Kernel Philosophy: A Way of Inspiring and Making Sense of Design in Information Systems Research?

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Abstract: This research in progress introduces the concept of *kernel philosophy* to advance prior discussions concerning design, meta-design, the underlying rationale of design, and the assumptions and values of which a design rationale rests upon. Consequently, the present research proposes philosophy as a kernel that ingrains the assumptions and values of a design rationale, and how an active use of *kernel philosophy* may establish a reflective attitude towards design in information systems research, through two main features (1) sense-making of design/meta-design and (2) inspiring the design/meta-design process. Finally, the paper provides a brief demonstration of *kernel philosophy* in use and ends with a brief discussion concerning limitations and future research.

Keywords: Philosophy, Design, Information Systems, Rationale, Research

"Philosophers are adults who persist in asking childish questions"

(Sir Isaiah Berlin, The Listener 1978)

1   Introduction

The literal meaning of philosophy is "the love of wisdom or knowledge" (Greek *philo*-"loving" + *sophia*-"wisdom"). Early philosophers such as Socrates, Plato, and Aristotle, were all confined to the idea of pursuing a life-long quest toward a *meaning of the truth*, by asking and addressing questions that opened up new doors/insights about oneself, the reality, and the assumptions and values of which one's reality rests upon. This essential trait of antique philosophy (and philosophizing – doing philosophy) was later throughout history, developed and established into an academic discipline. Today, philosophy is thus first and foremost seen as an academic discipline that incorporates a constellation of various traditions and schools of thought. The foundation of this academic discipline, has gradually been developed based on outcomes produced by a cascade of philosophers throughout history. This includes the works of well known philosophers such as Rene Descartes, Immanuel Kant, Friedrich Nietzsche, Arthur Schopenhauer, Ludwig Wittgenstein, as well as other later leading figures that belonged to a particular school of philosophy, such as, A.J. Ayer or Isaiah Berlin from the Oxford school of philosophy, Rudolf Carnap or W.V.O. Quine from the Vienna circle, Herbert Mercuse from the Frankfurt school of philosophy, William James or John Dewey from the pragmatic school of philosophy, Martin Heidegger or Jean-Paul Sartre from the existentialistic school of philosophy, Edmund Husserl or Merlau-Ponty from the phenomenological school of philosophy, and others.

Essentially, the kernel of academic philosophy lies in the heart of studying and developing fundamental ideas, concepts, and foundations that are not adequately addressed in specialized empirical disciplines, such as physics, chemistry, or history. As such, philosophy distinguishes itself by providing foundations upon which all belief structures and fields of knowledge are built. Arguably, all kind of research is (deliberately or intuitively) based on philosophical underpinnings of some kind. In turn, the underpinnings may vary in their status and resonate with assumptions and values that are grounded in different ontologies such as, logical positivism, pragmatism, existentialism, rationalism, interpretativism, or a combination of such. The variety of philosophical underpinnings, has enabled researchers from other disciplines to incorporate philosophical foundations into their research inquiries, to gain knowledge about the characteristics of their own research discipline, and to justify an epistemology or ontology around their research interest. This includes the research interest of scholars within the discipline of Information Systems (IS).

The discipline of IS has a historical relation with philosophy. A comprehensive overview of this is presented by Hassan et al (2018), where they explicitly show the historical relation between IS and philosophy, both from a historical perspective, as well as presenting implications and suggestions for future use of philosophy in IS-research. Generally speaking, IS-researchers have adopted and used philosophy to problematize, elucidate, and understand different perspectives of IS-research. This includes the perspectives of metaphysics or axiology of Information Technologies (IT) (e.g. Introna, 2002, 2005; Cheikh-Ammar, 2018), metaphysics and epistemology of IS (e.g. Beynon-Davies, 2018), philosophy of technology and rationality (e.g. Chiasson et al., 2018), sense making of IS through philosophy (e.g. Lyytinen &

Hirschheim, 1988; Janson et al., 2000; Janson & Cecz-Kecmanovic, 2005), or to inform and inspire design in IS (e.g. Ehn, 1988; Heng & De Moor, 2003, Ross & Chiasson, 2011).

In this research in progress paper, I will focus on the latter mentioned perspective above, namely design in IS and philosophy. The motivation behind this will be elaborated through a problem statement in the next sub-section, followed by a sub-section which introduces the purpose statement of this research. The style of this paper will in other words be manifested and expressed as a research in progress paper, rather than a full paper. My intention with writing this paper is to question, elucidate, and shed light on some issues that I hope I can discuss further at the 6th AIS Pre-ICIS SIGPrag workshop in San Francisco, USA.

1.1 The Problem

The problem statement of this present research is grounded within the movement of design in IS-research. Design in IS-research has been (and still is) a dominant movement and knowledge interest among IS-scholars. Historically, different notions about what design is and how subsequent research within IS can be organized and conducted, have generated various assumptions and values about what design *means*. Consequently, this has lead to many positive effects for the IS-community in general, such as, developing and providing a variety of design research approaches and methodologies (e.g. design science research, participatory design); producing a vast body of academic knowledge that relies on design research outcomes (e.g. concepts, frameworks, models, methods); establishing a supply of international conferences and workshops that enable IS-researchers to network and share their research outcomes; producing a rich source of literature (e.g. books, journal papers, proceedings).

In light of such positive effects however, rests an unintelligibility that enfolds and hides the presence of a potential kernel, of which different assumptions and values about design in IS, rests upon. This proposition has been expressed through prior discussions among researchers, both within and across the discipline of IS, as a problem for further scrutiny. The centrality of this problem emphasizes the two essential aspects: (1) what is the nature of design? and (2) what is the *underlying rationale* of design? Concerning the first aspect, prior research (e.g. Cross, 1982; Hevner et al., 2004; Gregor & Jones, 2007) has already produced a comprehensive body of knowledge that addresses and discusses the facets of what the nature of design is in general and what it means for design in IS in particular. The present research will therefore not emphasize the first aspect, but rather, I will address the second aspect as the given entry-point and problem for further inquiry.

1.2 The Purpose

The purpose of this research is to advance prior discussions (e.g. Stolterman, 1991; Goldkuhl, 1993; Introna & Whitley, 1997; Fitzgerald et al., 2002; Ågerfalk & Fitzgerald, 2006; Russo & Stolterman, 2000; Wistrand, 2009) which emphasizes the following issues:

- A curiosity towards exploring the underlying rationale of design
- A need for elucidating the hidden rationale through empirical examples combined with an intellectual clarity

- An urge for elucidating and discussing the implications of what bearing an understanding of such underlying rationale may have for further design research in IS

In this research, I will advance prior discussions around the three above mentioned issues, by proposing a set of arguments that initiates an entry-point toward my inquiry. The motivation behind proposing the following arguments, is not only grounded within prior discussions, but it is also grounded within the fundamental assumption that, all kind of research (including IS-research) is in one way or another (deliberately or implicitly) *philosophically ingrained*. With this I mean that, the assumptions and values that shape and nuance the rationale behind a chosen line of research, is ingrained by a philosophical foundation, which I in this paper will address as a hidden *kernel* that sets behind the underlying rationale. This is at least something that I propose as a hypothesis, which I subsequently back up with the following arguments:

(1) Design as an activity is governed through a process of design, implying that the so-called *underlying rationale* of design (or *design rationale*), is incorporated into the design process

(2) The rationale is in turn nuanced with assumptions and values, which in turn are constituted parts of a human being's worldview

(3) The worldview is based on a philosophy that (deliberately or intuitively) informs and justifies the rationale

(4) The philosophy is a kernel that ingrains the worldview and thus also the attached assumptions and values

(5) By explicating and understanding the kernel, we IS-researchers may actively use it as *kernel philosophy* to:

    a. elucidate and make sense of the assumptions and values behind the underlying rationale

    b. inspire the design of a specific artefact or the meta-design of a class of artefacts

The rest of this research is organized as follows: first, I will start defining what I mean with *design*, *meta-design*, *rationale*, and *assumptions and values*. Then, I will justify how and why philosophy matters for this research. After that, I will introduce the concept of *kernel philosophy* and demonstrate its applicability through two very brief examples. Finally, I will discuss the limitations of this present research and give a hint toward future research.

2 Design, Meta-Design, Rationale, and Assumptions and Values

To successfully investigate the underlying rationale of design, I must first address and attempt to understand what we in the IS-community mean by *design* in general. I will thus first start by briefly investigating a set of ideas related to design. Then, I will advance the discussion toward explicating the idea of *meta-design*, because meta-design is a part of what design researchers in IS (e.g. Walls et al., 1992; Gregor & Jones, 2007) consider as *design*. After that, I will address the question concerning *rationale*, and finally, I will briefly explicate what I mean by *assumptions and values*.

2.1 What is Design?

In this paper, I address *design* through a two folded meaning: (1) design as a process and (2) design as an artefact (the outcome of the process). The motivation behind this distinction is grounded in how prior research addresses *design*. For instance, concerning design as a process, the design process typically consists of a set of steps, or activities, which take place in achieving design goals or objectives (Burge & Brown, 2002). Design methods and models of the design process are used in order to describe the activities of the design process, prescribe how the design activities shall be executed, and construct the artifact, through (for instance) the guidance of principles and design theories (Walls et al., 1992; Gregor & Jones, 2007), or through tacit knowledge that the designer embodies and expresses through the design activity (Stolterman, 1991; Nelson & Stolterman, 2012).

Other key aspects of the design process concern the aspects of creativity and imagination. According to Sarkar & Chakrabarti (2011), creativity is crucial for designing artifacts that lead to innovation and novelty. The creative process can in turn be supported through various methods or techniques such as, heuristics (Yilmaz & Seifert, 2011), prototyping (Snyder, 2003), design thinking (Brown, 2009; Brown & Wyatt, 2010), or participatory design (Muller & Kuhn, 1993; Bodker et al., 2009). Furthermore, during the design process, many decisions need to be made while designing the artifact. A process model can assist in guiding what decisions should be made when and if the model describes subsequent steps that govern the design of a specific artifact. Consequently, the design process can be supported through a design science research approach (Hevner et al., 2004; Peffers et al., 2008; Gregor & Hevner, 2013), which enables a team of designers and researchers to build and evaluate efficient artifacts that not only solve specific problems, but also, produce outcomes that contribute to the academic body of knowledge. One heavily emphasized instance of such body of knowledge, concerns the meta-design of artefacts (Walls et al., 1992; Gregor & Jones, 2007).

2.2 What is Meta-Design?

Meta-design typically refers to the design of a class of artefacts (Iivari, 2015) that are supported through high-level artifacts (Gregor & Hevner, 2013) such as, design theories or design principles, In the field of IS, Walls et al (1992) introduced and used the term *meta-design* to emphasize and describe a class of artifacts that are hypothesized to meet a set of *meta-requirements*. *Meta-requirements* are in turn used to describe the class of goals to which a meta-design theory is applicable. Aken (2004) followed this line of reasoning by arguing that the intent of a meta-design should be for a general prescription (such as for instance a design theory) of a class of problems, rather than a specific prescription for a specific instantiation. Consequently, kernel theories, such as theories that derive from other disciplines (e.g. natural or social sciences), are adopted to govern the elicitation of meta-requirements and to inform the design process. Kernel theories are also sometimes referred to as *justificatory knowledge* (explicated by Gregor & Jones, 2007), which is used to give a basis for explaining and justifying the design process and design outcomes.

Examples of prior research that incorporate kernel theories/justificatory knowledge to inform the design process, can be found in various outlets within the IS-community ranging from research that emphasizes academic or practitioner theory-in-use (e.g.

Sarker & Lee, 2002; Markus et al., 2002; Lindgren et al., 2004) to conceptualizations of how theory can inform the meta-design of artifacts (e.g. Jones, 2011). However, supportive theories or justificatory knowledge, seldom do elucidate the assumptions or values of which design decisions rely on. Rather, they inform how and why it is justifiable to design in a certain way.

By adopting a *scientific* mindset towards design in IS, one tries to justify a meta-design as a product of design science. This is a rationale that is accepted by the design science community in particular, whereas design researchers from other domains of the field (e.g. Cross, 1982; Löwgren & Stolterman, 2004; Stolterman, 2008; Nelson & Stolterman, 2011) - or across the field for that matter (e.g. within the field of HCI) – advocate for a reflective approach that resonates with Schön's (1983) ideas of being a reflective practitioner. Here, design is in other words not only justified through a scientific mindset, but also, through a reflective (or thoughtful) mindset that inspires the designer to create a reflective design space. Subsequently, a reflective design space allows the designer to acknowledge the designer's responsibility for the functional qualities of the design artefact, as well as addressing the ethical and normative qualities of the design process as well (Löwgren & Stolterman, 2004).

In light of this tension between design as being an inquiry of science or design as being a reflective practice, rises the question: what is the underlying rationale behind either way of reasoning? In order to even begin answering such question, more knowledge about what a *rationale* is, and what it means within the context of design, is needed.

2.3 What is a Rationale and What does it mean within the context of Design?

A *rationale* is generally defined as the *"[...] the reasons or intentions that cause a particular set of beliefs or actions; the set of reasons that are given to explain a particular decision, action, etc."* (Cambridge Dictionary: *Rationale*, 2018). The nature of a *rationale* is subsequently a part of *rationality*, which according to philosophers such as Nozick (1993) or Audi (2001), is the accountability of taking rational decisions or thoughts. *Being rational* in decision-makings is thus a consequence of following a particular rationale that governs the decision-making process. Principally speaking, the same explanation can be undertaken when clarifying what a rationale means within the context of design. Lee (1997, p. 78.) for instance, states (about *design rationales*) that: *"Design rationales include not only the reasons behind a design decision but also the justification for it, the other alternatives considered, the tradeoffs evaluated, and the argumentation that led to the decision"*. Prior to Lee (1997), Shipman & McCall (1996) articulate three main perspectives of design rationales – argumentation, communication, and documentation – and argue that design rationales can be accessed by the designer or researcher through documentation of the design process, which in turn can be formalized into a model which other designers or researchers can access through.

Other researchers within the context of design engineering address *design rationales* as: statements of reasoning underlying the design process that explain, derive, and justify design decisions (Fischer, 1995); information that explains why an artefact is structured the way that it is and has the behavior that it has (Conklin, 1995); the reasoning and argument that leads to the final decision of how the design intent, or

the expected effect or behavior the designer intended the design object to have, is achieved (Sim, 1994). In essence however, all such views are ingrained by what the designer thinks and does, which in turn, is arguably affected and governed by a certain set of assumptions and values that are captured within the designer's worldview.

In order to investigate and understand the underlying rationale of any design, I argue that one is acquired to examine the assumptions and values of which the rationale rests upon. A good record of such understanding will therefore have to be able to elucidate, reflect, and explain these points (assumptions and values) through one way or another. However, what are *assumptions and values* in general? And why is this important to discuss in the context of design in IS? I will in the next sub-section, discuss these questions.

2.4 What are Assumptions and Values in general and why is it relevant to Elucidate them in the Context of Design?

A typical meaning of the term *Assumption* is defined as following: *"[...] Something that you accept as true without question or proof."* (Cambridge Dictionary: *Assumption*, 2018). Example of such can for instance concern the premises of an argument, which one bases on one to many assumptions: *"[...] These calculations are based on the assumption that prices will continue to rise."* (Cambridge Dictionary: *Assumption*, 2018). The meaning of *Values* on the other hand, is typically defined as: *"[...] the principles that help you to decide what is right and wrong, and how to act in various situations."* (Cambridge Dictionary: *Values*, 2018). Examples concerning how *Values* are manifested and expressed in everyday life is exemplified as following: *"[...] The political platform is based on traditional values associated with the rural South."* (Cambridge Dictionary: *Values*, 2018).

Both *assumptions* and *values* are relevant components of a design rationale (or the underlying rationale of design) because the rationale is arguably based on the designer's assumptions and values that determine the state of a subsequent rationale. Stolterman (1992) wrote a Ph.D-thesis that emphasized the hidden rationale of design from a systems development perspective, saying that (translated from Swedish into English): *"An aesthetics must be developed within the designer. What direction an aesthetics is developed towards is to a big extend dependent on the fundamental values and ideal that the designer lives with."* (Stolterman, 1992, p. 97). Stolterman (1992, p. 59) also states that: *"The fact that values are significant and that they affect the design process is rather obvious, the question should instead correctly be, what significance they have."*

One remedy towards addressing Stolterman's (1991) initial problematization of *values* in design, has been to advocate for a *reflective design approach* (Löwgre & Stolterman, 2002; Nelson & Stolterman, 2012) that resonates with Schön's (1983) early ideas of the *reflective practitioner*. Here, the designer reflects by actively using his/her critical mind to examine his/her role as a designer, which requires that he/she examines the purpose, outcomes, and benefits of conducting design in different ways, and using different methods, tools, guidelines, or theories.

The *reflective* (or *thoughtful*) design approach, is in one way similar to *philosophizing* (the process of doing philosophy) with a distinction that, philosophers do not always follow a particular method, tool, guideline, or theory, in order to conduct a re-

flective and critical inquiry. Nor do philosophers have the obligation to design anything. Instead, philosophizing means, as Sir Isaiah Berlin (former Oxford philosopher and idea historian) advocated, essentially to ask questions that helps the philosopher to elucidate and understand the assumptions and values behind the obvious. Subsequently, Berlin focused a great deal of his philosophical energy into examining the nature of human *assumptions* and *values* (Berlin, 1990; 1997; 2002). Berlin argued that, the values of mankind may be equally correct and fundamental, yet in conflict with each other. Subsequently Berlin (1990, p.13) stated that: *"[...] These collisions of values are the essence of what they are and what we are; a world in which such conflicts are resolved is not the world we know or understand."* I interpret Berlin's (1990) argument as, when two or more values clash, it does not mean that one or another as been misunderstood, implying and that one cannot (a priori) say that any one value is always more important than the other.

By *translating* the philosophical reasoning of Berlin into the context of design, one may imply that different assumptions and values behind the hidden rationale of design, may clash, yet be equally important to examine and elucidate in order to make sense of the hidden rationale. Consequently, one could argue that by doing so, one may move beyond the tacit nature of the hidden rationale, towards an explicit awareness of what kind of assumptions and values the rationale rests upon. However, if a rationale rests upon a set of assumptions and values, then it would be reasonable to ask what the assumptions and values are grounded in. Here, I argue that assumptions and values are a part of a human being's worldview, which in turn is a part of a kernel that is philosophically ingrained, because philosophy is considered to be the root of understanding the underlying nature of reality and phenomena in general (Magee, 1997; Grayling, 1998). In the next section, I will continue to elaborate how and why philosophy matters for the further inquiries of this research.

3   How and Why Philosophy Matters

I believe that the question towards *how* and *why* philosophy matters for IS-research in general, has already been carefully and extensively covered in a special issue of the *European Journal of Information Systems* ("Philosophy and the Future of the IS-Field") published in June, 2018. Several authors (e.g. Hassan et al., 2018; Chiasson et al., 2018; Rowe, 2018; Cheikh-Ammar, 2018) who contributed to that special issue, sufficiently showed how and why philosophy is a fruitful and relevant source of knowledge for inspiring contemporary, as well as future, lines of IS-research. Prior to this special issue, several attempts to justify philosophy as useful and relevant for IS-research, has been undertaken. In essence, I argue that the role of philosophy in IS-research, has historically at least, been oriented toward two distinct, yet sometimes overlapping, views, namely to make sense of IS-phenomena through philosophy and/or to inspire design in IS (as depicted in **Table 1**).

Categories	**Making Sense through Philosophy**	**Inspiring Design through Philosophy**
Main Activities	Reflection on or analysing established artefacts, by using a certain philosophical approach(es) that guide the sense-making process	Using a certain philosophical approach(es) as the foundation for identifying requirements and generating design knowledge

Point of Departure	- Existing implemented artefacts - Socio-technical phenomena - Concepts, models, theories, principles	- Socio-technical phenomena - Problem-Solution space - Philosophical concepts or ideas - Complex design phenomena
Role of Philosophy	A posteriori (informed empirically through for instance, case studies and/or literature)	A priori (informing and inspiring the concrete design process)
Potential Outcomes	- Conceptual models - Justifications - Validations - In situ use-related problems	- Meta-artefacts (e.g. principles, theories) - Requirement elicitation - Meta-design

Table 1. A Two-Folded View on the Role of Philosophy in IS-Research

The first proposed view (*Making Sense through Philosophy*) encompasses the attempts to use a philosophical lens to reflect and analyse (hence, *make sense of*) already known IS-phenomena as well as to discuss epistemological or ontological questions concerning the IS-discipline. Examples of such kind, include prior IS-research on computer-supported work (Ngwenyama, 1991), computer-mediated communication (Ngwenyama & Lee, 1997), e-commerce (Janson et al., 2000), phenomenological analysis of Information Technologies (IT) (Introna, 2002, 2005), and more (e.g. Lyytinen, 1987; Hirschheim & Klein, 1989, 1994; Hirschheim et al., 1996; De Moor & Weigand, 1996; Te'eni, 2011).

The second proposed view (*Inspiring Design in IS through Philosophy*) applies philosophy of some kind, as a foundational inspiration toward activities or outcomes that are related to the design process. Examples that resonate with this view include, elicitation of design requirements (e.g. Te'eni, 2011; Ross & Chiasson, 2011), justification of design decisions that inform the concrete design process (e.g. Ehn, 1988), produce design principles (Heng & De Moor, 2003), or to inspire the meta-design of artefacts (e.g. Author et al., 2016; Author & Author, 2017; Author, 2018).

In light of both views, it is seemingly reasonable to say that, there are a greater amount studies within IS which resonate with the first view, rather than the second one, but that both views are sufficient to adopt for various reasons (as depicted in **Table 1**). In order to advance how and why philosophy matters for IS-research, I claim and argue that both views are useful to adopt in the endeavour of inspiring the design process and consequently examining and elucidating the underlying assumptions and values behind a design rationale. I will thus, in the next section, continue to elaborate this by introducing and motivating the concept of *Kernel Philosophy*

4   Introducing the Concept of Kernel Philosophy

The essence of philosophy lies in the curiosity and interest of challenging, questioning, being critical yet imaginative, and rather uncomfortably, scrutinizing the most obvious assumptions and values of which human actions, ideas, general beliefs, and decisions, rests upon. Such assumptions and values are, what I argue in this research, a constitutive part of an underlying kernel that is philosophically ingrained. Hence, *kernel philosophy*.

On the other hand, philosophy can subsequently be used as a source of inspiration for designing artefacts. In this case, one may wonder: at what level of design, philosophy is sufficient to adopt and respectively use? I argue that, if a kernel of any design

rationale is (implicitly or explicitly) philosophically ingrained, then consequently, the kernel can deliberately and actively be used to reflect, support the imagination of the designer, and thus inspire both the design and meta-design of artefacts.

In this research, I introduce the concept of *kernel philosophy* as constituted by the following two main features: (1) an analytic lens for examining and elucidating the assumptions and values (which are philosophically ingrained) behind a design rationale; (2) input for inspiring the design/meta-design process (as showed in **Figure 1**).
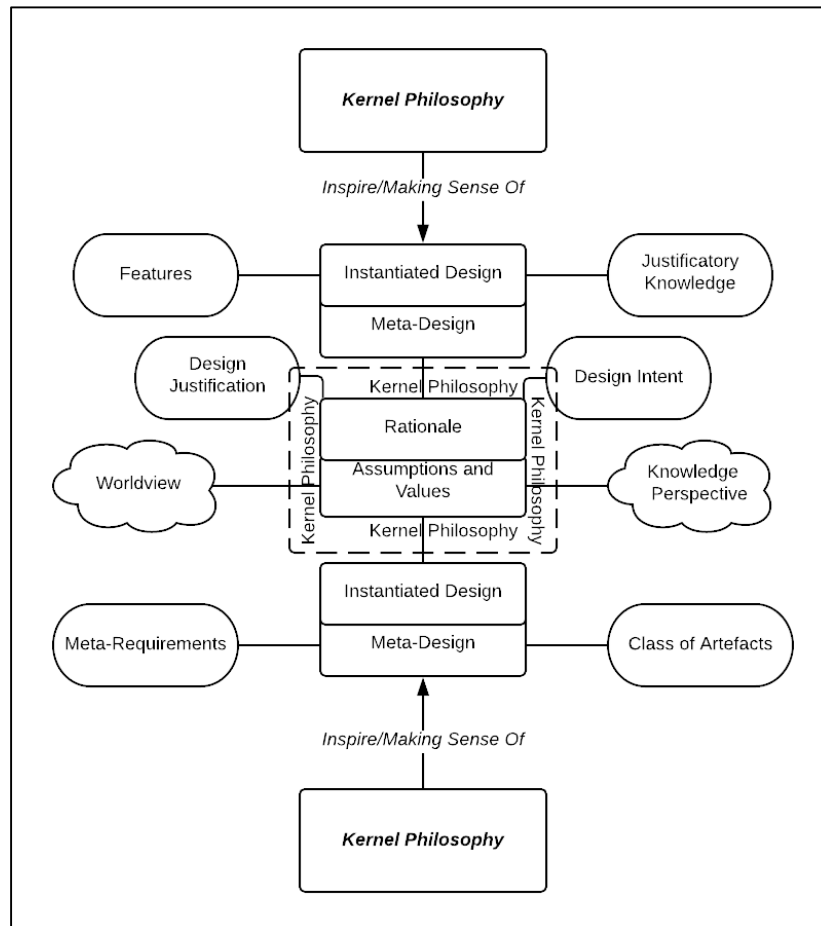

Figure 1. Features of Kernel Philosophy

Both features shown in **Figure 1** (*inspire/making sense of*) are features that can be employed by either inspiring, making sense of, or both, the meta-design of artefacts, or by inspiring, making sense of, or both, the design of the instantiated (specific) artefact. These proposed variants call for two different entry-points when employing the features of kernel philosophy. Consequently, depending on which entry-point one initiates from, different implications follow. For example, if one starts from the meta-design perspective, then one will reach the governing assumptions and values behind the rationale, whereas if one employs the features of kernel philosophy and starts from the instantiated design perspective, then one will reach the rationale behind that specific design because the rationale determines the logic behind certain design fea-

tures and the design features are *obvious* which one begins to interact with in order to gain knowledge about the artefact.

Figure 1 shows another significant aspect and that is the distinction between *a kernel philosophy* that ingrains the assumptions and values behind a rationale, and the activity of actively using *kernel philosophy* through its constituent features. The latter mentioned emphasizes the idea of using philosophy as a reflective lens for sense-making or source of inspiration for design/meta-design, whereas the earlier mentioned refers to the idea that the assumptions and values of which an underlying design rationale rests upon, is ingrained by philosophy as being its kernel. In order to clarify this reasoning further, I will in the next sub-sections, demonstrate what I mean.

4.1 Demonstrating Kernel Philosophy

Before I start demonstrating how features of *kernel philosophy* can actively be used in action, it is relevant to mention a few words about how prior research has used philosophy to either make sense of or inspire the design of instantiated (specific) artefacts.

For instance, Ehn (1988) contrasted the Cartesian dualism of the objective and subjective, with the existential phenomenology of Heidegger (1962), to inform an alternative – than the traditional rationalistic systems thinking – towards the endeavor of designing and using work-oriented artefacts. Ehn's (1988) work did thus first and foremost use philosophy as a source of knowledge to inspire how to design a class of artefacts (*work-oriented artefacts*) and can thus be classified as one of the earlier IS-researchers who used philosophy to inspire the meta-design process.

Another example of IS-research that has used philosophy, is provided by Heng & De Moor (2003), where they successfully use Habermas's (1984; 1987) *Theory of Communicative Action* (TCA) to identify conditions and requirements to be fulfilled in order for communicative action in Habermasian ideal speech situations, to take place. Outcomes of their (Heng & De Moor, 2003) inquiry were then utilized to inform the design of an instantiated artefact known as *GRASS*, a web-based *Group Report Authoring Support System*. Based on *GRASS*, Heng & De Moor (2003) then distilled knowledge from the design process and captured it into design principles.

Both examples show how philosophy can be used to inspire the meta-design of a class of artefacts (Ehn, 1988) as well as informing the design process of a specific artefact by making sense of artefact features (Heng & De Moor, 2003). However, none of these examples indicate how philosophy can be used to elucidate a design rationale nor to philosophically ingrain a rationale through a set of underlying assumptions and values. I will thus, in the subsequent sub-sections, focus on addressing these two aspects by providing two examples.

4.1.1 Inspiring the Meta-Design Process of a Class of Artefacts

In essence, this brief example gives a snapshot into how an active use of *kernel philosophy* can inspire the meta-design of a class of artefacts. The example is based on an earlier work of the author (me), where I used Heidegger's notion of *Dasein* (Heidegger, 1962) to conceptualize the phenomenon of presence in e-learning and to subsequently inspire the meta-design of a class of artefacts that reinforce a digital alteration of *Dasein* in an unconventional e-learning environment, which was situated

in the context of supporting the integration of immigrants into their host society. I will however, for the sake of being anonymous during the review process of this paper, exclude particular details from the example and instead focus on how a *kernel philosophy* was actively used to inspire the meta-design process.

In the beginning, Heidegger's notion of *Dasein* was introduced to understand *presence* from a phenomenological perspective. Questions such as the following were initially asked to initiate the philosophizing process: what does it mean to be present, *here, there,* or *anywhere* synchronously/asynchronously? How can technology mediate and facilitate such complex notion of presence in virtual learning environments? Based on such questions, and the fact that I reached a point of saturation in my literature study about how e-learning literature addresses presence, I started to introduce various scenarios where technology (or a combination of technologies) reinforce the idea of *being here, there,* or *anywhere* synchronously/asynchronously. This in turn, led me to conceptualize and introduce a notion of presence that aims to capture its essence through an existential meaning. Hence, Heidegger's idea of *Dasein* re-emerged and was entailed into a digital version and a set of meta-requirements were formulated to propose an immersive experience of what it means to be present *here, there,* or *anywhere*, in an immersive e-learning context.

Once the meta-requirements were specified, a meta-design was proposed to be instantiated into a virtual reality artefact, which immerses the user (in this case an immigrant) and sets him/her in the realms of society and the foundation that it operates with (e.g. democracy, norms, values). Consequently, different technical components (e.g. a development platform, learning platform) and features of the meta-designe, were proposed to support the different modes of *Dasein* (*being-here, being-there*, etc.) in an immersive environment. Doing so, the class of artefacts belonging to the proposed meta-design, were addressed as artefacts that support adaptable e-learning.

4.1.2 Actively Ingraining a set of Assumptions and Values into Potential Artefacts

The example provided in this section is based on a small thought experiment, rather than empirically grounded. Thought experiments, also known as *intuition pumps* (Dennet, 2003), are thinking tools used by philosophers to philosophize through imaginative narratives. Many famous philosophical works are based on the results of thought experiments, including Searle's (1984) *Chinese Room*, Putnam's (1973) *Twin Earth*, and Jackson's (1982) *Mary the Color Scientist*. Thought experiments are thus a justifiable way of doing good philosophy without the need of primary data. I will as follow, provide a thought experiment that illustrates how a design rationale can be understood by incorporating philosophy. For this experiment, I will subsequently elaborate how Heidegger's (1973) notion of *Space* can be used to actively ingraining a set of assumptions and values into a potential artefact (with *potential*, I mean an artifact that emerges based on imagination). Before I go into the actual thought experiment, it is worth providing an overview on what Heidegger meant by *Space*.

Heidegger's notion of *Space* resonates with his notion of spatiality, where he argues that certain features of *Space* are drawn towards reducing the physical distance of *Dasein*, or in other words, the ability of *bringing close* entities and making the

remoteness of these entities disappear (Heidegger, 1973). For example, according to Heidegger, an entity is *near by* if it is explicitly and readily available for some sort of action or activity, whereas it is *far away* if it is not available for some sort of action or activity. Here, we can imagine the distance between being at the lake or being at home, where the latter mode of being does not afford a *readily* possibility of stepping into the lake. But if being at home means that the house is located five meters from the lake, then the *Space* of which an intentional relation between the home, the lake, and the activity of stepping into the lake, is *near by* and thus an implication of spatiality.

The late Heidegger however, argued about the existence of *Space* from an existential perspective, saying that existential space is derived from *temporality* (as opposed to *spatiality*). In the 1969 text "Art and Space", Heidegger (1973) attempted to address what *Space* is, what it means to *be Space*, and what essential features of space there are, by pointing out several interesting perspectives such as, "space means *clearing out, making free*, the setting free into a free area, an open", or "in *spacing*, a happening at once speaks and conceals itself", or "a space is something that as been spaced, or made room for".

Based on the Heideggerian notion of *Space*, I can now extract a set of assumptions about *Space* as follows:

- **Assumption 1**: *Space* reduces the distance between entities and their interaction

- **Assumption 2**: *Space* enables room for entities to exist and co-exist in

- **Assumption 3**: *Space* clears out, making free a setting or environment into a free area that is open

- **Assumption 4**: *Space* elucidates or conceals an action (happening) through a direct experience of that action

Based on the given assumptions, I can now use them and attach them as values that philosophically ingrain my future design rationale into a potential artefact. I can in other words, use these values as philosophical input for imagining the meaning of *Space* for a particular artefact - for example, an artefact that mediates an immersive experience of activities that occur during the circumstances of each and every assumption provided above. An example of this could (based on assumption 3) include an artefact that enables a private space (*Space clears out, making free a setting...*) and mediates an immersive experience (through immersive media such as virtual reality or mixed reality) of a state of being which requires a private *headspace*, such as meditation. Another example (based on assumption 1), could include an artefact that brings people from various cultures together by providing immersive experiences of each and every individual's particular culture (*Space reduces the distance between entities and their interaction...*). A third example (based on assumption 4) could include an artefact that mediates an immersive experience of actions and phenomena that occur in the real-world. Here the immersive experience could be situated an alternative mixed reality that replicates and reproduces a rich experience of a demarcated part of reality (e.g. the experience of being in a particular city of the world). Altogether, these imaginary examples provide a brief indicator on how *kernel philosophy* can actively be used to ingrain a set of assumptions and values into a rationale through pure imagination, by starting from philosophical ideas (such as Heidegger's

notion of *Space*) that inspire the researcher's imagination to ingrain a certain set of assumptions and values into the design of potential artefacts.

5   Limitations and Future Research

This paper is a work in progress that originally proposed that:

(1) Design as an activity is governed through a process of design, implying that the so-called *underlying rationale* of design (or *design rationale*), is incorporated into the design process

(2) The rationale is in turn nuanced with assumptions and values, which in turn are constituted parts of a human being's worldview

(3) The worldview is based on a philosophy that (deliberately or intuitively) informs and justifies the rationale

(4) The philosophy is a kernel that ingrains the worldview and thus also the attached assumptions and values

(5) By explicating and understanding the kernel, we researchers may actively use it as *kernel philosophy* to:

   a.   elucidate and make sense of the assumptions and values behind the underlying rationale of a particular design

   b.   inspire the design of a specific artefact or the meta-design of a class of artefacts

Further on, I illustrated how and why philosophy matters for this research (as well as IS-research in general) by discussing prior studies within IS that have used philosophy to either make sense of IS-phenomena, or to inspire the design of artefacts. Subsequently, I proposed *kernel philosophy* (together with a set of features) as a concept that embodies my arguments and advances prior discussions in design research concerning the hidden rationale of design. Finally, I demonstrated the use of *kernel philosophy* and will now focus on the limitations of this present research.

First of all, as with any other emerging research, this research is a work in progress that needs to gain maturity over time. For instance, the examples provided in sections 4.1.1 and 4.1.2 are very short and tentative in their nature, whereas a more rigorous work would most probably provide an extensive outlook on how the concept of *kernel philosophy* can be operationalized empirically.

Second, there are certain key issues concerning this paper that needs to be pointed out. For instance, one may wonder: is it *essential* to incorporate philosophy as a source of knowledge, in order to design artefacts? Not necessarily, because design is first and foremost an activity that requires certain skills and abilities to design and thus create artefacts. However, as soon as one starts asking *why*-questions that tap into epistemological or ontological aspects of design, then philosophy becomes relevant (or perhaps even inevitable) to incorporate, because epistemological and ontological questions lie in the heart of philosophy (and philosophers) to address and problematize.

Another key issue of this paper concerns the limitation of providing a consistent view on how outcomes of this research, consequently addresses key-points about the hidden rationale of design in prior research.

Finally, the essential limitation of this paper lies in the fact that I have not elaborated the concept of *Kernel Philosophy* to a sound degree of maturity. Hence, I named the paper with a question mark in the end of the title, hoping to get the opportunity to present this work at the 6th AIS Pre-ICIS SIGPrag workshop in San Francisco, USA, and get substantial feedback for future research.

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