



INNOVATIVE PARTICIPATORY DESIGN METHOD USING SOCIAL MEDIA AND ONLINE PLATFORMS

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Abstract. The study examines the effects of social media (SM), online platforms (OP) and digital instruments (DI) on participants' communication and the structure of the participatory design processes (PDPs). It addresses a gap in the literature by exploring the potential of these SM and OP to enhance stakeholders' involvement in PDPs. Through a case study of a participatory children's furniture design project involving diverse stakeholders, including children, parents, scholars, specialists, industry, university and the community, the study investigates how SM, OP and DI facilitate enriched and expedited communication in PDPs. The paper discusses these tools' challenges and opportunities within a conceptual framework. A mixed methodology approach is employed for data collection, incorporating observations, surveys, interviews and various participatory activities. By examining the findings, the study seeks to answer two key research questions: How do SM and OP influence communication patterns in PDPs? What is the impact of these DI on the structure and dynamics of the PDPs? The study proposes an innovative approach to overcome associated challenges. The positive effects of SM, OP and DI can significantly reshape the nature of participation in PDPs, such as the number of participants, the duration of the process and budget limitations.

Keywords: Innovative participatory design process, children's furniture design, social media, online platforms, digital instruments.

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1. Introduction

Introducing DI, SM and OP has driven a revolutionary journey for Participatory Design (PD) in recent years (Bjerknes *et al.*, 1987; Manzini & Meroni, 2017; Del Gaudio *et al.*, 2020; Jagtap, 2022). This development is a reaction to the increasing awareness of how digital technologies can encourage democratic principles, inclusion and teamwork in design processes (Danielsson *et al.*, 2008; Hagen *et al.*, 2007; Schuler & Namioka, 1993). These efforts require PDPs where designers collaborate with users and empower them to influence the design process (Mulgan, 2007). Designers can leverage existing resources and knowledge by partnering with local actors and organisations (Hussain *et al.*, 2012). With its roots in democratic and pragmatic ideas, the field of PD has broadened its scope to investigate creative strategies meant to increase stakeholder engagement (Foth & Axup, 2006; Slingerland *et al.*, 2022). PD has evolved, incorporating not only

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innovative design approaches but also pragmatic and democratic values, as evident in the Scandinavian tradition of the field (Schuler & Namioka, 1993). It is crucial to recognize that this tradition does not solely emphasize innovation and creativity. Instead, PD is fundamentally driven by a commitment to pragmatic, democratic, and societal values that focus on inclusivity, collaboration and the empowerment of end-users. At its core, PD seeks to involve end-users throughout the design process to the greatest extent possible. The aim is not just to stimulate innovation and creativity but, more fundamentally, to empower stakeholders, encourage democratic dynamics and address social challenges. The fundamental tenets of PD underscore the importance of user involvement and participation, as highlighted in the Scandinavian tradition. However, challenges exist regarding power dynamics, collaboration and engagement. Strategies such as explaining the design process, negotiating common interests and fostering supportive networks can help designers navigate these challenges and promote positive change. The design aims to create a more inclusive and democratic society through freedom of speech, voting rights and equal representation (Sanoff, 2011).

PD attempts to involve actual users throughout the design process for the purpose of involving potential users and to enable an environment in which they have a say concerning design decisions that affect them. An additional aim is to produce several ideas to the possible extent to increase innovation and creativity through inclusion (Sanoff, 2006).

There are many benefits to be gained from innovative approaches in PDP. First, it allows the users and the community to meet their social needs, increasing the efficiency of the local community's resources. Secondly, the involvement of the user group and the professional in the design and planning process increases their sense of influence and awareness of the consequences of their decisions (Hester, 1990). Users included in the design process's earliest stages are likely to take ownership of the outcome (Brandt, 2007; Scharoun *et al.*, 2019). The professional also benefits from the involvement in the design and planning process. Perhaps, most profoundly, it provides them with up-to-date information and makes them more likely to make informed decisions that are tailored to the users' needs as well as unearthing innovative and creative solutions that might not have been arrived otherwise (Ho, 2021; Choi *et al.*, 2022).

Although the advantages of PD approaches are profuse, the application may take time and effort from several points of view. The main challenges are often time limitations and short budgets, which can be invested elsewhere in the project (Zhang *et al.*, 2022). Furthermore, participants' involvement may be negatively affected by geographical distance (Arcury *et al.*, 2005) and people "hard to reach" may be eventually excluded from the PD project (Blomkamp, 2018). The budget restrictions and time limitations to finalise the projects only sometimes allow an extended PDP (Sanders & Stappers, 2008; Sanders *et al.*, 2010). The study also analysed the effects of SM, OP and DI on the project's duration.

A significant turning point in the development of PD has been reached with the integration of SM and DI (Mouter *et al.*, 2021; Ali *et al.*, 2021). PD has embraced the opportunities that DI present to increase collaboration, promote diversity and strengthen the democratic aspects of design processes as they become more and more commonplace. By adding new levels of involvement, empowerment and access, the use of SM and DI in PD redefines the field of participatory design.

In light of the importance and accessibility of these tools in the current digital era, our work attempts to investigate how SM and DI can redefine and improve PDPs (Ali *et*

al., 2021). Our objective is to innovate and adapt within the current framework of PD, building on the extensive history of PD approaches rather than to develop an entirely new PD method (Foth & Axup, 2006). We recognize that SM and DI in PD may positively affect stakeholder participation, dynamic communication and the spread of democratic principles, among other things (Slingerland *et al.*, 2022; Hagen *et al.*, 2007). However, their advantages should be included more in research and methods (Ahmed *et al.*, 2019). This study explores how these tools can promote participatory design and build on co-design, using various OP to encourage collaborations between designers and stakeholders. The aim is to introduce a new PDP method to facilitate active participants' involvement in the design process.

We have developed research-based design solutions that empower stakeholders and end users by implementing PDPs that integrate SM, OP and DI in partnership with the Education Volunteers Foundation of Turkey (TEGV) (Duarte *et al.*, 2021). Our work emphasizes the value of discussion, safe places, storytelling and critical reflections as crucial forms of communication in participatory research, in addition to providing methodological, conceptual and practical tools (Duarte *et al.*, 2018; Talhouk *et al.*, 2019; Ekmekcioglu *et al.*, 2021). Our goal in incorporating these focal themes is to help research teams engage with community members, build relationships, establish trust and deal with power dynamics.

To summarize, there are many benefits associated with PD and the combination of social media and information design presents a unique chance to improve the PDPs further (Hester, 1990; Brandt, 2007; Scharoun *et al.*, 2019; Ho, 2021; Choi *et al.*, 2022). The more dynamic and inclusive approach that digital technology offers will benefit communities, designers and stakeholders as we move into this new era. By highlighting the part that SM and DI play in enhancing the collaborative, inclusive and democratic aspects of participatory development, our research aims to support this continuous change (Slingerland *et al.*, 2022; Mouter *et al.*, 2021).

2. Theoretical Framework

2.1. Evolving Participatory Design

Democratic principles are the foundation of PD, which echoes the idea that public participation can impact decisions through democratic processes such as voting, equal representation and freedom of speech (Sanoff, 2011). It is critical to realize that design is an ever-evolving, dynamic process that adapts and integrates new tools and systems (Star & Ruhleder, 1996; Sanders *et al.*, 2010).

Developing design empathy, which includes ethical and perspective empathy, is a fundamental principle of participatory design (Raviselvam *et al.*, 2022). While perspective empathy explores the designer's ability to experience the user's perspective, ethical empathy focuses on the designer's desire to connect with the end users.

According to Vasconcelos *et al.* (2018), this method turns users into co-designers by giving them the ability to participate in the design process actively and greatly influence the creation of design alternatives. It is important to note that participatory design needs to change and evolve along with technological landscapes.

2.2. The Importance of Social Media and Online Platforms for PDP

With user-generated content and interaction, social media (SM) is a dynamic and adaptable Internet-based platform (Ahmed *et al.*, 2019). SM fosters communication and

information exchange among users by incorporating social media and online participation (Kaplan & Haenlein, 2010). These platforms redefine how information is created and shared online by enabling users to freely communicate, create, and share content (Oh *et al.*, 2014).

SM's role in participation must be understood from a variety of angles. On the one hand, it encourages a participatory approach to design by putting users at the centre of the system (OECD, 2007; Ahmed *et al.*, 2019). It is imperative to recognise, nevertheless, that SM frequently harbours ambiguous power dynamics in which developers retain substantial control over data and applications (Petersen, 2008).

A new era in PD has been brought about by SM, which has cultivated an inclusive atmosphere that supports broad, adaptable and creative design processes (Jenkins, 2006; Bruns, 2008; Shirky, 2008). Traditional participation needs have been re-evaluated due to the shift towards online participation and user-generated content (Johnson & Hyysalo, 2012). Given SM's transformative potential, it is incumbent upon researchers and practitioners to strengthen the role of creative participation in design processes and utilise the new opportunities that developing SM features might offer.

3. Online Participatory Design

Online participatory design has been extensively utilised in gaming, web design, and other areas where the medium coincides or draws parallels with the output product. For instance, the work of Slingerland *et al.* (2023) explores the challenges and opportunities of distributed participatory design, especially in place-making during the COVID-19 pandemic. They conducted a two-week online summer school with Irish teenagers, focusing on building relationships with each other and the community through digital artworks. Their findings emphasise the importance of activities and materials designed for reflection, empowerment, inclusiveness, emergence and playfulness in participatory place-making. However, in the context of products or environments, such approaches are less observed in the existing literature. Enabling a far-reaching process involving various stakeholders and providing an accessible platform was vital for this project Slingerland *et al.* (2023). The coordination of the project stages and reaching a satisfactory end for all involved participants were challenges that were overcome through the flexible nature of the online platforms delivered by the coordinators of that particular process, which is also emphasized in the framework of the current paper to be elaborated in the Case Study section that follows.

3.1. Exploring Online Participation with Youth

The PDP's online participation ecosystem is intricate and multidimensional by nature. For a PDP to be effective, it is essential to comprehend the different roles, levels of engagement and strategies used by online participants (Bossen *et al.*, 2010). Online users come in various roles and defining them is complex (Bernoff & Li, 2010).

However, the collaborative aspect of Web 2.0 creates an environment conducive to quick and extensive online interaction. Social media platforms provide an open environment to quickly draw, engage and mobilise users-individuals or organised groups-into coordinated actions (Confetto *et al.*, 2023).

When the nature of online participation is examined, it becomes clear that young people are the most active group in SM. Generation Z shows a significant presence and active involvement in both OP and SM (GWI, 2023). Young people are remarkably adept

at navigating multiple social media platforms and are active users of YouTube, WhatsApp, Instagram and others.

It is imperative to acknowledge that selecting a particular social media platform can substantially influence the degree and nature of involvement within a PDP. The ramifications of these decisions demand careful consideration, especially in light of how various stakeholders can contribute to the inclusive and innovative design process and need to be adapted according to the particular project.

3.2. Effects of Digital Instruments on the Design Process

Much PD research has investigated methods and instruments to meet particular project requirements (Sanders *et al.*, 2010; Davis *et al.*, 2013). According to Sanders, Brandt and Binder (2010), these tools fall into three primary categories: creating tangible objects, interaction and communication and action and performance. These tools can also be used online and in person, providing different levels of creativity and occasionally posing new challenges.

The widespread use of augmented reality (AR) and virtual reality (VR) techniques in design is primarily due to the advancement of computer-aided design (CAD) systems. The way designs are presented has significantly improved thanks to these technologies, giving users more accurate representations of real-world spaces (Janusz, 2019). Virtual reality (VR) has also developed into a potent tool that helps designers produce realistic scenarios pertinent to the design process, especially those that involve actual manufacturing and assembly (Neroni *et al.*, 2021). For users with different levels of expertise, it is essential to visualise spatial objects within the framework of a PDP. Conventional depictions need to frequently express crucial design elements like size, configuration and scale.

The way designers engage with participants has changed due to new visualisation tools, which improve communication and stimulate creativity (Loyola *et al.*, 2019). According to Pommeranz *et al.* (2012), artefacts play a vital role in fostering communication with participants by acting as inspiration and creative sources. However, time and financial constraints limit how much participants can interact with models and prototypes during in-person professional development sessions (Sanders *et al.*, 2010). The literature, which focuses on increasing participation and satisfying project-specific requirements, notably highlights the transformative potential of DI in the design process (Sanders *et al.*, 2010; Davis *et al.*, 2013).

By incorporating a range of stakeholders, including children, parents, educators, professionals, corporate partners, the university and the neighbourhood, the case study seeks to enhance its reach. In this study, the aim is to enable smooth communication and engagement between stakeholders by integrating SM, OP and DI. Another expectation is to foster a collaborative approach to creativity and problem-solving by bridging geographical boundaries.

4. Research Methodology

This research explores the crucial role that SM and OP play in the PDPs, analysing the subtle modifications to participation dynamics that they bring about and the broader effects of digitalisation on the design process. As Creswell and Plano Clark (2018) recommended, the research methodology is based on a mixed methods approach that combines qualitative and quantitative research approaches. The early stages of this

research relied heavily on semi-structured interviews. In order to form the basis for developing the brief, these interviews were carried out to gain a basic understanding of the viewpoints of TEGV kids regarding the project. Seidman's (2006) guidelines for conducting in-depth interviews and obtaining wealthy, qualitative data align with this qualitative method.

In order to maximise involvement and promote inclusivity, new SM accounts were created on various platforms. To ensure that kids, families and volunteers knew these SM accounts, they were purposefully made public and actively promoted within TEGV Centers. Hagen et al. (2007) emphasise that this strategic approach aligns with the principles of engaging stakeholders through social media.

Coordination of online seminars and workshops, which attempted to improve participants' communication abilities and promote teamwork, was also included in the methodology. In order to improve communication and promote a sense of community among all participants, these sessions were created with designers in mind as well. The initiatives mentioned above were instrumental in dismantling obstacles and promoting efficient communication within the heterogeneous affiliates of participants.

Interestingly, thorough documentation was kept during the PDPs to monitor the volume and variety of interactions on SM platforms every week. As recommended by Creswell and Poth (2016), measuring the calibre and character of interactions was made possible by this thorough record-keeping.

During an online meeting, specific data was gathered, such as the quantity and variety of participants, their contributions to each project and the completion of structured surveys. This procedure made it possible to collect data in a thorough manner, which is consistent with Dillman et al. (2014) recommendations regarding surveys and quantitative measurements and the mixed methods approach of Creswell and Creswell (2017) to gain a comprehensive understanding of the evolving participatory design process. According to the guidelines of case study research, this multimodal approach enables a comprehensive analysis of the experiences, preferences and general efficacy of the participatory design process (Yin, 2014).

5. Case Study

This project was carried out during one semester in the Furniture Design course at the Department of Interior Architecture and Environmental Design at Yaşar University, Izmir, Turkey. The task was based on the TEGV Education Centre, which has supported over two million children, particularly in areas with limited educational possibilities, for over 25 years. The Caploonba Furniture Firm (CFF) was the third party to sustain the project with years of knowledge in creating children's furniture.

The project's initial idea was to create a bridge among children around Turkey by using a wide range of accessibility of TEGV. The concept of "empathy" was chosen for the project theme as an abstract concept that would instigate creativity. The project began with the dictionary meaning of "empathy" and continued with its interpretation by children. The project's objective is to create awareness in the community and the parents about the importance of empathy. Through the creative design process, designers and participants developed furniture that would help raise empathy among individuals.

All furniture elements were manufactured using plywood as the mandatory material. The manufacturing process integrated digital fabrication techniques, such as

Computer Numerical Control (CNC) fabrication and 3D printing for additional accessories. A team of two designers developed each project.

The project's duration was 24 weeks, which consisted of eight weeks of preparation (Phase 0), fourteen weeks of the design process (Phases 1, 2 and 3) and two weeks of the exhibition and usability testing. In addition to those periods, the post-evaluation continued for eight weeks. In the project, different varieties of participants were involved in each phase.

5.1. Participants' Profile

The course was orchestrated under the supervision of five faculty members serving as moderators and was formally introduced on the university's webpage, complete with a comprehensive syllabus. As part of the selection process, third-year students majoring in Interior Architecture and Environmental Design voluntarily enrolled in the course as designers. The user group encompassed Volunteer Children and Members of the Educational Volunteers Foundation (TEGV) and the project's initiation was publicised across TEGV Education Centers nationwide. Out of those exposed to the project, five Centers expressed their willingness to participate voluntarily. Moreover, the inclusion of specialists was managed through invitations extended by moderators, stakeholders and on certain occasions, volunteers.

In this study, informed consent from the parents of children was collected through the TEGV organisation, as well as from students via email. This process was initiated after the initial delivery and comprehensive description of the project were completed. Additionally, informed consent for the use of the collected data in further research was provided by all specialists who participated in the study. It is essential to highlight that this step, although challenging and time-consuming, is significant and must be addressed to ensure ethical research practices.

- Moderators (Five lecturers) who follow the process from the start to the end. The role of the moderator begins with the Investigation Part by defining the problem/s, collecting data about user needs, space, and previous studies, categorising data and analysing data to prepare the project for the second part, Initiation. The researchers were also within this group.

- Designers (Students) are 59 students aged 18-25 in the third-year Bachelor of Interior Architecture and Environmental Design Department at Yaşar University. Since they were in their third year, they had the necessary skills to complete the project. They oversaw executing the process based on the demands of other parties and elaborated on the meaning of empathy and its effect on the design.

- Users refer to the people who finally use an appropriate design element. The primary users of this case study were the volunteer children and volunteer members of TEGV. As this was a pilot program, the project initially focused on five centres in different regions of Turkey. The educational centres were designed to accommodate students from varying cultural and socioeconomic backgrounds.

- Stakeholders are individuals or firms involved in a business and can be divided into two. These are external stakeholders who are indirectly affected by the operations and internal stakeholders who are considerably influenced by the business outcome.

- Specialists are individuals with superior knowledge or ability associated with an appropriate topic or exercise. They are invited to the PDP by moderators and stakeholders. This study included design-related specialists, child development specialists, child

communication specialists, child psychologists, social psychologists, paediatricians and education specialists as part of the PDP.

Throughout the PDP, the roles of moderators and designers remained consistent, with the same individuals fulfilling these positions across all five phases. However, the composition of other participant groups varied from phase to phase, reflecting the dynamic nature of the engagement.

Phase 0 (Investigation): The initial phase involved five moderators, 59 designers, 56 users, ten stakeholders, and seven specialists (child development specialists, child communication specialists, child psychologists, social psychologists, paediatricians and education specialists). This stage aimed to gather insights and understand the context of the design problem.

Phase 1 (Initiation): During this phase, there were five moderators, 59 designers, two stakeholders and four specialists. The focus was on establishing goals and setting the foundation for the design process.

Phase 2 (Interaction and Workshop): In this collaborative phase, there were five moderators, 59 designers, 92 users, three stakeholders and 14 specialists. The involvement of a more significant number of users emphasised the importance of gathering diverse perspectives.

Phase 3 (Post-interaction): Transitioning from the interaction phase, there were five moderators, 59 designers, one stakeholder and two specialists. This phase involved analysing and synthesising the insights gathered from the previous stages.

Phase 4 (Findings and Post-evaluation): The final phase included five moderators, 59 designers, ten stakeholders and 18 specialists. The number of users will vary according to number of customers. It focused on presenting the findings and evaluating the outcomes of the participatory design process.

It is worth noting that while some participants remained consistent across certain phases, such as the moderators and designers, other groups, including users, stakeholders and specialists, varied in their level of involvement throughout the process. This dynamic composition allowed for a diverse range of perspectives, promoting collaboration and the exploration of different insights and expertise at various stages of the PDP. In addition to this number of participants, SM interactions were also considered (Table 1).

Table 1. Empathy Project SM interactions

	<i>Phase 0: Investigation</i>	<i>Phase 1: Initiation</i>	<i>Phase 2: Interaction</i>	<i>Phase 2: Workshop</i>	<i>Phase 3: Post- interaction</i>	<i>Phase 4: Findings</i>	<i>Phase 4: Post- evaluation</i>
<i>Youtube Likes</i>	0	0	61	0	1081	161	571
<i>Youtube Comments</i>	0	0	32	0	493	109	178
<i>Instagram Likes</i>	36	104	37	81	16	60	1922
<i>Instagram Comments</i>	13	29	13	28	7	30	243

Throughout the PDP, two essential platforms, Instagram and YouTube, played significant roles in facilitating communication and interaction with the participants. These platforms were selected based on their unique features and advantages in fostering engagement and enabling extensive interactions compared to traditional participatory design methods.

Instagram, one of Turkey's most commonly used SM platforms for communication through comments, was crucial in this study. It allowed for seamless and immediate interaction with the participants, fostering a dynamic exchange of ideas.

Phase 0 (Investigation): It was for shaping the PDP. During this phase, there were 36 likes and 13 comments, demonstrating the active engagement of participants. A guidebook was prepared for the participants to clarify the PDP.

Phase 1 (Initiation): The project poster (Figure 1) was prominently showcased on Instagram and subsequently shared with TEGV for publication on their online platform through email and WhatsApp channels.



Figure 1. Poster Design to start the PDP

Participants were encouraged to express their interest and initiate contact by liking the announcement. Additionally, they were invited to communicate their preferred level of participation, whether active or passive, through Direct Message on Instagram. This platform streamlined communication, yielding a noteworthy response of 104 likes and 29 comments, underscoring the participants' eagerness to engage in the process. The moderators proactively reached out to each individual who had liked the post to assess their genuine interest in joining the PDP.

Phase 2 (Interaction and Workshop): This phase marked the stage where participants actively followed the design process and contributed their insights through Instagram. Parallel to this, online meetings, presentations, seminars and workshops were conducted using platforms like Zoom to engage with different participant types. During this phase, the workshop process was shared on Instagram, garnering 81 likes and 28 comments. In comparison, the overall interaction on Instagram received 37 likes and 13 comments from participants who could not attend the online meetings.

Phase 3 (Post-interaction): Similar to the interaction phase, it relied on Zoom as the primary communication platform. As a result, the contribution on Instagram was limited, with 16 likes and seven comments. However, it remained an essential channel for sharing updates and maintaining communication.

Phase 4 (Findings and Post-evaluation): Instagram became a crucial platform for moderators, designers, specialists and stakeholders to collaborate and make final design decisions that the factory production line could adopt. During this period, the process was

shared on Instagram, resulting in 60 likes and 30 comments. The high engagement on Instagram was evident, with 1922 likes and 243 comments. The comments played a significant role in gathering valuable input for final updates before production and shaping future projects.

While Instagram played a central role in enabling ongoing and extensive interactions throughout the PDP, YouTube was utilised specifically for video presentations of each project and online meetings. Its capability to host longer videos and facilitate comments made it an ideal platform. Although the contribution on YouTube was primarily limited to Phase 2 - Interaction (61 likes and 32 comments), Phase 3 - Post-interaction (1081 likes and 493 comments) and Phase 4 - Findings and Post-evaluation (161 likes and 109 comments for findings; 571 likes and 178 comments for post-evaluation), its role in providing visual content and facilitating communication cannot be undermined.

Overall, the combined use of Instagram and YouTube offered limitless opportunities for interaction and engagement compared to traditional participatory design processes. Managing the vast number of participants and data was possible through SM and OP. In addition to SM, OP, such as Zoom, WhatsApp and Google Drive, were used to communicate, meet and share data.

5.2. Method

This section introduces four criteria authors can employ to assess and select methods during a PDP (Table 2). PDP. The table was created to gain insights into the activities and the extent of participants' engagement during these activities.

“Create through”: These methods allow participants to be part of the design activities and create alternatives to present proposals or fresh ideas that support the PDP.

“Learn from”: These methods allow the participants to gain data from specialists, moderators or other participants.

“Hear out”: These methods are for reaching feedback from participants about their memoirs and expertise but are based mainly on ideas to produce new opportunities.

“Feedback”: These methods benefit experiment designs from more initial design analysis, like usability testing.

- The Research Instruments phase focused on gathering insights and data to inform the participatory design process.
 - Brainstorming: Brainstorming sessions were conducted to generate and collect many ideas from participants. This method encouraged open and creative thinking, allowing participants to contribute alternative proposals and fresh ideas to support the design process.
 - Interview: One-on-one interviews were conducted with participants to gain in-depth insights into their perspectives, experiences and needs. These interviews provided valuable qualitative data and personal narratives, allowing designers to learn from the participants.
 - Observation: Systematic observation was employed to study participants' behaviours, interactions and context. By observing their actions and reactions, designers gained valuable insights into the participants' engagement and the dynamics of their participation.
 - Research and Analysis: This method involved an extensive literature review and data analysis to provide a solid knowledge foundation and identify key

themes and patterns in the research domain. It helped moderators and designers understand the topic better and informed the design process.

- Seminar: Informative sessions were organised to provide participants with knowledge and expertise related to the design domain. Seminars allowed participants to learn from specialists, moderators or other participants, promoting knowledge sharing and fostering a collaborative atmosphere.
- Survey: Structured surveys were administered to a larger sample of participants to collect data. This method provided insights into a broader range of perspectives and allowed for statistical analysis of the data collected.
- The Design Instruments phase focused on creating alternative proposals and supporting the design process.
 - Digital Modelling: Computer-aided design sessions facilitated the creation of virtual models and prototypes. Digital modelling tools enabled participants to actively engage in design activities and contribute to developing design alternatives.
 - Drawing: Traditional or digital drawing techniques visually represent design concepts and ideas. Drawing helped participants express their thoughts and visualise design possibilities.
- Communication Instruments phase aimed to facilitate effective communication, collaboration and feedback among participants.
 - Animated Video: Animated videos were created to present design concepts and engage participants. This method allowed for a dynamic and visual representation of ideas, enhancing participant understanding and involvement.
 - Augmented Reality/Virtual Reality (AR/VR): Immersive technologies like AR/VR were used to create interactive experiences. AR/VR allowed participants to explore and interact with design concepts virtually.
 - Online Discussion: Collaborative meetings and discussion sessions fostered communication and collaboration among participants, designers, specialists and moderators. OP enable asynchronous or synchronous interactions, allowing for flexible and inclusive participation.
 - Online Jury: Online jury sessions allowed participants to present their proposals or ideas and receive feedback from a panel of experts. This method enabled a structured evaluation process and promoted constructive criticism and improvement.
 - Social Media: SM platforms facilitated communication and engagement among participants. These platforms provided spaces for sharing ideas, receiving feedback and expanding the reach of the participatory design process.
 - Online Workshop: Live online workshops allowed for interactive and collaborative design activities. Participants engaged in hands-on exercises and creative tasks, remotely contributing to the design process.

This study aimed to ensure inclusion, gather creative outputs and explore participant roles and dynamics by employing diverse methods across the research, design and communication phases.

Table 2. Methods and criteria (Participants are D: Designer; M: Moderator; U: User, SP: Specialist, ST: Stakeholder)

METHOD	Description	Create through	Learn from	Hear out	Feedback	Participants
Research Instruments						
Brainstorming	Gather ideas spontaneously	x		x		D, M, U, ST
Interview	Understand issues and topics and gain feedback on a possible design proposal			x	x	All
Observation	Gather data on phenomena in their natural setting			x	x	D
Research and Analysis	Gather input to be used in the design process		x			D
Seminar	Share information		x			D, M, SP
Survey	Gain an understanding of user-profiles and opinions			x	x	All
Design Instruments						
Digital modelling	Develop a design idea	x				D, M, SP
Drawing	Develop a design idea	x				D, M, SP
Communication Instruments						
Animated video	Enable communication with participants	x			x	All
AR/VR	Enable communication with participants in the virtual environment	x			x	All
Online Discussion	Enable feedback and discussion from various participants around specific topics over a structured time		x	x	x	All
Online Jury	Enable gathering opinions and feedback from the participants		x		x	All
Social media	Communicate with the participant and collect feedback			x	x	All
Online Workshop	Evaluate and generate concepts, ideas, and prototypes	x	x	x		D, M, U, SP

5.3. Phases

The aim was to design and produce 1-to-1 scaled prototypes of furniture elements envisioned for children according to their creative interpretation of empathy. It consisted of five phases: one preparation phase, three design process phases and one analysing phase.

5.3.1. Phase 0: Investigation

The case began with Phase 0 through the agreement process. In that phase, moderators and stakeholders clarified the direction of the design process using brainstorming, discussion, face-to-face meetings and online meetings (Table 3).

Table 3. Empathic Design Project – Phase 0

PHASE 0: Investigation			
Date	Topic	Activity	Method
Eight Weeks Duration	Agreement and Investigation Process	-Agreement process	- Brainstorming - Online meetings
Four Weeks Duration	Research and meetings	-Meeting with Children	- Semi-structured interview

The project name and motto were decided as “Empathic Design” and “Empathic Design will do us good”. A guide for semi-structured interviews was prepared with the help of child development and marketing communication specialists. Five TEGV centres volunteered for the process. After delivering all documents, an initial video that includes the answers of TEGV children was prepared for the project’s brief.

5.3.2. Phase 1: Initiation

Phase 1 started with the brief and program presentations to the designers. Designers were then asked to create groups of two and research TEGV and children's furniture. After, they presented their work with drawings, charts and visuals. Specialists and moderators prepared four activities (Table 4).

Table 4. Empathic Design Project – Phase 1

PHASE 1: Initiation			
Date	Topic	Activity	Method
Week 1	Introduction to project	-Brief presentation, -Group formation.	- Research and Analysis - Drawing
Week 2	-Child behaviour and their relationship with their environment	-TEGV specialists’ presentations	- Seminar / Q&A - Brain Storming - Workshop
Week 3	Seminar - 60 Years of Good Design	-Seminar -Desk Critics	-Seminar / Q&A -Face-to-Face meetings
Week 4	Project presentation	- Concept proposal presentations	- Seminar - Discussion

The first two seminars were about TEGV and child behaviour and their relationship with their environment. Then, designers joined the workshop to understand group behaviour and the child approach.

The third seminar was about the pre-work on Empathic Design. The prepared video was shared with the designers. The volunteers from the other cities joined the seminar online, creating an opportunity for designers to ask direct questions to the executors of the interviews. The last seminar was about the CFF. Knowing the company's production capacity and production methods was one of the crucial issues that would affect the design process.

Phase 1 continued with the seminars of the professionals in the sector. These seminars helped stakeholders, designers and users understand the nature of the design process. In the next meeting, designers presented their initial ideas to get feedback from all parties. In summary, brainstorming, discussion, drawings, interviews, observation, seminars and analysis were used during Phase 1.

5.3.3. Phase 2: Interaction and Workshop

In Phase 2, Designers had four meetings to observe, conduct interviews, brainstorm and produce virtual models and drawings. The meetings among designers and moderators were repeated thrice before their first design presentation. In the presentation, designers used digital drawings, models and animation to communicate with the users effectively on the Zoom online platform (Table 5).

In addition to these activities, another online workshop was organised among specialists and designers. The workshop called “Rethinking Environment” aimed to improve the designers' point of view with the specialist's help. This activity used Zoom and Miro platforms to communicate and interact. The workshop had several phases and the first phase was about using keywords to define the design process. It started with the defining objects designers wanted to improve in their environment. Secondly, they are asked to question their emotions about their existing and dream environments. At last, possible constraints and opportunities for their design process were requested. In the next step, the designers develop possible design solution definitions using only words and inspirations (Figure 2).

Table 5. Empathic Design Project – Phase 2

PHASE 2: Interaction and Workshop			
Date	Topic	Activity	Method
Week 5	MODEKO (Fair)	- Furniture fair visit	- Observation
Week 6	Online Group discussion	- Revision and development of the conceptual proposal. - Group working, project revision, scaled drawings, and draft model.	- Virtual Modelling - Seminar - Discussion
Week 7	Online Desk Critiques	- Revision of the project proposal. - Group working, project revision, scaled drawings, and draft model.	- Virtual Modelling - Online Seminar - Online Discussion
Week 8	Online Desk Critiques	- Revision of the project proposal. - Group working, project revision, scaled drawings, and draft model.	- Online Seminar - Online Discussion
Week 9	Project presentation	- Online presentation - Online meeting with all parties	- Online Meetings - Online Questionnaires

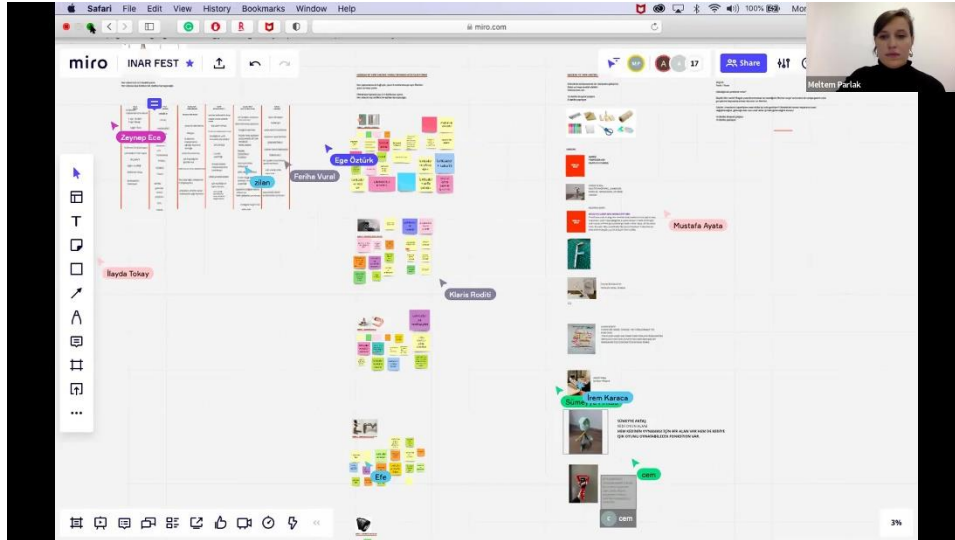


Figure 2. Online Workshop about Rethinking Environment

At last, they were asked to develop a design solution and make quick sketches and models to present. The final design solutions were uploaded to the same platform and shared with all the designers (Figure 3).

The students could also conduct the workshop without time and budget restrictions because a specialist was living abroad and could assist with an online platform. In addition to that, having an online archive that can be revisited unlimited times by designers brought the advantage of not missing any detail of the online workshop process. The digitalisation of traditional methods (such as stickers, sketches and modelling) was also established by using the online platform.



Figure 3. Online Workshop about Rethinking Environment

At the end of Phase 2, an online meeting was organised to unite all parties. Five moderators, 59 designers, 92 users, three stakeholders and 14 specialists participated in this meeting. The meeting was divided into several sessions and lasted about 8 hours. In

those sessions, designers presented the process of their work and their first proposals in Zoom meetings using renders, animations and storytelling (Figure 4).

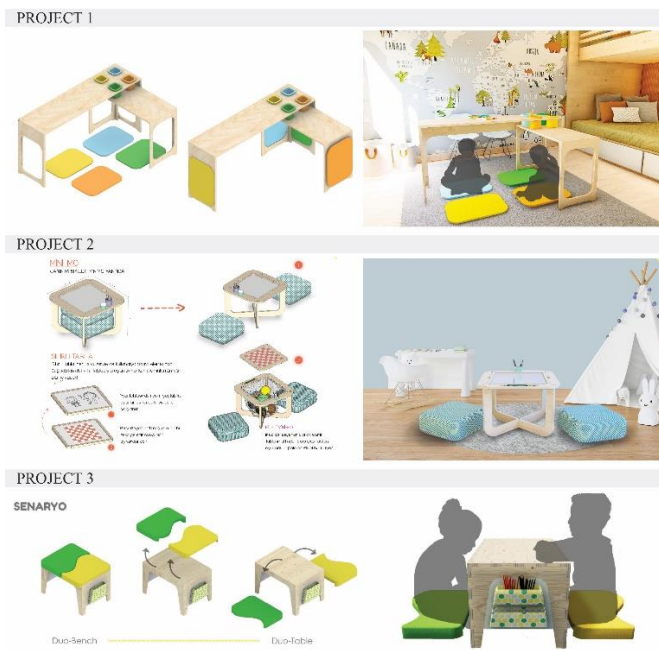


Figure 4. Phase 2 project presentations



Figure 5. Some of TEGV children's participation and their sketches showing interior elements such as stairs, shelves and chairs

During the presentations, participants were asked to contribute their opinions to improve the projects. Simultaneously, each project was published on the Instagram and YouTube platforms. In addition to feedback from the online meeting, there were many interactions through SM platforms. Due to the limitation of the platforms for sharing visuals, WhatsApp channel was used to create communication among parties (Figure 5).

Multiple photographs were taken for the study to show the children actively participating. The children showed they could contribute despite physical limitations like time and place, as seen in the top-left and top-right photographs. They were encouraged to participate in the creative process from any location and at any time, highlighting the inclusive aspect of their participation with their hand-drawn designs.

5.3.4. Phase 3: Post-interaction

Phase 3 initiated a presentation session about revisions made according to the feedback. The following sessions included the moderators, designers, specialists and facilities to finalise the design and prepare for advanced-level online presentations and productions (Table 6).

Table 6. Empathic Design Project – Phase 3

PHASE 3: Post-interaction			
Date	Topic	Activity	Method
Week 10	Project presentation	- Online presentation - Online meeting with all parties	- Online Meetings - Online Questionnaires - Online Observation - Online Interviews
Week 11	Group discussion	- Group working - Project revision	- Physical Modelling - Virtual Modelling - Online Seminar - Online Discussion
Week 12	Group discussion	- Group working - Project revision	- Physical Modelling - Virtual Modelling - Online Seminar - Online Discussion
Week 13	Project presentation	- Advanced project proposal - 1:2 scale prototype.	- Online Meetings - Online Observation - Online Interviews
Week 14	Group discussion	- Project revision - Production follow-up at 1:2 scale	- Physical Modelling - Virtual Modelling - Online Seminar - Online Discussion
Final	Project Finalization	- Panel review - Digital model - Group working - Project revision - Advanced prototype - Scaled drawings	- Virtual Modelling - Online Seminar - Online Discussion - VR presentation - AR presentation

With specialists in DIs, communication with children was established through images and animation to help the designers with their final preparations (Figure 6).

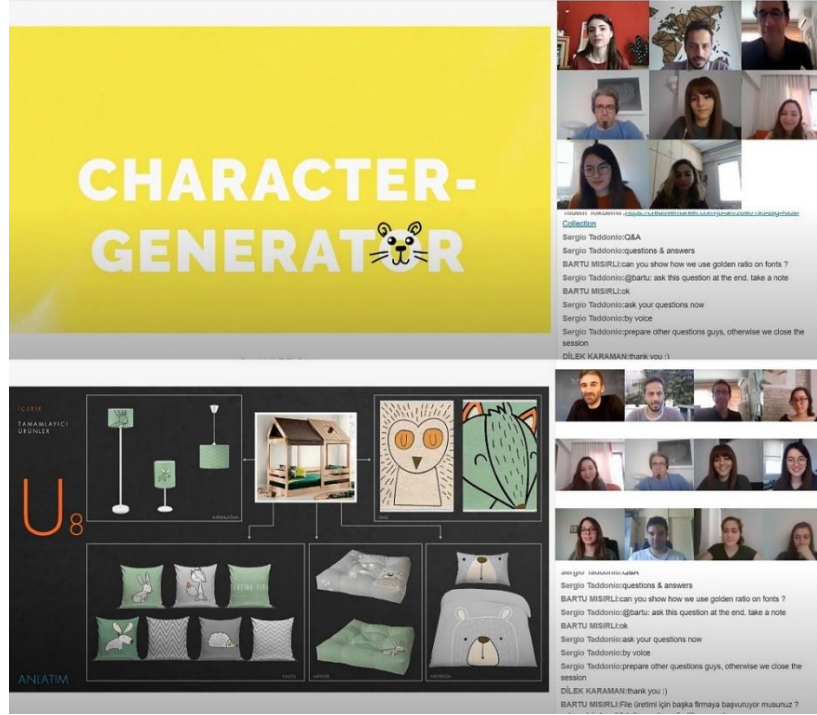


Figure 6. Communication with children through images and animation seminars

All parties met on an online platform at the end of Phase 3. In addition to the meeting, as mentioned earlier methods, AR/VR tools were employed to collect information from online group presentations and the final display prototypes conducted online. During the designers' presentations of the final concept, the five moderators assumed the responsibility of assessing the proposals put forth by the participants. AR tools enabled participants to visualise design elements in their environment, facilitating a better understanding of the natural scale. This feature also allowed for brief instructional sessions on the online platform and its usage (Figure 7).



Figure 7. On The Left - Training for AR / On The Right – One of the participant's images with AR furniture

The three selected projects' revisions were analysed according to interaction with users. Project 1 received comments mostly about pattern and colour. Due to safety concerns, the designers redesigned the connection and corner details. Project 2 was criticised for limitations such as the number of users and top-board options. The designers

increased the cushions to be enough for a family. Project 3 upgraded the design with a transparent surface that could be painted. Parents could draw here to tell bedtime stories (Figure 8).



Figure 8. Phase 3 project presentations

5.3.5. Phase 4: Finding and Post-evaluation

In phase 4, the Findings and Post-evaluation part commenced with participant interviews. The main goal of these discussions was to learn more about three important topics: satisfaction, challenges and feedback.

The participants were explicitly told to reflect critically during the interviews, offering thoughtful insights into their processes, thoughts and ideas. The same five moderators participating in the study afterwards transcribed and reviewed the interview material collected from the participants. The moderators thoroughly read the interview scripts and used thematic analysis. They created coding systems and discovered recurrent patterns in the data by working cooperatively with the researchers (Table 7).

Table 7. Empathic Design Project – Phase 4

Phase 4: Findings and Post-evaluation			
Date	Topic	Activity	Method
Eight days	Observation & Interviews	-Pieces of Furniture published	- Interview
Eight weeks	Online Observation		- Observation
			- Online Observation

At the end of the voting process, three projects were delivered to CFF. The company formed a specialist team to select the furniture to be produced. Three project designers joined the research and design development team of CFF to adapt the conceptual projects to the production line. At the end of Phase 4, projects were produced and distributed in CFF showrooms around Turkey (Figure 9).



Figure 9. Selected and produced projects

5.4. Finding and Discussion

In this comprehensive case study, twenty-four projects were systematically developed to examine various facets of inventiveness and user engagement. Each project was meticulously assessed by our team of moderators, considering design concepts, design considerations and restrictions, innovation, the utilisation of digital instruments and the overall quality of the designs. Deeper insights into the impact of SM, OP and DI on the PDP were gained by comparing the ratings provided by moderators with the extent of participant interaction.

Despite the promise of digital tools in participatory design, several limitations were encountered in the study, which warrant consideration:

- **Internet Connection Problems:** The seamless flow of online meetings and interactions was hindered by internet connectivity issues, especially in remote settings (Hagen *et al.*, 2007).
- **Uploading Files Problems:** Collaborative efforts were impeded by difficulties in uploading and sharing files, documents and images (Klammer *et al.*, 2010).
- **Digital Literacy Challenges:** Varied levels of digital literacy among participants, including children and elderly individuals, sometimes hampered their effective use of technology, underscoring the need for additional support and training (Hess & Pipek, 2012).
- **Communication Obstacles:** Despite online communication tools, challenges related to communication persisted, leading to occasional misunderstandings and communication gaps (Bratteteig *et al.*, 2013).

- **Real Scale Model Issue:** The complex challenge of ensuring that participants comprehended the natural scale of design elements presented digitally persisted (Karen & Sandra, 2017).

To mitigate these challenges, support and training were proactively provided by our research team. However, it is essential to recognise these limitations when interpreting our findings.

A range of OPs, including WhatsApp, Google Drive and Zoom meetings, were leveraged to establish robust communication channels among all stakeholders. WhatsApp groups created an immediate conversational environment for discussions, brainstorming and decision-making. The sharing of images, documents and audio expedited the collaborative process. Google Drive facilitated online document editing, creating timelines and conducting surveys (Hagen *et al.*, 2007). Zoom meetings emerged as a vital tool, enabling the seamless participation of all stakeholders, regardless of geographical limitations (Klammer *et al.*, 2010). Given the challenges associated with physically bringing children to the project site, including permissions, travel constraints and budgetary considerations, these online platforms played a pivotal role in ensuring the inclusive participation of all TEGV children, families and volunteers across Turkey.

Throughout the concept and design development stages, the effective use of SM platforms, such as Instagram and YouTube, proved invaluable for sharing project progress, engaging users and soliciting feedback. Additionally, we employed online workshop platforms like Miro to foster an interactive and international environment for brainstorming and creative exercises. These digital tools enabled participants from various regions of Turkey to contribute to the PDP. At the same time, our workshop moderators hailed from diverse locations, including the USA, Ankara and Izmir.

To address the challenge of comprehending design elements on a digital platform accurately, we embraced innovative techniques. Our study harnessed VR, AR, animations and collaborative representations like draft drawings, 3D modelling and rendering (Karen & Sandra, 2017). This approach aimed to provide a clear and precise understanding of the entire design before its finalisation. Nevertheless, it is vital to recognise that with many participants involved in the PDP, effectively representing projects can be a daunting task. Ensuring that participants without design experience understand the digitalised data and scale is an ongoing challenge that calls for innovative solutions (Karen & Sandra, 2017). In our case study, we employed AR technology to bring virtual designs into the real world at a correct scale, assisting children in forming a vivid mental image of the specific design (Karen & Sandra, 2017).

In addition to these technological endeavours, we acknowledge inherent challenges associated with distributed PD and the use of digital tools in PD. As identified in prior research (Slingerland *et al.*, 2022), the shift to distributed settings often necessitates continuous monitoring of participants' actions, identification of suitable participants, addressing power asymmetries and overcoming challenges related to participant engagement and reflection. As remote work and digital collaboration become increasingly prevalent, further research is needed to explore how distributed PDPs can align with the principles of PD, fostering participant reflection, questioning and the creation of shared meaning through collaborative design (Karen & Sandra, 2017).

By recognising these limitations and incorporating them into our study, we strive to provide a more comprehensive and nuanced perspective on the challenges and opportunities associated with digital participatory design, especially in distributed settings.

Moderators were asked to provide evaluations of the ideas using a 5-point Likert scale. This scale allowed for identifying agreeable and disagreeable polar points and a neutral reference point (Table 8).

A prepared collection of codes that represented how inexperienced designers interacted with stakeholders using prototypes served as the basis for the grading criteria. The selection criteria comprised:

- *Design concepts*: Assessing the clarity and elaboration of participants' concepts and the effectiveness of their selection process.
- *Design concerns and limitations*: Evaluating participants' clear and complete knowledge of design concerns and limitations.
- *Innovation*: Assessing participants' optimal outcome of proposed new technology and ingenious statements.
- *Use of DIs*: Evaluating participants' proficiency in utilising available DIs and resources through demonstrations of digital modelling.
- *Overall design*: Evaluating participants' steps in creating the digital model regarding aesthetic values and ensuring that the digital model adheres to realistic norms.

Table 8. Average of the five moderators' grades using a 5-point Likert scale for each grading criteria (The projects are sorted according to total interaction number)

Prj. No	Concept	Concerns & Limitations	Innovation	Use of DIs	Overall	Grade
1	4,40	4,60	4,20	4,80	4,80	A-
2	4,20	4,40	4,20	4,80	4,40	B+
3	4,20	4,00	4,20	4,80	4,60	A-
4	4,40	4,60	4,00	4,80	4,80	A-
5	4,40	4,20	4,60	4,40	4,60	B
6	4,20	4,20	4,20	4,60	4,60	A-
7	4,20	4,20	3,80	4,40	4,40	B+
8	4,20	3,80	4,40	4,20	4,20	B
9	4,60	4,40	4,00	4,00	4,40	B+
10	4,40	4,00	4,20	4,20	4,20	B
11	4,40	4,40	4,20	4,20	4,20	B
12	4,60	4,60	4,20	4,40	4,60	B+
13	3,80	4,00	3,80	4,00	4,00	C
14	3,80	4,00	3,80	4,20	4,00	C+
15	3,80	4,00	4,00	4,20	4,00	C-
16	4,20	4,20	4,20	4,40	4,20	C+
17	4,20	4,20	4,00	4,00	4,20	C+
18	4,40	4,40	4,60	3,80	4,40	B-
19	4,20	4,20	4,20	4,00	4,20	C+
20	3,80	4,00	3,80	4,00	4,00	C
21	3,80	4,00	3,80	4,00	4,00	C+
22	4,20	4,40	4,20	3,80	4,00	C
23	4,60	4,60	4,60	3,80	4,60	B+
24	4,40	4,00	3,60	3,60	4,00	C-

Grading Scale	
A	95-100
A-	90-94
B+	85-89
B	80-84
B-	75-79
C+	70-74
C	65-69
C-	60-64
D+	55-59
D	50-54
F	0-49

Regarding the quantity and quality of the arguments data set, moderators assessed the ideas to determine whether modelling with DIs enhanced participants' abilities to develop concepts. The assessment focused on how many new ideas aligned with the objectives of the project brief. All moderators evaluated these ideas based on mutually agreed-upon metaphors, considering two criteria: clarity of form and shape, detailing and visual appearance.

Several intriguing patterns and discoveries appear after studying the projects in the table. Projects 1, 2, 3 and 4 received a perfect score of 4.80 for using DIs, making up the first four projects. Notably, these initiatives also attracted the most participant interaction. This link implies a close connection between participant involvement and the effectiveness of adopting DIs. It emphasises how good use of DIs is necessary for efficient communication with participants, even in well-designed projects.

Furthermore, Project 18 and Project 23 received B- and B+ grades, respectively. Despite receiving generally satisfactory grades, these projects are near the bottom of the list. Upon closer inspection, it becomes clear that their lower participant involvement mainly causes their lower ranking in using DIs. This finding emphasises the need to utilise DIs effectively to raise participant engagement.

These results underline how crucial it is to include DIs in the design phase to maximise participant participation. Designers can improve communication channels, address issues, and promote creativity by utilising the potential of DIs. This helps participants to have a more immersive and successful experience, eventually leading to better project ratings and success.

The level of interaction between SM and OPs between parties, including likes, comments, and messages, was analysed in this study to understand better how these interactions impact project success, building on prior research (Aldous & Jansen, 2019).

Data collection entailed using multiple methods, such as web scraping or application programming interface integrations, to collect analytics on likes, comments and messages from the specified social media platforms. The level and patterns of interactions were assessed and analysing the messages, likes and comments offered insightful information about user involvement and participation in the PDP. It was feasible to determine influential users, assess the project's reach and find user engagement patterns by looking at these interactions' frequency, sentiment and network structures.

A thorough study of the interactions between SM and OPs was made possible by combining the quantitative analysis of metrics and the qualitative analysis of content (Cha *et al.*, 2010). The study gave a solid framework for studying the link between SM and OP interactions and project performance by strictly evaluating likes, comments and direct messages.

The study showed that communication among all parties could be manifested more creatively when the activities related to these collaborations happen within SM and an online platform. The findings revealed how the interactions between designers and OP can reshape the position of designers in non-emancipatory settings. The PD practice is also marked by SM logic and the reconfigured roles of participating in traditional design settings and perceiving “platform vernaculars” (Gibbs *et al.*, 2015). Contrary to traditional participatory methods, the innovative PDP method presented prevents the users, stakeholders and participants from being a participant only at certain stages of the project to creative involvement. This new PDP method can be applied in different scales, times and cases.

Table 9. Comparison of project final grades and SM and online platform interactions
(The projects are sorted according to total interaction number)

Project No	Instagram	YouTube		Direct Message	Zoom Platform	Total Interaction	Grade
		Phase 2	Phase 3				
1	224	88	162	47	28	549	A-
2	167	162	67	17	16	429	B+
3	87	77	159	22	16	361	A-
4	106	111	79	33	30	359	A-
5	74	131	118	18	12	353	B
6	99	102	88	41	22	352	A-
7	50	131	52	23	32	288	B+
8	187	33	14	15	14	263	B
9	92	126	16	11	11	256	B+
10	86	60	70	14	14	244	B
11	150	33	20	5	22	230	B
12	128	53	20	11	10	222	B+
13	130	46	10	8	9	203	C
14	80	57	30	5	16	188	C+
15	127	20	11	11	16	185	C-
16	99	34	22	2	15	181	C+
17	72	35	16	14	14	151	C+
18	57	17	36	19	25	131	B-
19	78	23	10	4	16	131	C+
20	76	27	9	7	10	129	C
21	74	27	8	6	13	127	C+
22	44	37	17	11	17	125	C
23	49	27	11	17	28	122	B+
24	8	38	32	14	14	116	C-

Grading Scale	
A	95-100
A-	90-94
B	85-89
B+	80-84
B-	75-79
C	70-74
C+	65-69
C-	60-64
D	55-59
D+	50-54
F	0-49

The proposed PDP method is divided into seven steps: investigation, initiation, interaction, workshop/s, post-interaction, findings and post-evaluation. According to the needs of the PDP, the steps can be repeated several times. Reprising the same steps several times in traditional methods is challenging and effortful, especially in active participation. While the new method, supported by SM, OP and DI, facilitates the optimisation of this process, it also facilitates the active follow-up of the process for the participant. Users can follow the projects' processes by logging into their SM accounts whenever they want, not only when invited. This increases their sense of belonging to the project. In the survey conducted on the launch day at the end of the project, the participants stated that they saw themselves as more unrestrained and more influential on the project compared to the participatory design process carried out in previous years. One participant commented; "I felt more unrestrained and influential in this project compared to previous participatory design processes. The online participation aspect allowed me to follow the project's

progression in real-time, making it possible for me to be actively involved throughout the entire process”.

While this research emphasizes the positive impact of online platforms, it is crucial to acknowledge potential challenges that may arise. Many studies have reported instances where technology encountered issues during the process. Participants may need help accessing platforms due to device limitations or insufficient internet connectivity. Surprisingly, this study does not provide insights into whether such challenges occurred. A critical reflection on the technological aspects, drawing from experiences reported in the literature such as Danielsson et al. (2008), Hagen et al. (2007) and Ali et al. (2021), would enrich the discussion by providing a more balanced perspective on the role of technology and its potential limitations in the examined PDP.

Elaborate coordination, continuous communication and feedback, along with flexibility throughout the process are important in ensuring the success of the process. Technology failure, difficulty in accessing the platforms, device-related issues or internet connection problems all present themselves as possible challenges that need to be attended to during online design interactions. Moreover, the lack of face-to-face connections may bring other communication issues in similar cases, and they need to be factored into the individual planning of the study.

6. Conclusion

The study examines the effects of SM in design processes in which the goal is to include a large number of participants from various backgrounds to enrich the findings. The aim was to understand the means by which participation may be enhanced, especially when involving a varied group such as, youth and children, along with their families, student designers and industry. This was a challenging task with several lessons for all stakeholders as well as in terms of a possible contribution to existing literature.

This study used SM and OP to encourage increased creativity and participation in a national-scale project with more than 250 active participants and 3000 SM contributions. The challenges of a national PDP were scale, scheduling, time limitations, budget, data organisation, and prototyping. The potential of SM, OP, and DI were used to overcome these limitations. The study explores the importance of having children participate actively in the design process and an innovative method of working with the community, specialists and designers to develop creative and effective methods for PDP. With the active participation of children, one may expect feelings of belongingness and be heard as a member of society, but also be able to achieve feedback to improve design which may not be accessible otherwise.

The case was chosen as TEGV because their education units around Turkey gave an effective opportunity to create a nationwide PDP within the context of a learning environment. The Furniture Design course in the Interior Architecture and Environmental Design department at Yaşar University created an advantage for the randomly chosen third-year design students as designers and lecturers as moderators, joined by specialists and facilities.

The primary challenge of a PDP at this scale was securing the official agreements and investigation. At the end of Phase 0, the program of the PDP was announced publicly on official and other parties' SM platforms. OP was used for meetings, sharing forms and collecting data to accomplish Phase 0 in a limited time. Although the COVID-19 pandemic brought disadvantages in many issues for the PDP, OP became more valuable

in terms of enhancing creative participation. Digitalisation methods increased the quality of communication among designers and other parties, increasing variation in communication tools and products and fuelling creativity. Modelling, rendering, animation, VR and AR tools made the presentations possible to be detailed and fast without budget restrictions. Online data-sharing platforms were used to collect, share and analyse a large amount of data.

In their study, van Dijck & Poell (2013) identified the popularity principle as the underlying concept of SM platforms. It refers to the relational activities on SM platforms when people are connected. Aside from the number of likes and comments, the engagement of SM platforms is also measured by the time people spend using the platform. Although the individual's time on SM cannot be calculated in the existing platforms, new online platforms that only serve PDP's can be designed and utilized in further studies through personalised creativity-enhancing tools. These platforms may directly connect with SM accounts, more specifically to individual and group needs.

SM encourages user communities and similar productions after the market release. Active users may voluntarily take over where developers have no resources. In uncertainty, developers can easily follow the users' actions by observing or reading the comments. Through web analytics, service operators can examine all the users' activities, such as site visits, transactions and ways of use. This setting provides interaction between users and designers and collaboration with user-owned connected resources and services.

Even while the research emphasizes the wide-ranging connections made possible by online platforms in participatory design, it is essential to acknowledge the complexity of digital participation. Danielsson et al. (2008), Hagen et al. (2007) and Foth and Axup (2006) warn against ignoring such drawbacks and advocate a more thorough analysis of the benefits and drawbacks of digital platforms in participatory design. In keeping with Slingerland et al. (2022), who discusses opportunities and problems for distributed place-making in digital participatory design, a more thorough examination of the complications involved in a project of this size nationwide would be beneficial for the studies that build upon the current one.

Furthermore, knowledge gained from studies by Mouter et al. (2021) on participatory value assessment in the Dutch energy transition and Ali et al. (2021) on distributed interaction design in socially distancing contexts may contribute to a more thorough comprehension of the opportunities and potential drawbacks of online platforms. In order to achieve a comprehensive understanding of how to effectively use online platforms to promote inclusive participation and creative collaboration in varied design processes, expanded constructive approaches may include a critical study of these mentioned works.

Since contemporary digital platforms are becoming more and more common, PD is becoming increasingly associated in several ways networked public. The use of platforms is also increasing, including both younger and older aged persons of the community. This is believed to support creative PD practices that are often regarded as having a unique and diverse audience. The findings of this study reveal a variety of stakeholder participation means in the design process, suggesting that the roles of all parties are continuously evolving. It is suggested that new SM platforms can serve as a way for designers and users to connect and collaborate on various design projects to increase effective inclusion with opportunities to enhance effective participation and inclusion of various voices from the local and global communities.

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