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The health of ecosystems is vital for the existence of human life on our planet. As we witness large-scale deterioration of the natural environment, consequences of climate change call for innovative solutions to guide the process of sustainable development. Despite the critical role of information systems (IS) for facilitating sustainable action, research on Green IS in this context has been limited. Our study addresses the question of how to design Green IS for sustainable user behavior by following a design science research approach. In particular, we derive and evaluate theory-based design principles that promote sustainable user behavior with respect to responsible consumption.

Keywords: Green Information Systems, Sustainable Human Computer Interaction, Design Science Research, Sustainable User Behavior

Extended Abstract

The tremendous degradation of the natural environment creates a major threat to our planet and consequently to human life [1]. Hence, the urgency for sustainable product and service solutions has never been more prominent than at this point of history. In general, sustainability is defined by the World Commission on Environment and Development [2; p.17] as "[…] development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Since Information Systems (IS) have served as major transformative force of productivity growth over the past fifty years [3], a critical role has been attributed to the domain of Green IS with respect to sustainable development. Accordingly, Melville [1] paved the way for a Green IS research agenda by increasing scholars' attention on the design and implementation of IS for environmental sustainability. Furthermore, the landmark publication by Blevis [4] on sustainable interaction design (SID) spurred research on sustainability in the context of human computer interaction (HCI).

In contrast to the majority of studies focusing on sustainable transformation of organizations [5], our study focuses on individual users in a consumption context. Such Green IS research for sustainable user behavior can generate high scalability of sustainable impact [6]. In particular, we address the following research question: *What are design principles (DPs) for Green IS facilitating sustainable user behavior?*

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To establish DPs for sustainable user behavior, we apply the design science research process (DSRP) by Peffers et al. [7]. Since Melville [1, p. 8] advocates DSR as "[…] essential to develo[p] innovative IS-enabled solutions to environmental problems and evaluating their effectiveness", the framework forms a valuable foundation with respect to our study's purpose described above. Moreover, DSR has been demonstrated as a useful approach in prior IS studies at the intersection of human behavior and design science [8, 9].

Based on Bandura's social cognitive theory (SCT) [10] as powerful explanation for human behavior, we derive DPs for sustainable user behavior. Prior studies especially found environmental self-efficacy, environmental outcome expectations, and environmental facilitation as key predictors of sustainable user behavior [11–13], which build the grounding meta requirements for deriving DPs for sustainable user behavior. To evaluate the proposed DPs for Green IS promoting sustainable user behavior, we conduct an in-depth case study analysis, in form of a Green IS in the food waste context, following established guidelines [14]. We also refine the DPs in light of prior literature. The result is specific design product propositions.

Our results supplement the established research agenda on innovative Green IS by Melville [1] concerning the demonstration of a design approach and the inclusion of explanatory knowledge. By acknowledging sustainability as a central target of Green IS design as suggested by Blevis [4], our DSR study proposes to consider environmental effects along two dimensions, direct and indirect impact. The proposed DPs also inform and guide practitioners who strive to develop Green IS for promoting sustainable user behavior.

By providing guidance to scholars as well as practitioners, this study hopes to pave the way for future Green IS and SHCI research on empowering individuals in sustainability movements.

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