From (Design) Theory to (Participation) Practice: Leveraging a Taxonomy for Digital Involvement Projects

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Abstract

Amidst the rapidly evolving landscape of digital participation formats, navigating the field becomes a challenge for practitioners, policymakers, and researchers. This paper investigates how a taxonomy for digital involvement projects can be leveraged to capture design knowledge on participatory projects and make it accessible to relevant stakeholders. Employing a Design Science Research approach, we develop and assess an interactive web application, and preliminary design archetypes based on 46 project examples. Our research contributes to capturing the diversity of participatory project design, bridging theory and practice in the digital governance domain and beyond.

Keywords: E-Participation, Citizen Science, Crowdsourcing, Design Taxonomy

1. Introduction

The increasing complexity of global societal challenges such as the COVID-19 pandemic or the climate crisis results in governments worldwide seeking new approaches to involving experts, citizens, and other stakeholders in government action (United Nations, 2022). With virtual communication and collaboration becoming the norm, digital participation formats take a central role, and the market for participation and deliberation technologies is rapidly expanding (García et al., 2023; United Nations, 2022). While e-participation, as part of digital government, has been available for two decades, the field experiences lately a diversification of participatory approaches. Concepts emerging from other domains, such as crowdsourcing or citizen science, are increasingly finding their way into the practices of governments and local administrations (Shanley et al., 2019). This holds promising benefits for policymakers, improving their possibilities of finding suitable approaches (Flores & Rezende, 2022; Fritz et al., 2019). However, the dynamic developments fuel the complexity of designing, conducting, and evaluating projects, especially as the design of participation is decisive in ensuring that projects have no adverse effects or become pseudo-participatory (Palacin et al., 2020; Pristl & Billert, 2022). In times of societal polarization and the threat of democratic backsliding (Weinhardt et al., 2024), guiding practitioners in the evolving field of participatory approaches becomes paramount. In addition to the scientific field of e-participation, the research areas of crowdsourcing and citizen science are increasingly relevant to finding orientation and best practices. To benefit from theoretical knowledge across domains Stein et al. (2023a) have developed a unified taxonomy, deriving key design characteristics to describe digital involvement projects (DIP). While this enables the joint consideration of participation projects, the taxonomy as a theoretical artifact remains somewhat unaccessible to practitioners such as community organizers, government officials, administrative staff, or industry practitioners, who want to leverage existing design knowledge. Thus, we turn to the research question: *How can we use the DIP taxonomy to capture design knowledge and make it available to domain practitioners?*

In a Design Science Research (DSR) approach, we take upon the work of Stein et al. (2023a), further developing the DIP taxonomy into an interactive web application (app) that we demonstrate and evaluate in a real-life scenario with 60 practitioners. Furthermore, we apply the taxonomy in illustrative scenario analysis to 46 projects, deriving design clusters that we use to formulate preliminary DIP archetypes. Thereby, we aim to contribute to the knowledge base on the diversity of design approaches for digital involvement, making a theoretical taxonomy accessible for both research and practice.

2. Theoretical Background

Formats of laypeople's digital participation are being discussed in political, economic, and scientific contexts. As a branch of digital government, e-participation focuses on using information and

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Dimension		Characteristics				
Degree of participation	1.1 Participation extend	Information sharing (52%)	Consultative (30%)	Democratic (17%)		
	1.2 Participation offer	Single task (65%)	Multiple tasks optional (35%)	Multiple tasks mandatory (0%)		
	1.3 Type of participation	Active-effort (85%)	Active-resources (17%)	Passive (2%)		
Implementation of participation	2.1 Format	Digital (96%)	Analog/ digital (parallel) (0%)	Analog/ digital (sequential) (4%)		
	2.2 Implementation	Asynchronous web-based platform (91%)	Asynchronous mobile app (11%)	Synchronous (0%)		
	2.3 Structure of participation	Teamwork/ participation (13%)	Individual work/ participation (98%)			
	2.4 Time requirements	High (4%)	Low (70%)	Self-selected (26%)		
	2.5 Enabling effort	Domain knowledge (13%)	Domain-specific equipment (7%)	Assumed preconditions (80%)		
Incentives	3.1 Incentives for participation	Extrinsic self-related (17%)	Intrinsic self-related (39%)	Impact-related (78%)		
	3.2 Reasons for the participatory design	Acceptance/ legitimation (28%)	Funding (13%)	Access/ resources (83%)	Values (2%)	Profits (7%)
Communication	4.1 Direction of communication	One-sided (41%)	Two-sided (22%)	Multi-sided (37%)		
	4.2 Feedback	Expert feedback (22%)	Crowd feedback (43%)	No feedback (46%)		
	4.3 Community building	Yes (28%)	No (72%)			
	4.4 Moderation	Crowd (0%)	Individual from crowd (4%)	Internal organization/ expert (2%)	External organization/ expert (2%)	None (91%)
Project Stakeholder	5.1 Project driver	Crowd (11%)	Individual from crowd (11%)	Organization/ expert (78%)	Equal partnership (0%)	
	5.2 Project owner	Crowd (4%)	Individual from crowd (7%)	Organization/ expert (89%)		
	5.3 Target group	Open (80%)	Restricted (20%)	Closed (0%)		
Gains & Outcomes	5.4 Project outcome	Product (30%)	Knowledge (52%)	Decision (24%)	Sharing (24%)	
	5.5 Publicity of the outcome	Public (67%)	Accessible for the participants (13%)	Non-public (20%)		

Figure 1. DIP taxonomy based on Stein et al. (2023a); in parentheses, distribution of 46 sample projects.

communication technology for consultative and democratic political processes (Macintosh, 2004; Pristl & Billert, 2022; Sanford & Rose, 2007). Similarly, in the economic context, crowdsourcing describes a problem-solving model where digital means enable the involvement of an (often undefined) digital crowd in completing tasks (Estellés-Arolas et al., 2015; Howe, 2006). Finally, scholars in the field of participatory science subsume research under the term citizen science (Haklay et al., 2021), with online citizen science focusing on digitally mediated forms (Aristeidou & Herodotou, 2020). Individually, frameworks to guide, discuss, and reflect involvement practices have been established in all three research fields (e.g, Estellés-Arolas et al., 2015; Haklay, 2013; Van Dijk, 2012). However, as crowdsourcing and citizen science practices are gradually finding their way into theory and practice of digital government (e.g., Flores & Rezende, 2022; Halmos et al., 2019; Schmidthuber et al., 2022), traditional e-participation typologies can no longer adequately reflect the diversity of participation formats. With DIP, a concept has been proposed to jointly discuss participatory initiatives, describing "projects that utilize digital platforms for the involvement of multiple external individuals in a defined participation process" (Stein et al., 2023a, p.5). The DIP taxonomy proposes 19 design subdimensions based on five existing theoretical classification frameworks from e-participation (IAP2, 2007; Van Dijk, 2012), citizen science (Haklay, 2013; Shirk et al., 2012) and crowdsourcing (Estellés-Arolas et al., 2015). The taxonomy (see Figure 1) includes three subdimensions for the participation level, five subdimensions describing the project's implementation process, two subdimensions on participants and organizers' incentives, four subdimensions depicting communication structures, three subdimensions addressing project stakeholders, and two subdimensions focusing on the projects' outcomes. Eleven of the 19 dimensions employ the mutual exclusivity criterion, while eight allow for multiple selections (gray-shaded). The taxonomy extends classical e-participation frameworks, which differentiate projects, e.g., based on the level of involvement (e.g., Macintosh, 2004) or their driving party (e.g., Van Dijk, 2012), by connecting multiple design dimensions and, importantly, including dimensions that are applicable across contexts, which helps to describe, compare, and potentially include emerging involvement practices in the digital government sector.

3. Methodological Approach

Design Science Research (DSR) is a problem-solving paradigm that creates artifacts, constructs, models, methods, and instantiations, providing descriptive or prescriptive knowledge and innovative solutions (March & Smith, 1995; vom Brocke et al., 2020). It is a suitable method for taxonomy development, as it supports an iterative approach and enables revision based on evaluation results (Kundisch et al., 2022). Building on the initial DSR cycle of Stein et al. (2023a), we aim to further operationalize the taxonomy as an extant model in the forms of additional design artifacts, i.e. instantiations and models (Gregor & Hevner, 2013; March & Smith, 1995; vom Brocke et al., 2020). Methodologically, the first cycle integrated taxonomy development within Peffers et al. (2007) DSR approach (Kundisch et al., 2022; Nickerson et al., 2013) (see Figure 2, Cycle 1). Consequently, we also structure our research activities within the established procedure of problem identification, definition of objectives, design and development, and demonstration and evaluation (Peffers et al., 2007) (see Figure 2, Cycle 2). We started our DSR cycle by reflecting on the DIP taxonomy and its development, motivating further artifact development, and deriving objectives for improved solutions. Identifying two independent areas for improvement, we proceeded in two individual subcycles (a) and (b), before combining the endeavors for their communication. In subcycle (a), we improved the usability of the taxonomy as a theoretical framework by contributing a physical implementation in the form of an interactive web app. While the initial DSR cycle emphasized qualitative evaluation, we set a quantitative focus when assessing the taxonomy as a theoretical model, and the web app as its situated instantiation (Gregor & Hevner, 2013; March & Smith). We demonstrated the artifact in a field test to domain practitioners, asking them to use the web app themselves to classify their individual DIP. Consecutively they were asked to share their experiences through a survey, a standard method for both taxonomy and software testing (Gediga et al., 2002; Szopinski et al., 2019). The survey evaluated qualitative criteria for the taxonomy's quality (Nickerson et al., 2013, Stein et al., 2023a) (one positive and one negative item per criterion arranged on a scale of -3 to 3) and the net promoter score (Sasmito et al., 2019), as a means of determining overall satisfaction with the web app. To reach a large group of active DIP practitioners, we collaborated with the largest German Citizen Science platform, "Mit:forschen" (e.g., (Moczek et al., 2021), contacting 240 project initiators between June and August 2023. 60 of them utilized the web app to classify their project and 24 proceeded to take part in the survey evaluation. No monetary incentive for app utilization and evaluation was set. Second, subcycle (b) focused on using the DIP taxonomy to capture current design practices in the form of operationalized models, the DIP archetypes. We followed an illustrative scenario approach, applying the taxonomy to real-world projects (Szopinski et al., 2019). To sample a diverse set of projects, we utilized both scientific and public sources. From the literature, overviews for e-participation (Fegert, 2022) and citizen science platforms (Stein et al., 2023b) were used to randomly extract projects from all presented platforms. Additionally, a random sample of projects was selected from public project overview websites on *crowdsourcing projects* and *internet-based activism* (Wikipedia, 2020, 2024), resulting in a total of 46 DIP projects. Two independent reviewers coded the project examples based on their websites and publicly available information, achieving a Cohen's Kappa of 0.767, indicating substantial agreement (Landis & Koch, 1977). To identify common design patterns and relationships among the DIP projects, we used hierarchical, agglomerative clustering following guidance by Kassambara (2017). This technique enables the evaluation of similarities of objects, sorting them into a tree-based representation (Kassambara, 2017; Romesburg, 2004). Working with a binary data structure, we measured object distance based on the Yule similarity (Choi et al., 2010), suitable for clustering observations based on overall profiles rather than magnitudes (Kassambara, 2017). The clustering results were assessed with the silhouette coefficient (Range -1 *poor* to 1 *optimal*) (Kassambara, 2017; Rousseeuw, 1987) and qualitatively evaluated by two domain experts to derive preliminary DIP archetypes.

4. Results of the DSR Activities

4.1. Reflection and Definition of Objectives

The DSR cycle of Stein et al. (2023a) produced an initial DIP taxonomy, developed through a combination of literature review and practical examples, and evaluated by an expert focus group. The evaluation confirmed the need for a DIP taxonomy but also highlighted areas for improvement and further development. This included content adjustments for dimensions 1.1, 2.1, 2.4, 4.1, and 4.4, which have already been addressed but not yet evaluated. Additionally, opportunities to enhance usability and explanatory clarity remained unexplored: Currently, the taxonomy, as a model artifact, is challenging for its primary users being practitioners, as focus group participants noted difficulties with terminology and the need for more explanations. This motivates considerations of instantiating the taxonomy in a more

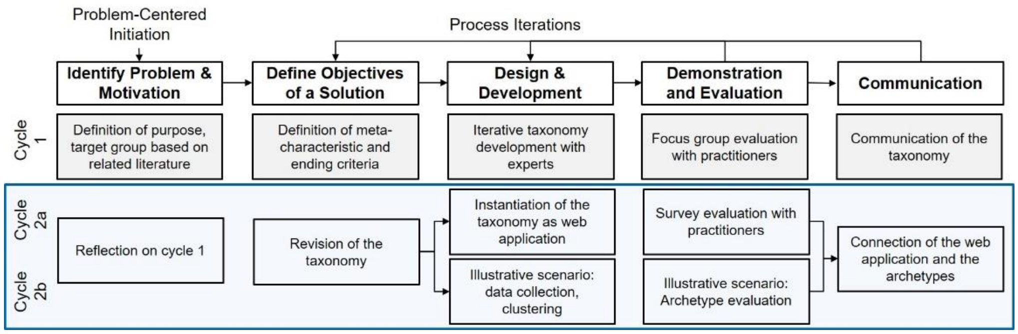

Figure 2. The DSR cycles based on Peffers et al. (2007) with the current research activities (in blue) and the previous research activities (in grey).

flexible and interactive form (Stein et al., 2023a). We embrace this notion, directing our focus toward designing and developing a publicly accessible web app (subcycle a). The artifact should ease access to the theoretical construct while providing necessary guidance in the application process. Thereby, practitioners could independently access the design knowledge while contributing to it when capturing their project designs. Furthermore, although the DIP taxonomy is rooted in theoretical and practical knowledge, its application in the creation process was limited to nine project examples. Therefore, a comprehensive knowledge base for practitioners on typical design configurations and their differences is still lacking. Given that this was seen as a major potential of the DIP taxonomy (Stein et al., 2023a), a more thorough analysis of illustrative scenarios is essential. By expanding the application of the taxonomy to a broader spectrum of project examples, we aim to uncover existing design patterns and ultimately delineate them as archetypical projects. Archetypes help to investigate configurations and dynamics of IS phenomena (Schilling et al., 2017) and can thus contribute to capturing additional design knowledge in the DIP research field.

4.2 DIP Web App

4.2.1 Design and Development: The design of the web app aims to enhance the understandability of the taxonomy. As such, we enrich the taxonomy by developing brief explanations for its contents, e.g., subdimensions and characteristics, to provide them for more inclusive reach in German and English. Furthermore, the objective is to ease access and empower practitioners to contribute to the knowledge base. We thus design an interactive experience, leading through the classification process of a DIP project (see Figure 3, top-left). For every dimension, a page is developed with the corresponding subdimensions and their characteristics and provides interactivity by selecting fitting project characteristics. To gain further insights into the user's experiences, for every subdimension, users can indicate difficulties with the selection if it occurred. Finally, the user receives an overview of the chosen design configuration and can decide to share this classification, providing additional details on the project (see Figure 3, bottom-left). We develop the web app utilizing the vue.js framework for frontend development and integration to MongoDB for the backend.

4.2.2 "Mit:forschen" Demonstration and Evaluation: We received 60 project descriptions from coordinators via our web app. In evaluating the difficulty of dimension selection, only four out of the 19 subdimensions were flagged by more than 10% of the users (n=60). These included the extent of participation (0.30), reasons for the participatory design (0.25), community building (0.13), and time requirements (0.12). Feedback from an optional open-text entry provides insights into associated challenges. One participant stated: "The project offers many different tasks to participate in. Some of the questions, therefore, do not apply equally to all offers."; while another added: "Sometimes several answers apply or something in between[..]". For objective quality criteria, mean values for all five criteria exceeded the neutral level of 0 (Scale -3 to 3, n=24). The highest approval was given for explanatory capabilities (mean: 1.67, stdv.: 0.87) and extendibility (mean 1.38, stdv. 0.97), followed by conciseness and robustness (mean 0.88, stdv. 1.33 and 1.57). Comprehensiveness received the lowest approval (mean 0.83, stdv. 1.43). Evaluating participants' willingness to recommend (Scale 0-10), we found, on average, a positive likelihood that participants would recommend the DIP web app to a colleague (mean: 6.29, stdv. 2.46).

4.3 Illustrative Scenario and DIP Archetypes

4.3.1 Illustrative Scenario Analysis: Applying the taxonomy to a sample of 46 projects revealed a rich variety of design configurations. Figure 1 visualizes the

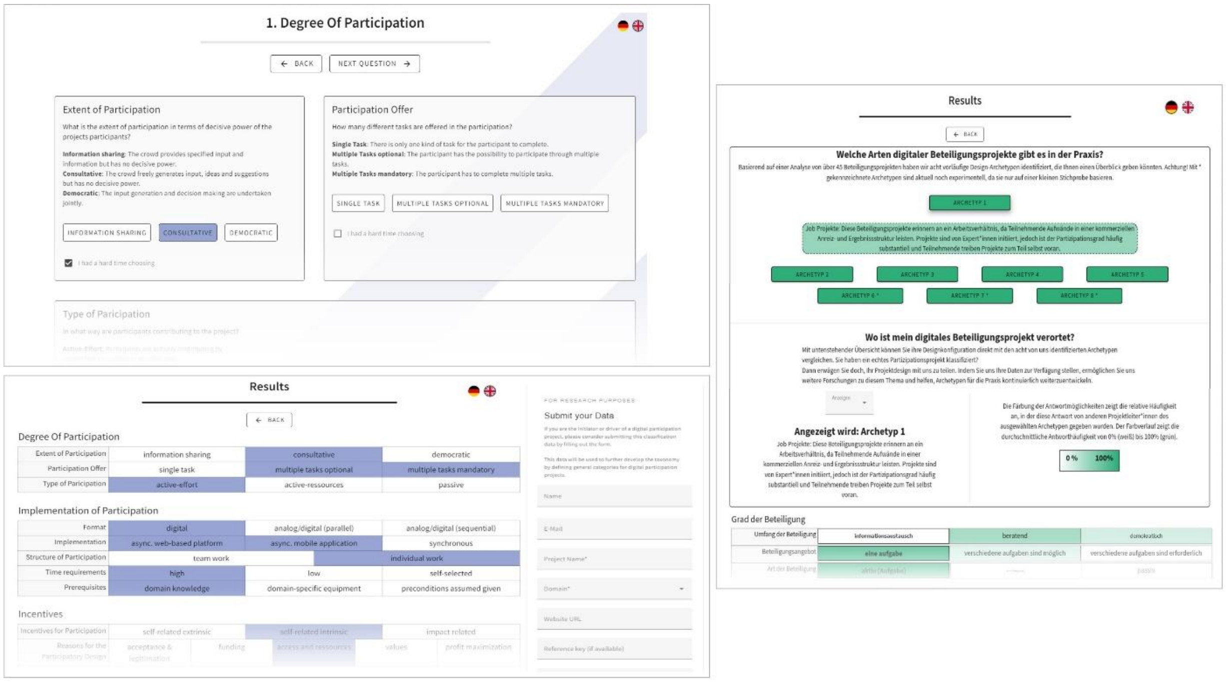

Figure 3. Left: DIP web application publicly available under hop.fzi.de/taxonomy; right: prototypical extended results page.

distribution of characteristics in the sample. While for most dimensions, the samples' features are diverse, in some, we find particularly little variation, and some characteristics are not present. Specifically, the format is predominantly digital, with few analogous components, and moderation is rarely present. Additionally, the sample lacks projects offering multiple obligatory tasks, synchronous participation, closed target groups, and projects driven by equal partnerships.

Using hierarchical clustering on the dataset, we identify an optimal number of three clusters, with an average silhouette coefficient of 0.49. Beyond this, the average silhouette coefficient decreases until a sharp increase is observed at eight clusters (0.47). The dendrogram indicates that the three-cluster solution produces two smaller clusters (see Archetypes 1, 6) and one larger cluster (see Archetypes 2-5, 7-8). When expanding to eight clusters, the larger cluster splits into six, resulting in more balanced partitions.

4.3.2 DIP Archetypes: Evaluating the eight-cluster solution, we identified five robust (five to twelve project examples) and three experimental (<5 project examples) DIP archetypes, which we describe in the following and have summarized visually in Figure 4:

Archetype 1 "Job Projects": This cluster contains six projects that resemble employment relationships, characterized by extrinsic participation incentives (100%) and non-public product results (100%) (Figure 4, dark-blue graph). The projects have a medium to high degree of participation, i.e., a consultative (83%) or democratic character (17%) and one (67%) or more (33%) effort-based participation tasks. Although participation is exclusively digital, specialist knowledge is often required (67%), and time expenditure can vary greatly, resulting in a medium to high participation threshold. The incentive and result structure is commercial: extrinsic incentives, non-public product results, access to knowledge/resources (100%), and partially profits (50%). The communication is limited, with predominantly two-sided communication (83%), often without feedback (83%), no moderation (100%), and limited community building (67%). Projects are initiated by an expert/organization (100%) but have different drivers and are open for everyone to join.

Archetype 2 "Research Projects with Crowdsourced Tasks": The cluster includes twelve projects, characterized as research projects with crowdsourced tasks, primarily due to their knowledge outcomes (see Figure 4, yellow graph). They exhibit a low to medium degree of participation, either informative (58%) or consultative (42%), with typically one effort-based task (83%). Projects have a low to medium participation threshold, being web-based (75%) with low time requirements (83%) and individual work (100%), though some require specialized equipment (17%) or a mobile app (25%). Incentives and outcomes are socially and scientifically oriented: impact-related incentives (100%) and access-based motivators on the initiators' side (100%) to generate knowledge outcomes

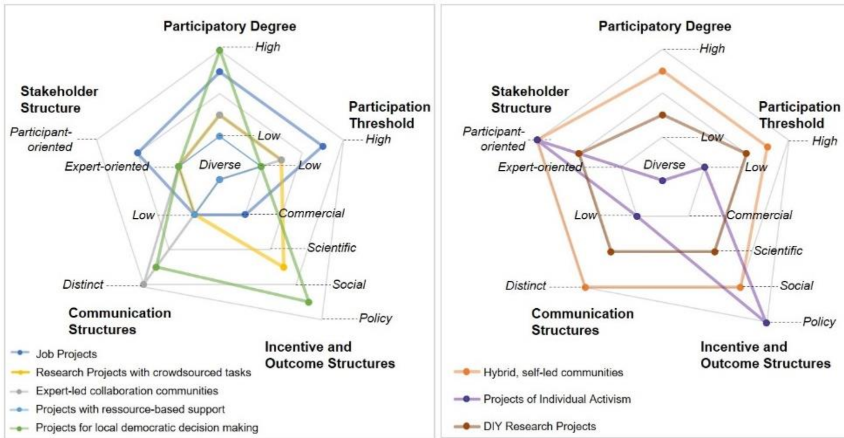

Figure 4. DIP archetypes with robust archetypes on the left and experimental archetypes on the right.

with varying publicity. Communication is limited, typically one-sided (83%), without feedback (75%), community building (83%), or moderation (100%). Initiated and driven by experts or organizations (100%), these projects generally invite everyone (83%), though some restrict participation (16%).

Archetype 3 "Expert-led Collaboration Communities": This cluster contains eleven projects described as expert-led collaboration communities (Figure 4, grey graph). They are community-oriented but lack decisive power for the community and are initiated and driven by experts. The participatory degree is low to medium, with low decisive power (82%), but one (55%) or multiple (45%) effort-based tasks. Participation thresholds are low to medium, being web-based (91%), with low (72%) or self-selected time requirements (27%), individual work (100%), and no prerequisites (91%). Communication means are distinct, including multi-sided communication (82%), feedback from participants (100%) and experts (27%), and means to promote community building (55%). The incentive and outcome structure is more diverse than for cluster 2: Although the need for access and resources remains a motivator for initiators (100%), the incentives for participants vary, and different public outcomes are achieved.

Archetype 4 "Projects with Resource-Based Support": This cluster includes five projects where participation is limited to resource-based support (Figure 4, light-blue graph). They have a low participatory degree, being informative (100%) with a single participatory task (100%), either resource-based (80%) or passive (20%). Participation thresholds are low, with no prerequisites (100%), low time requirements (100%), and individual work (100%). Communication is limited, with one-sided communication (80%), no feedback (80%), moderation (80%), or community building (80%). The incentive and outcome structure is very diverse, with intrinsic (40%) and impact-related incentives (80%), financing (80%) or acceptance-related (20%) motivators, and public or non-public outcomes, including products (60%), sharing of things (20%) or knowledge (20%). Projects are initiated and driven by experts and open to join for everyone (100%).

Archetype 5 "Projects for Local, Democratic Decision Making": This cluster contains five projects focused on democratic decision-making, i.e. they are all democratic and produce a decision (Figure 4, green graph). Thus, their participatory degree is high with participants engaging in one (40%) or multiple effort-based tasks (60%). Projects have low thresholds for participation, i.e., web-based with no prerequisites (100%), individual work (100%) and low time requirements (80%). Multiple characteristics suggest that projects have a local focus, including a restricted target group (100%), intrinsic incentives of participants (100%), and the absence of community-building measures (100%). Simultaneously, they have a socially and policy-oriented incentive and outcome structure with impact-related incentives (100%) and access and acceptance motivators (100%) while producing decisions (100%), and additionally sharing of things (60%) as either public (80%) or participant-restricted outcomes (20%). Although projects typically do not promote community building nor provide moderation (80%), they have medium to distinct communication structures with multi-sided communication (80%), expert (80%), and crowd (80%) feedback. They are initiated and driven by experts (100%).

Experimental Archetype 6 "Hybrid, Self-led Communities": This cluster contains two projects, which need to be considered outliers in the dataset (Figure 4, orange graph). What distinct them from other projects are their analogous components and their initiation and control by the entire participant group.

This occurs with other participant-centric characteristics such as particular distinct communication structures, team-based participation, and the sharing of endeavors as a primary project outcome. We thus describe these outliers as hybrid, self-led communities.

Experimental Archetype 7 "Projects of Individual Activism": This cluster contains three outlier projects (Figure 4, purple graph). What sets them apart from others is the importance of individual participants as initiators and drivers of the project and the exclusive focus on producing legitimized decisions. Besides this, in their structure, they resemble archetype 4, including low-threshold, resource-based participation without a strong community focus. We thus characterize them as projects of individual activism.

Experimental Archetype 8 "DIY Research Projects": This cluster groups 2 outlier projects that are situated between archetypes 2 and 3 with a strong research focus and community orientation, i.e., distinct communication structures and outcomes that are available for the participants (Figure 4, brown graph). Thresholds to participation are higher than in cluster 2, indicating more personal responsibility for participants and, thus, a do-it-yourself research character.

4.4 Connecting the DIP Web App and Archetypes

To communicate results to DIP practitioners, we connect the DIP web app and the DIP archetypes. While the web app improves the accessibility and usability of the initial taxonomy, the archetypes extend its informative value. By connecting both developments, we aim to bundle these potentials, making the DIP archetypes more accessible while increasing the attractiveness of the web app. Based on the web apps' results page, we thus design a prototypical extended results page, which enables the user to be informed about the DIP archetypes. In addition to viewing their own classification, users receive short summaries on the different archetypes and can view the archetypes' characteristics next to their classification in the taxonomy's display (see Figure 3, right).

5. Discussion and Conclusion

In this paper, we presented our research on making a theoretical taxonomy for DIP available to domain practitioners using the iterative process of DSR. Reflecting on the initial taxonomy, the necessity to further address practitioners' requirements regarding application and usability became apparent. Our instantiation of the taxonomy as an interactive web app yielded promising results in improving usability, empowering practitioners to independently use the taxonomy, with most subdimensions proving accessible. Furthermore, the positive feedback on the evaluated quality criteria underlined the value of the DIP taxonomy as a theoretical construct. As a challenge, we remark that the complexity of some participatory projects (i.e., multi-staged projects or multi-faceted activities) is not inherently considered in the taxonomy. For a more precise classification, those projects currently would have to be considered individually in their phases. Furthermore, while intentions to recommend the web app were, on average, positive, the evaluation of the classical net promoter score yields negative results, indicating that the web app does not operate as an individual service or product. If this is desired, further enhancements might be necessary, with the extended results page featuring the DIP archetypes or potentially an automatic self-assignment to an archetype being one promising avenue.

With our illustrative scenario analysis of 46 DIP projects, we advanced the application of the taxonomy, uncovering both the rich diversity of design variations in certain domains as well as underrepresented characteristics in others. Interestingly, especially the dimensions format and moderation, added based on the practitioners' feedback in the focus groups (Stein et al., 2023a) showed little variation in the dataset. This could indicate the practitioners' interest in these topics due to difficulties in implementation in practice, such as a lack of practical solutions. Utilizing cluster analysis, we identified significant design variations across commercial *(Archetype 1)*, hybrid *(Archetype 6)*, and digital, non-commercial involvement projects (*Remaining Archetypes*), as the majority of projects in our sample. Further exploration of this predominant category yielded the identification of a total of eight design clusters that we described as preliminary – partially experimental – archetypes of DIP projects. Although especially experimental archetypes can't be considered robust due to their small sample size, the archetypes show promising alignments with prior research in DIP. This includes e.g., distinctions between resource- and intelligence-oriented participation, patterns of a joint increase of communication structures and participation degree, or distinctions between organization- and citizen-centric design (Haklay, 2013; Van Dijk, 2012). Encompassing classical economic crowdsourcing, research-oriented, and policy-driven initiatives alongside emerging mixed archetypes that transcend traditional boundaries, the illustrative scenario analysis underlines the suitability of the taxonomy to guide emerging developments in the digital government sector.

With our research we provide multiple practical and theoretical contributions. For practitioners and policymakers, the DIP taxonomy already captures design knowledge that can provide guidance within the DIP domain (Stein et al., 2023a), yet its instantiation as a web app makes this knowledge more easily accessible to them. The web app supports practitioners in the development of new initiatives by guiding them through key design considerations and providing inspiration for their implementation based on various participatory practices. In a similar way, existing projects can be evaluated by raising awareness of one's own design decisions and highlighting alternatives. Beyond this guidance, the web app facilitates evidence-based research on digital participation by collecting further DIP data and empowering practitioners to participate in capturing design descriptions of their projects. The DIP archetypes provide a starting point for practitioners, making common design choices tangible and enabling comparison while breaking down the diversity of DIP approaches. As a theoretical contribution, our research activities strengthen the evaluative rigor of the initial DIP taxonomy. In addition, while the web app instantiation of the taxonomy can serve as an example to other practitioner-oriented taxonomy developments, the archetypes as operationalized models, grounded in empirical data, offer a valuable counterpart to theoretical typologies, enabling a deeper understanding of current DIP practices and a point of reference for their evolution over time.

As a limiting factor of our research, for subcycle a, we note that in favor of brief study duration, little information was collected on the test user group, preventing us from insights into user-specific experiences. Instead, we relied on the sufficient diversity of project initiators on "Mit:forschen", which was documented e.g., in terms of institutional or thematic backgrounds (Moczek et al., 2021). Regarding the illustrative scenario analysis, our approach to data collection ensured standardized coding but was limited to the interpretation of publicly available data and may, therefore, contain biases or incomplete information. In particular, dimensions such as incentives for participants and initiators can externally only be evaluated to a limited extent. In addition, our project sampling method cannot strive for representability in the field of DIP projects. Thus, rather than aiming at uncovering all design types within the DIP landscape and relying exclusively on external descriptions, we contribute preliminary archetypes as a starting point and enable continuous collection of further (internal) design knowledge via the DIP web app.

In conclusion, our research aims to provoke more engagement with the topic of project design for digital involvement not only by researchers but also by practitioners. As the DIP field is developing rapidly, creating rigid models and overviews is not feasible. Instead, structures should be created that promote the continuous exchange between research and practice. With the DIP taxonomy, we want to encourage research areas such as digital government, citizen science, and crowdsourcing to share experiences, rather than to separate themselves from one another because emerging practices in one discipline might be already established in others.

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