

# **IWI Discussion Paper Series #97 (March 08, 2021)<sup>1</sup>**



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## **The Role of User Involvement: Relationship between Participatory Design and Design Science Research**

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# Abstract

An important factor for the success of design-oriented processes is the involvement of the future users. However, there is a dispersed knowledge about how Participatory Design can be used in connection with Design Science Research to assess user preferences. Aiming to synthesize the existent knowledge on these both design-oriented approaches, this IWI discussion paper provides an overview of the relationship, similarities and differences on diverse Participatory Design methods used in the extant scientific literature either separately or embedded in Design Science Research processes.

## Keywords

Design Science Research, Participatory Design, User Involvement, Research Design, Research Method

## 1 Introduction

The Digitization of the world of work plays a major role, especially in the Information Systems research area. Due to the unique nature of each design project and its requirements, it is crucial in each design process to carefully select the appropriate design approach as well as suitable methods, techniques, and tools (Sanders, Brandt & Binder, 2010).

To be able to adequately address the technical design on the one hand and the associated organizational change processes on the other hand, Participatory Design has been seen in recent years as a collection of approaches and tools that allow future users to collaborate continuously in the socio-technical development process, even after the implementation (Kohtala et al. 2020). Along this path, for about three decades, non-designers have been involved in an increasing number of Participatory Design projects in various design activities worldwide (Sanders, Brandt & Binder, 2010). However, while user involvement is seen as a key success factor in design processes (Macelli and Atwood, 2013), the choice of the design methodology has a distinctive influence on the extent of the user involvement. For example, Participatory Design gives a central role to the future users and involves them as equal members in the entire design process, whereas other widely applied design-oriented approaches such as Design Science Research involve the future user mainly for requirements analysis and evaluation. Therefore, in essence, the involvement of future users plays a fundamentally different role in diverse research approaches.

Recent research have targeted the role of the stakeholder in the research design and addresses the nature and importance of the involvement of the users in the design and development process by combining, for example, Participatory Design with research designs like Action Design Research (Haj-Bolouri et al. 2016). However, little similar efforts have been directed towards Participatory Design and Design Science Research.

In view of the above, the aim of this IWI Discussion Paper is to show the context and the importance of Participatory Design both separately and within Design Science Research. To accomplish this, the discussion paper is structured as follows. After the introduction, section 2 lays the theoretical foundations for the design methods of Design Science Research and Participatory Design. Subsequently, section 3 describes the procedure of the literature review as well as related literature to Participatory Design and Design Science Research to assess the manner in which both design approaches have been used in the scientific literature. Based on the results of the literature review, in section 4 an overview of the relationship, similarities and differences of both design methodologies is provided. This is followed by a discussion and the description of implications and limitations, before the article ends with the conclusion and future recommendations for research.

## **2 Theoretical Background**

### **2.1 Design Science Research**

Design Science is a problem-solving research paradigm, including the creation and analysis of information technology (IT) artefacts with the objective of solving difficulties within the organization (Hevner et al., 2004; Von Alan et al., 2004). Through building new artefacts, Design Science strives to expand the boundaries between the capacities of humans and organizations (Hevner et al., 2004). The construct-scientific paradigm Design Science aims at developing useful IT-solutions through creating and evaluating several artefacts (Wilde & Hess, 2007). These artefacts can arise in form of models methods as well as systems (Wilde & Hess, 2007). Three research cycles have been developed in the Design Science environment: "relevance cycle", "design cycle", which is embedded in Design Science Research (DSR) and "rigor cycle", which connects DSR with knowledge base (Hevner, 2007). Seven guidelines assist and help to use the approach in a research project correctly (Von Alan et al., 2004).

### **2.2 Participatory Design**

Participatory Design (PD) is an approach originated in Scandinavia, which gives the people that are destined to use the system a decisive role in designing it (Schuler &

knowledge networks in general. Out of five design principles for network support value creation, principle 2 refers to PD: *"The principle of creating participatory value"* (Hansen & Pries-Heje, p. 70, 2017). Principle 2 aims to create participatory value by involving all stakeholders within the design process. This PD guiding principle allows all participants in a network to express their thoughts and engage in dialogue (Kensing et al., 1998; Hansen & Pries-Heje, 2017).

Within a DSR process, Janssen et al. (2019) develop a participatory design model for individual web traffic report development. This artifact contains the participatory design CARD method for key performance indicator (KPI) prioritization. Due to the strong involvement of the future users and the collaborative work with the developers, a high acceptance and high quality is expected (Janssen et al., 2019). In addition to the PD CARD method, the 3-stage model according to Spinuzzi (2005) is also used. Pictograms within the model show in each stage which stakeholders are involved in the respective step. A notable aspect is that multiple roles can also be filled by one person (Janssen et al., 2019). Within a case study with 14 interviewees, the card method is applied within the second step "discovery process" (Spinuzzi, 2005; Janssen et al., 2019). The authors conclude that Spinuzzi's (2005) three-step process is an ideal method to provide a clear orientation and structure for the individual steps within the process (Janssen et al., 2019).

## **5 Implications, Limitations and Conclusions**

Overall, it can be stated, that DSR focuses on creating an artifact, while PD focuses on equal collaboration between the designer and the artifact (Recker, 2012). By incorporating PD methods within the DSR process, future users are also granted some influence within the development of an artifact. However, our analysis suggests that when PD is used as a methodology, the future users are seen as an essential part within the overall design process, while PD methods within the DSR are mainly used in the design and development and in the evaluation of the artifact. This is also understandable, since in practice it is not always possible to include all future users. In the future, it would be interesting to develop guidelines on when it is more appropriate to use PD and when a combination of DSR and PD is the most suitable approach. While it is explained in detail which methods are used to gain implicit knowledge and acceptance, it has not yet been discussed how participants are selected and who is important. Particularly in the DSR, where a generally applicable artifact is to be developed, this is proving difficult.

The review of the literature shows that there are three distinct layers in the collaborative use of PD and DSR. While PD as methodology and PD as method are widely used within DSR, PD as method was shown to be rarely found within the final DSR artifact.

This infers that PD as part of the DSR result is currently a completely unexplored area which needs further investigation. It would be recommendable to investigate which design principles should be considered in the use of PD within the artifact.

The results of the analysis also indicated that PD is also used with other research designs, such as AR or ADR. However, although the literature review identified different approaches, they all have one thing in common, the importance of considering the future user. Involving various stakeholders as designers, producers and innovators encourages the active participation of the community. However, this in turn creates a gap between the participants and the rest of the community who have not been involved in the whole process. In the future, it would be valuable to analyze and map the research designs commonly used in IS and HCI in terms of user engagement.

The structural and content-related aspects of the present article are subject to limitations that need to be taken into account when generalizing the results. A literature-based approach to the topic consolidates already existing publications and opens up fewer opportunities to generate deductive findings as would be the case with an empirical approach. The conclusions of the purely theoretical approach are therefore based on theories. Consequently, this discussion paper has a more introductory character. As research in the Information Systems and Human Computer Interaction fields continues to evolve, further literature-based analyses should be conducted regularly in the future.

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