from the atmosphere over time (Mills, 2005, p. 71)). However, the historical quest for ultimate precision draws up a continuum from the absolute real (ultimate lack of precision) to the absolute true (ultimate precision). This continuum is reminiscent of Bruno Latour’s (1999) chain of transformations in his photo-philosophical account of a group of scientific researchers’ field trip in the Amazon. Following Latour’s distinction between the concrete (‘things’, e.g. earth samples) and the abstract (‘signs’, e.g. the pedocomparator, a spatial grid-like device for organizing and comparing earth samples)

along the continuous transformations in the scientific work carried out, the international prototype appears as a hybrid (something Latour also specifically argues for in relation to Actor-Network-Theory (2005, p. 288), an interesting tangent I won't pursue further in this context). Let's instead shift our attention towards the subject matter: Presence.

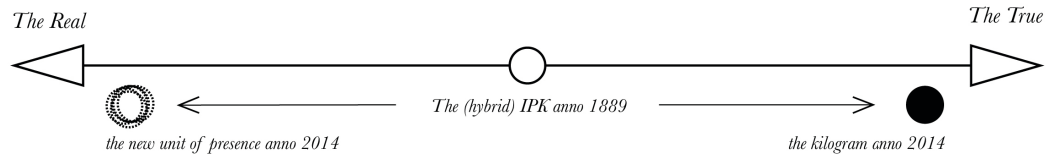


Figure 2 shows the movement of the NUP towards the real, counterbalancing the movement of the kilogram towards the true. Illustration by Søren Rosenbak.

The Subject Matter

It's interesting to note that against the enormous efforts in quantifying time leading up to the current SI definition, one does not find a similarly consistent and structured discourse around the qualification of time. From a design perspective, recent technological advancement in media has radically challenged our experience of presence: the Internet, smart phone technology, social media, the cloud, Google Glass, the currently accelerating consumer market for drones, Snowden's global surveillance disclosures, etc.: telepresence, virtuality, omnipresence and so on. All this happened in less than a fifty-year timespan and researchers are still trying to unravel the consequences and implications across the full spectrum of disciplines, design included. The concept of presence plays a key role in fields and industries as diverse as philosophy, religion, extreme sports, psychology, investment banking, game design, smart phone technology, etc. Indeed, in a design context presence can be considered a wicked problem (Rittel, 1972). Rather than making any naïve attempts of grasping all the complexities and questions inherent in the concept of presence, I wanted to use this dense, highly relevant field of inquiry to ensure the degree and nature of failure in the task of designing a new unit of qualitative measurement. Thus, I decided to design the NUP.

This process was based on field research carried out in Copenhagen, Denmark & Cape Town, South Africa. Before discussing the NUP and its five constituent parts in greater detail, I'll briefly touch on the field research in relation to the question of contextualization.



Figure 3 shows the IPK, the international prototype of the kilogram as it's kept at BIPM. Source: BIPM.

Contextualization and Field Research

Despite its true and universal nature, the IPK remains extremely contextualized in a real world setting. Envaulted at the BIPM headquarter in Pavillon de Breteuil in Sèvres, the IPK is shielded by several bell jars. In this sense the IPK exists in a paradoxical state of simultaneous extreme universal applicability on the one hand and extreme inaccessibility due to being a one-of-a-kind artifact locked in a vault on the other. Interestingly, this dualist nature extends to its immediate physical context as well, as the BIPM headquarter since 1969 has enjoyed extraterritorial status, grounding it both locally in Sèvres and

internationally at the same time. As a consequence, I decided that the field research towards designing the NUP should play out with special attention to territoriality and contextualization, thus framing the research across two highly different time cultures (and of course continents), namely Copenhagen, Denmark and Cape Town, South Africa. This was of course also yet another way of designing the process of failing to design the NUP. As this paper focuses explicitly on this process, I won't be able to give an exhaustive account of the field research and data collection. Instead, I'll attempt to illustrate the main tension between insights from Copenhagen and Cape Town through a single example.

In Copenhagen I did an online qualitative survey asking questions related to presence and mediation. The answers displayed a clear ambivalence towards the Internet, social media and smart phone technology. This result was contrasted by the overwhelmingly positive adaptation of social media and smart phone technology in South Africa. This difference obviously has a number of complex reasons. One key insight from interviewing Professor M'Rithaa at Cape Peninsula University of Technology in Cape Town was the link back to the South African philosophy of ubuntu: "I participate therefore I am. I am because we are" (M'Rithaa, 2013). This profound sense of community transcends the analog and digital. Professor M'Rithaa went on to explain how South Africans joke about virtual reality already existing in Africa:

"(...) maybe [that is] part of the reason why the technology has leaped so quickly in Africa, because if you tell someone [about] the idea that I could be speaking to someone who is in a virtual space, that is what they have always done, only that they call it the spirit world." (M'Rithaa, 2013)

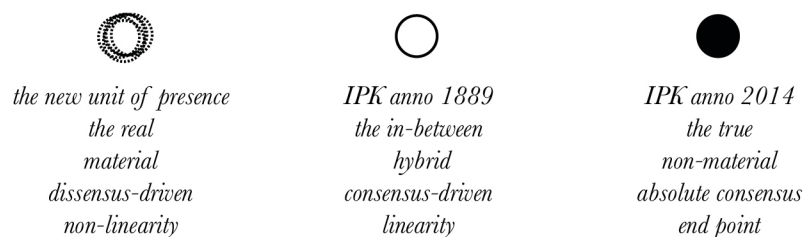


Figure 4 shows the differences between the three units. From left the NUP, centre the IPK anno 1889 and right the IPK anno 2014. Illustration by Søren Rosenbak.

Dissensus and Non-Linearity

Counter to how the IPK is currently moving towards an absolute end point of non-materiality, I was interested in moving the NUP towards a plural position of materialities. In contrast to the linear, consensus-driven design process in 1875-89, I wanted to design the NUP in a dissensus-driven, non-linear way. I further wanted to instill these qualities into the unit itself. This of course relates to a critical understanding of design practice that focuses on asking the right questions rather than attempting to provide any “right answers”. Following the decision to design a unit characterized by dissensus, I decided to turn the unit into an assemblage of five different constituent design research experiments that would run in parallel, thus breaking down linearity. All of these five experiments would explore different aspects of the overall task of failing to design the NUP. As some of the design experiments are short projects in themselves, I’ll try to restrict myself to short, concise presentations, focusing on the sum in the following discussion rather than lingering over the details of any single experiment. The numbering is strictly practical and doesn’t reflect any kind of hierarchy or chronology.

The Five Constituent Artifacts



Figure 5 shows the front cover of the Speculative Diary. Photo by Leyla Nasib & Søren Rosenbak.

1) *The Speculative Diary (book object)*

The Speculative Diary is a reflection-ideation crossover tool developed in the process of designing the NUP. Rather than simply recording data, it uses any information from a given day to generate speculative scenarios along any one future path within the project. Drawing heavily on the Dadaist tradition of automatic writing, dream journals etc., it offered a chance to step outside the constraints of the here-and-now and map out a particular future trajectory using the starting point: “what if...?”. Each entry would use the format of one page of text (right-hand side) and one optional illustration (left-hand side). At some organic point in the process of failing to design the NUP, the function of the Speculative Diary changed from recording speculations to exploring ideas. The double function is materialized in a classic plain Moleskine® paper notebook (reflection) covered in shiny multicolored stars and rainbows (ideation).



Figure 6 shows the Aspirations Elsewhere poster of the Atlantic Seaboard in Cape Town. Photo by Søren

Rosenbak

2) *Aspirations Elsewhere (poster format)*

Aspirations Elsewhere is a poster format originating from the experience of living on The Atlantic Seaboard during the research trip to Cape Town. As a predominantly white and highly affluent area of the city, The Atlantic Seaboard consists of blocks and villas with strong associations elsewhere: Pleasant Ways, St. Moritz, Bordeaux, Atheneum, Rapallo etc. In this sense the project explores the local extraterritorial qualities of The Atlantic Seaboard with reference to Pavillon de Breteuil in Sèvres, home to BIPM: being somewhere and elsewhere simultaneously. This state was translated into a poster format that framed the aspirations elsewhere at The Atlantic Seaboard in a photographic montage composition with the single headline “We Are Not Here”. The photographs of local aspirations elsewhere are leveled in a pragmatic b/w filter, rendering the diversity of typographical styles, building facades etc. into an extraterritorial unified whole. The poster format exists as a template free of any photographic material, inviting graphic designers worldwide to frame the local aspirations elsewhere (than the Atlantic Seaboard).



Figure 7 shows the Atlas of Most Presence with one fragment opened. Photo by Leyla Nasib & Søren Rosenbak.

3) *The Atlas of Most Presence (atlas fragmentarium)*

The Atlas of Most Presence is a graphical and spatial transformation of the answers to one of the questions from the online survey carried out in Copenhagen: “Where are you most present?” The design of The Atlas of Most Presence consists of two phases. The first stage was largely interpretative: A selection of digitally submitted answers would be translated into analog Polaroids using a slightly wonky Polaroid camera and experimental, idiosyncratic wayfinding to locate and capture the locations/situations/moments suitable for the particular response (e.g.: “*There is a place in Greece where I always find myself 100%*”). The second stage concerned reconfiguration: By revisiting all the survey responses through each ambiguous Polaroid, several responses would appear to relate back. The final atlas consists of a series of envelopes made from an anachronistic African atlas, each Polaroid sealed in an envelope and the corresponding responses printed out and glued unto the front. In this way each envelope contains a narrative as well as an open dialogue. A red string of yarn connects all the envelopes into a whole. Thus, The Atlas of Most Presence consists of an indefinite amount of spatial pockets of presence, materializing the highly ambiguous written answers from one context (Copenhagen) into a highly concrete spatial rendering within another (Cape Town). The project extends the peculiar mix of particularity and ambiguity found in the digital survey responses into the design of the atlas by its focus on analog media: A slightly wonky Polaroid camera and the tactile experience of yarn and folded paper.



Figure 8 shows Utopian Moments, design probing kit envelope at the back and utopian moment by participants in the front. Photo by Leyla Nasib & Søren Rosenbak.

4) *Utopian Moments (design probes)*

Utopian Moments is a design probing kit looking into utopian notions of 'presence' (note the warning by Gaver et al. regarding the strictly scientific adaptation of cultural probes back in 2004). The design probing kits contain very low-fi analog tools such as crayons, twine, cardboard etc. in addition to instructions of use. They were distributed at the very first Utopia Music Festival in the semi-desert outside Cape Town. The probing kits asked the participants to capture a utopian moment and use it to address a dreamer. Each moment would then travel to Copenhagen and spark a dream that would return to Cape Town, completing a loop of 20.000 km. This process is still ongoing.



Figure 9 shows all the different time culture 'bricks' exhibited together with interactive sheets of blank paper for filling in. Photo by Søren Rosenbak.

5) *Time Culture Bricks for a Non-Existing Puzzle (graphic mosaic)*

This is a graphic mosaic based on a qualitative survey conducted at the graduate program in Graphic Design in CTI Claremont, Cape Town. The survey asked the student to define time, presence and list name and cultural background. The diversity of answers was spectacular. By scanning and digitally manipulating the handwritten responses into a coherent graphic style, I wanted to emphasize the equivalence between all the answers.

The different hues of the same tone of colour further emphasize how all the answers simultaneously carry many differences and similarities. The added white sheets of blank paper encourage any audience to reflect and participate in this maze of understandings of time, presence and culture.



Figure 10 shows the new unit of presence viewed from the front. Photo by Leyla Nasib & Søren Rosenbak.

The New Unit of Presence

The NUP is a highly processual artifact. As a material syncretism, the unit contains various elements from the five design research experiments, both the final results (e.g. the stars from the Speculative Diary) and the design process (e.g. the Polaroid camera from The Atlas of Most Presence). Answering to the impossible task of designing a qualitative unit, the construction itself is exhibiting traits of this impossibility: it's literally held together by string (Utopian Moments) and yarn (The Atlas of Most Presence).

Returning to the explicit unification of the end results and the design process, the final outcome positions itself as an experimental, exploratory design research project using a constructive design research methodology, “referring to design research in which

construction (...) takes center place and becomes the key means in constructing knowledge” (Koskinen et al., 2011, p. 5). However, there is an important distinction to be made between the NUP and other projects within this tradition, in particular at the more critical end, such as critical design, speculative design, design fictions and discursive design. While many projects within this critical strand tend to use design to articulate a critical discussion targeted at the public domain, the NUP addresses other design researchers and design professionals as its primary audience. Rather than critiquing technology and its pervasive future implications for society, the NUP explores the paradoxical state of the matrix of constants that upholds science and technology like unearthly, eternal pillars. The NUP displaces this order through proposing the impossible act of designing a qualitative unit of measurement. The impossibility first and foremost resides in the basic contradiction of designing a *qualitative* unit within the *quantitative* system par excellence. The displacement is illustrated in Figure 2 within the continuum, with the NUP counterbalancing the current non-materialization of the IPK through exploring the hybrid nature of the IPK anno 1889 in the exact opposite direction: towards the outmost real and materialized. Why do this? And what is the use of the NUP itself?

Through stretching the iterative, designerly qualities inherent in the years of 1875-89, the NUP explores the borderline in-between science (the true) and design (the real), at a point in history when the foundation of science is leaving this territory behind in favor of greener, more absolute and thus less uncertain, pastures. What does this space have to offer for design? What does it mean in the first place that the SI is being designed and re-iterated by scientists? How can designers engage in the task of designing units of measurement and what purpose should they adopt outside the confined scope of ultimate scientific precision? By deliberately failing to design the NUP, I wanted to ask these questions through a materialized, designed artifact. The element of ‘failing’ is easily located in the difference between a designerly and scientific understanding of the task. However, it also resides in the ironic ‘the’ preceding ‘NUP’. In many ways the definite article is the crux of the project, encapsulating the approach of successful failure by expressing the incomppliance with the scientific method and understanding of base units (despite its kinship to the IPK anno 1889), and at the same time fitting surprisingly well within the framing of any given design solution as the ultimate particular (Nelson & Stolterman, 2012) (again, despite its kinship to the IPK anno 1889). In this way, the irony goes hand in hand with a deep seriousness. After all what is more ultimately particular

than a qualitative unit of measurement?

By instating a state of dissensus into the material artifact and working across two highly different contexts, I was interested in opening up the unit as a sort of discursive space. In contrast to the seemingly identical copies of the IPK delivered to nations worldwide, one can imagine how a copy of the NUP would look like: highly different than the original although exhibiting similar qualities, recalling the dualist nature of the envaulted, yet universal IPK.

Finally, a few words on presence: the subject matter of this entire journey. Whereas the NUP and its five constituent artifacts do have a lot to say about our understanding and experience of being present, especially with regard to contrasting time cultures and mediation, this is an additional—valuable, although extensive—discussion, worthy of its own venue. This paper has focused on exploring the methodological challenges, paradoxes and possibilities within the process of failing to design a physical, materialized unit of qualitative measurement. The fact that there is a possibility to have additional discussions specifically around the outcome of this endeavor is seen as an opportunity rather than a limitation.

Concluding remarks

Science continues its relentless work towards absolute certainty in measurement, although leaps and discoveries such as quantum science, dark matter, multiverses etc. continue to pose serious questions and challenges along the way. As an example, Heisenberg famously shook the foundation of objectivist science with the uncertainty principle:

“(...) when a human observer makes a measurement, one and only one result is obtained; for example, the rebounding electron will be found moving in a certain direction. In the act of measurement, a single, specific reality gets projected out from a vast array of possibilities.” (Rennie, 2006, p. 11)

This shifting terrain of concurrent certainty and uncertainty strikes me as an ideal platform for design to operate on. And yet, faced with the often all too tangible schism between the true and the real, it seems slightly ironic that we designers, faced with extreme complexities in the questions of how nature is constructed (such as time, mass, distance etc.), have been willingly clinging on to a set of designed prototypes as truths,

and yet when it comes to extreme complexities in the questions of the human experience of nature (such as presence), we don't allow ourselves the same freedom of using our design skills to prototype and employ a similar set of (very different) designed units. This latter process would obviously be one of failure, at least in the strictly scientific sense. However, from a design perspective, I believe valuable outcomes indeed emerge from these successful failures, as they help us navigate in that peculiar hybrid space in-between the true and the real, in theory as well as in practice.

Acknowledgements

Thanks Johan Redström, Carl DiSalvo and Erik Stolterman for valuable critique and discussions. Also, thanks to the two anonymous reviewers for constructive feedback. So many have provided great insights throughout this journey. Recalling all these wonderful people listed in my master's thesis, I wish to express a second wave of gratitude. Also, thanks to colleagues from UID, Designfakulteten and the DRS2014 Doctoral Colloquium for all the input. Finally, a very special thank you to Leyla Nasib.

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