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Ensemble Artifacts: From Viewing to Designing in Action Design Research

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Abstract

Action Design Research (ADR) is a research method for generating design knowledge through building and evaluating ensemble artifacts. In this paper, we respond to Goldkuhl's critical review of the conceptualization of IT artifact in ADR. In particular, the review problematizes the so-called "conceptual journey" from an ensemble *view* to ensemble *artifact*, and suggests that this journey restricts the use of ADR. We recognize Goldkuhl's critique as a valuable opportunity to clarify our thinking and elaborate the rationale behind ensemble artifact. We maintain that the notion of ensemble artifact in ADR is appropriate because it highlights the forward-looking orientation of designing *artifacts* and stresses the importance of the context for the evolution and use of the resulting artifact. It stands in contrast to the retrospective orientation of the ensemble *view* nomenclature from Orlikowski and Iacono that we borrowed and extended for ADR. Finally, we endorse Goldkuhl's proposed communicative view as a useful addition to the toolkit of ADR researchers who can study the design of communicative tool artifacts.

Keywords: ensemble view, ensemble artifact, IT artifact, action design research, communication view

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1 Introduction and Background

There is little doubt that Orlikowski and Iacono's (2001) seminal work made information systems (IS) researchers acutely aware that focusing on the IT-artifact matters. It matters because such a focus enhances our discipline's ability to cultivate better IS theories. In making this argument, they examined how published work in the IS literature had conceptualized the IT-artifact. They categorized the various conceptualizations into 4 substantive views (a fifth view is "nominal"). They argued and showed that these conceptualizations matter because they serve as vehicles for communication across different strands within and beyond the IS discipline. While Orlikowski and Iacono's primary purpose was to draw the attention of the IS research community to the IT-artifact (note the title of the paper), the community was more eager to em-

brace their efforts at categorizing the IT artifact into views mentioned earlier. These views became a vehicle for IS researchers to articulate their conceptualization in a way that clearly conveyed their intent, bound the scope for investigation, and identified a cohort of concepts with which readers could understand and appreciate the research outcomes.

We therefore welcome Goldkuhl's review of the conceptualization of the IT artifact that underlies our proposal for conducting design research, namely, Action Design Research (ADR) (Sein et al. 2011). Although Goldkuhl begins his thoughtful essay by stating a focus on the notion of the ensemble artifact, it emerges into a broader "conceptual inquiry into the notion of IT artifacts" albeit with a sharper focus on the term "ensemble." In the end, Goldkuhl's conclusions are almost entirely on the notion of "ensemble view": only one out of his six points is on ensemble artifact and another on "ensemble approach" (this is neither a view nor an artifact, hence we will view it as a contribution to the discourse on design research itself).

This emergence is not surprising since the very nature of this kind of inquiry is an invitation to a conceptual journey and, in the process, detours are bound to happen. While we agree with much of the sharp insights in Goldkuhl's article, there is also much to debate and dissect. We will not embark on a lengthy tour that such a full examination requires. Rather we will limit our response to two specific aspects of Goldkuhl's critique of ADR. The first aspect argued by Goldkuhl, which is the main critique of our work, is that not only is the conceptual journey from ensemble view to ensemble artifact problematic, but the very notion of ensemble artifact itself is 'deeply problematic.' The second aspect argued by Goldkuhl, which can be interpreted as a secondary critique, is that the ensemble orientation of ADR leads to disregarding the tool functionality and utility orientation of the developed artifact. We respond to his first critique in Sections 2 and 3 and to his second critique in section 4. In crafting our response, we clarify our rationale and conceptualization that were carefully and thoughtfully developed in writing our paper.

2 The Primary Critique: Ensemble Artifact is Problematic

Goldkuhl's critique builds on a key argument. This argument is posited early on, elaborated throughout the paper with the help of different lines of reasoning and examples, and maintained as the key concluding remark of the paper. We summarize the argument in the following manner:

- Orlikowski and Iacono (2001) identify five different views of the IT artifact in articles published in *ISR* over a ten-year period.
- Sein et al (2011) adopt this typology, in particular, borrowing the ideas underlying the ensemble view.
- Sein et al, however, use the notion of ensemble artifact as they build their arguments.
- In doing so, Sein et al engage in a "conceptual journey" that transforms the 'ensemble view of IT artifacts' to an ensemble artifact.
- In spite of the terminological difference, Sein et al. acknowledge key properties that emphasize the contextual aspects of IT artifacts (see Section 2.4 in Goldkuhl 2013): the embeddedness of artifacts, and their role as contextual carriers.

- Further, Sein et al subscribe to the ‘technology as structure’ sub-view as “structures of the organizational domain are inscribed into the artifact.” (Sein et al 2011, p 38)
- Sein et al also emphasize the dynamic nature of the artifact, positing “ensemble artifacts ... emerge from the contexts of both their initial design and continual re-design via organizational use.” (Sein et al 2011, p 52)
- Goldkuhl, thus, finds significant resonance between the ensemble view of Orlikowski and Iacono (2001) and the ensemble artifact of Sein et al (2011) – subject to the difference in terminology – and wonders why the conceptual (and terminological) journey takes place in Sein et al (2011).

Goldkuhl’s critique then is the perceived problem of the conceptual journey. We welcome the opportunity to elaborate how and why we coined the notion of ensemble artifact, drawing on Orlikowski and Iacono’s seminal work. In the next two sections, we will also elaborate what the notion of ensemble artifact ‘buys’ for us compared to the more historically oriented notion of ensemble view.

3 Responses to Goldkuhl’s Primary Critique

We present our rebuttal to this critique in two parts: the first describes what we call a simple nomenclature shift that allows us to emphasize the ensemble nature of IT artifacts; the second elaborates the move ‘from conceptualizing to designing’ that allows us to accentuate the forward-looking stance of ADR researchers.

3.1 Emphasizing the Ensemble

Our first, perhaps somewhat tame, response to the critique is that the notions of ensemble artifact and ensemble view can be considered analogous. As Goldkuhl points out, there are several characteristics that we attribute to ensemble artifacts that are identical to those attributed to the ensemble view by Orlikowski and Iacono. Consider, for example, the dual characteristics of embeddedness and the role of artifacts as contextual carriers (Section 3.4 in Goldkuhl). Along with other aspects of the critique from Goldkuhl, these characteristics emphasize overlaps between the ensemble view and the ensemble artifact.

As another example, consider Orlikowski and Iacono’s presentation of characteristics of IT artifacts (see Section 2.3 in Goldkuhl). These include, but are not limited to the following: (a) IT artifacts are not natural, neutral, universal, or given; (b) IT artifacts are embedded in some time, place, discourse, and community; and (c) IT artifacts are made up of often fragile and fragmentary components. Goldkuhl is astute in his remarks, following a similar observation by Markus (2007), that these properties are “accepted cornerstones of the ensemble view,” that is, they are not properties of all views on IT artifacts but are instead appropriate characterizations that reflect a specific perspective taken by the researcher that emphasizes the ensemble. A natural consequence of this observation is that Orlikowski and Iacono give voice to the belief held by many IS researchers that all IT artifacts are, in fact, ensembles; and if researchers assume a narrower view (tool, proxy and others) they do so because of the focus of their investigation.

A simple response to the critique from Goldkuhl, then, is that we wished to communicate to the readers the above, important properties of IT artifacts by using

the phrase ensemble artifact. A more traditional rendition of this position may have been the terminology ‘ensemble view of the IT artifact,’ or, as Goldkuhl suggests, ‘IT artifacts with ensemble characteristics.’

What, then, is the key advantage of using the term ensemble artifact instead of ensemble view? It provides a succinct shorthand, and it emphasizes the key characteristics that exhort IS researchers to adopt a view of all IT artifacts as ensemble artifacts. It fits the central premise of ADR, which posits a broader view of the IT artifacts, consisting of not just the hardware-software instantiation but also the embeddedness of the artifact, and the role of that artifact as a contextual carrier. The use of the terminology ensemble artifact, thus, simply allowed us and future users of the ADR method to more forcefully overcome the tool view in IS design research (prevalent in traditional versions of design science).

While this rebuttal may be considered adequate, it does not allow us to elaborate on the rationale underlying the term ensemble artifact in ADR. We turn to this next.

3.2 From Conceptualizing to Designing

We start a more direct response to Goldkuhl through a brief confessional account of how and why we arrived at the terminology of ensemble artifact. This requires us to go back to the central premise and goal of the ADR effort. We conceptualized, formulated, and described ADR not only as an effort to understand how IT artifacts can be viewed and appreciated. That effort has been undertaken and disseminated in the work by Orlikowski and Iacono. Instead, we developed ADR to advocate a forward-looking perspective that IS researchers can adopt in their research efforts. This perspective meant a clear focus on *designing* an IT artifact to develop prescriptive design knowledge, not merely on developing a new theoretical lens to *make sense* of an IT artifact. With such a perspective, it was imperative for us to clarify that, when we spoke of the building and evaluation of an IT artifact, we did not mean merely a hardware-software bundle in a way that design scientists sometimes do. Rather, we spoke about an IT artifact that was embedded in space, time, and community, one that inscribed structures from the organizational domain, and one that serves as a way for the action design researcher to manifest the emerging design theory in a socially recognizable form. Such an artifact, therefore, represents an ensemble of a number of heterogeneous components, i.e., an ensemble artifact. Our conceptualization here is consistent with the definition of the IT artifact as made up of “fragile and fragmentary components” (Orlikowski and Iacono 2001), also highlighted by Goldkuhl (Section 2.3).

As we coined this term, we were, and are even more so now, trying to convince future IS scholars to devote their talents to take on research projects with a forward-looking ADR perspective. Note, in particular, the emphasis we have on the process of design throughout the paper. We describe this as the set of activities – simultaneous building, intervention and evaluation (BIE) – at the core of the ADR effort. These activities, by their very nature, require us to re-consider the IT artifact not merely as a tool (a hardware-software bundle, emphasized in traditional design science) but rather, as something that carries traces of the organizational and social domain, inscribed by actors involved in its design and use. Taking this stance makes it possible for the action design researcher to more consciously think about the artifact in theory-developing terms. The building, intervention, and evaluation of the artifact help shaping the emerging design theory and knowledge.

The resulting artifact is, therefore, not static but dynamic. As Goldkuhl points out (Section 2.4), we emphasize this dynamic nature by stating: “ensemble artifacts are dynamic and emerge from the contexts of both their initial design and continual redesign via organizational use” (Sein et al 2011, p 52). This combination of the terms (a) ensemble artifact and (b) the BIE activities, thus, reflects our intent to communicate to the researchers that their research efforts should be aimed at designing, shaping and influencing a new ‘thing in the world.’ Our choice of the term ensemble artifact should, therefore, not be compared against the ensemble view term from Orlikowski and Iacono. It does not represent an accidental conceptual journey. Instead, it is intended as an integral part of the argument we develop for ADR along with the core set of activities that we describe as BIE.

As we developed these two complementary terms – BIE and ensemble artifact – through the process of refining the manuscript and responding to the multiple rounds of review and editorial commentary, it became clear to us that we were trying to figure out a way to combine two seemingly contradictory ideas. First, we attempted to goad the IS research community to engage in a forward-looking research activity that would lead to the design of an IT artifact and new design knowledge. Second, we attempted to ensure that we go beyond the classical, tool-view implicit in design research (Hevner et al 2004). So, our intent was to convey to the researchers that they should (a) consciously guide the design of the artifact, and at the same time, (b) allow the artifact to emerge via influences from the organizational participants. This notion of guided emergence was accurately captured in the combination of terms: BIE and ensemble artifact. The critique by Goldkuhl has now allowed us to revisit and articulate our rationale more fully.

There are a number of implications of this conscious shift in terminology. First, we suggested that IS scholars’ domain of intervention should be the ensemble artifact, i.e. not only the hardware-software instantiation but also the work practices of organizational participants relevant to the context in which the IT-artifact is realized (Alter 2002). Second, we suggested that the design process should not be limited to the researchers’ own conscious decisions but should also be open to influences from the organizational practices and participants (Mathiassen 2002). Third, we endorsed the stance of the original design research paradigm, which suggests that it is not sufficient to study existing artifacts and practice, and devise lenses to do so. IS scholars should also engage in research that designs artifacts and practices for users in authentic settings. As Nunamaker pointed out a long time ago, this mode of research creates opportunities for other researchers to reflect and conceptualize, because “... without research efforts directed toward developing new solutions and systems, there would be little opportunity for evaluative research” (Nunamaker et al 1991, p. 90).

This is the primary reason why the notion of ensemble artifact makes sense for ADR. We argue that by following ADR, IS scholars can generate novel artifacts where the sphere of influence is not just the hardware-software bundle but also the actors and the environment surrounding its use. Interestingly, Goldkuhl himself points to this, arguing that Hevner et al (2004) implicitly focus on IT artifact as a tool with a focus on utility, and suggests that ADR may provide us a way to go beyond this. As we have described here, our goal was to expand design research towards a more situation, organization and user aware approach (Löwgren 2013). BIE and ensemble artifact are foundational concepts that allow us to achieve this goal.

We then come to Goldkuhl's query: what is not an ensemble artifact? And if ensemble artifacts are a class of artifacts, are there other classes of artifacts? We argue that the question should be re-framed, not as "aren't all artifacts ensemble artifacts" but as "can all artifacts be *studied (or viewed)* as ensembles?" The answer to the latter question is of course a resounding yes. A still better reformulation of Goldkuhl's query is "are all artifacts built as ensembles?" The answer is most likely to be an equally resounding no. In ADR, we deliberately choose the term "ensemble artifact" that emphasizes this stance.

4 The Secondary Critique: What about the "Tool Properties" of Artifacts?

We now address Goldkuhl's second critique, which involves ADR's perceived unawareness of "tool properties." Perhaps fueled by a similar concern about the ensemble view, Goldkuhl seems to rely on the premise that "ensemble artifact" is the same as "ensemble view," and is, therefore, likely to suffer from the same shortcoming. It is worth noting that ADR is a design research approach where the outputs include, but are not limited to, an IT artifact in a socially recognizable form, as well as design knowledge in the form of principles and rules. The first outcome, thus, directly contributes to the "tool properties." We were also surprised to learn that Goldkuhl sees a discrepancy between the method description of ADR and the case of Volvo IT used to illustrate it, and recommends that ADR users should read both parts of the paper. We of course endorse this recommendation. The outcome in the form of an IT artifact, and our clarifications above, have hopefully allowed us to clarify how the ADR method and the case are tied together.

The discussion then brings us to a key question: what is it that ADR researchers design? In ADR, we proposed "ensemble artifact." Goldkuhl proposes that we instead "design the ensemble characteristics of IT artefacts." At first glance, this proposal appears acceptable. However, it divorces the tool from the manner in which it is embedded in the context and how it evolves through design and use. For example, designing the work practices and incentives (say, for a knowledge management initiative) independently from the design of the hardware-software bundle (that represents the knowledge management platform) would result in a separation of the two, and would not allow us to understand how the two co-evolve.

In our response, we find echoes of the stance taken by Pentland and Feldman (2008). They argue that artifacts (in their terms: rules and procedures) are conceptually separate from organizational routines. Routines are seldom affected or changed by even the most thoughtfully designed artifacts. This leads Pentland and Feldman (2008) to despair whether routines can ever be designed. An analogy in our case may be to question whether artifacts (in our case: a hardware-software instantiation) are conceptually separate from the organizational practice in which they are intended to be embedded. If that were the case, we would not be able to shape and guide organizational practice. They would not be considered part of the ensemble we are trying to shape as action design researchers. A careful reading of ADR principles, especially those pertaining to BIE, shows that we argue that such ensemble artifacts can, in fact, be designed as the whole "package" – tools, routines, procedures and even policies. The ADR proposals, thus, suggest a possible way out of the dilemma expressed by

Pentland and Feldman (2008): researchers can collaborate with practitioners in a proactive manner to design ensemble artifacts, and in the process, generate greater understanding in the form of design principles and rules.

5 Concluding Remarks

At the heart of Goldkuhl's thoughtful review is the argument that, as the ADR proposal is laid out, we make a so-called "conceptual journey" from the original ensemble *view* notion (Orlikowski and Iacono 2001) towards a similar one referred to as ensemble *artifact*. This conceptual journey, Goldkuhl argues, restricts the use of ADR. Our writing does, in fact, make this small but purposeful and essential shift in nomenclature as we describe how action design researchers generate new knowledge. This paper, developed in response to Goldkuhl's review, has therefore mostly concerned itself with discussing the extent to which this shift is restricting or expanding, and developing a rationale for sticking to the ensemble artifact notion rather than ensemble view, when dealing with ADR as a design research method.

We have reflected upon the criticism raised by Goldkuhl and suggested that the use of the ensemble artifact notion is intended to highlight the forward-looking orientation of ADR. This does not negate the importance of the ensemble view suggested by Orlikowski and Iacono. Our use of the notion of ensemble artifact simply suggests an alternative that is more appropriate in situations where artifacts are employed to study novel ideas and concepts. This orientation and the term ensemble artifact explicitly respond to the call from Orlikowski and Iacono: to bring a more holistic conceptualization of the IT artifact into the center stage of IS research.

Goldkuhl is right in observing that through ADR, we engaged in a conceptual journey. However, it was not from ensemble view to ensemble artifact, but more fundamentally, from a retrospective view for gaining understanding to a proactive approach for gaining understanding via design. The ensemble artifact is a vehicle that we needed for our journey. We readily concede that ADR can focus on the design of a "communication tool artifact" or other kinds of ensemble artifacts. The emphasis is clear: to an ADR researcher, the greater concern is gaining understanding via design.

On a concluding note, it is worth emphasizing that ADR is still an open endeavor. It is, therefore, useful to further elaborate the conceptual apparatus of ADR. In this regard, we appreciate the invitation to respond to Goldkuhl's careful review of our original paper. The particular focus on the notion of ensemble artifact has given us the opportunity to further elaborate our stance. We appreciate the careful efforts from Goldkuhl to extract and comment on this particular aspect. In reflecting on his comments, we have revisited and reflected on some of our decisions and reasoning. It is also worthwhile to explore ADR in different empirical settings. We hope that ADR will evolve considerably through its use in the research practice of IS researchers. We are aware of ongoing applications in several domains, including automotive, banking, health care, and pharmaceuticals. We hope that the appropriation of the method in such domains will continue to enrich ADR.

As we move ahead, we would like to return to the values that we attempted to voice in this response. These deal with an intent to generate knowledge via design, and a holistic view of the artifact that emphasizes the ensemble. The choices of terms for the ADR method – the ensemble artifact and the BIE approach – are guided by these values. We look forward to more engagement from the community of IS schol-

ars to further develop the ADR method with participation from scholars in other disciplines as well as our practitioner colleagues.

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