A PARTICIPATORY INTERIOR DESIGN METHOD FOR A LEARNING ENVIRONMENT THROUGH THE USE OF SOCIAL MEDIA AND DIGITAL TECHNOLOGIES

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ETHICAL DECLARATION

I hereby declare that I am the sole author of this thesis and that I have conducted my work in accordance with academic rules and ethical behaviour at every stage from the planning of the thesis to its defence. I confirm that I have cited all ideas, information and findings that are not specific to my study, as required by the code of ethical behaviour, and that all statements not cited are my own.

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Date:

26.02.2024

Signature:

ABSTRACT

A PARTICIPATORY INTERIOR DESIGN METHOD FOR A LEARNING ENVIRONMENT THROUGH THE USE OF SOCIAL MEDIA AND DIGITAL TECHNOLOGIES

Keskin**,** Gökhan

Ph.D. Program in Design Studies

Advisor: Prof. Dr. Deniz Hasırcı

February, 2024

The study addresses challenges in implementing Participatory Design (PD) models in interior design, citing constraints such as time and budget. To enhance the participatory process, the research proposes leveraging Social Media (SM), Online Platforms (OP), and Digital Instruments (DI). Recognizing the complexity of the interior design scale, the study seeks to bridge the gap between design processes and PD by thoroughly analyzing their relationship. Through literature review and case studies involving the Education Volunteers Foundation of Turkey (TEGV) and Yaşar University (YU), various methods, including animated videos, AR/VR, and digital modeling, were employed to engage participants ranging from 6 to 14-year-old children, families, educators, and workers. These methods offer insights into participant roles, interaction dynamics, and communication channels among users, designers, specialists, and moderators. Despite extensive research on traditional PD processes, the study highlights the limited exploration of the impact of SM, OP, and DIs on PD. While

face-to-face methods remain valuable, incorporating digital tools strategically can provide significant benefits for moderators, designers, and users. The findings contribute to a deeper understanding of PD in interior design and offer implications for the broader design field, emphasizing the potential of SM and digital tools in enriching the participatory process. Ultimately, the research aims to provide practical insights into leading a PD process with children, emphasizing the importance of active participation and effective communication. These findings have implications not only for interior design researchers but also for practitioners seeking to enhance the engagement and inclusivity of their design processes.

ÖZET

ÖĞRENME ORTAMINDA SOSYAL MEDYA VE DİJİTAL TEKNOLOJİLERİ KULLANAN KATILIMCI TASARIM YÖNTEMİ

Keskin**,** Gökhan

Tasarım Çalışmaları Doktora Programı

Tez Danışmanı: Prof. Dr. Deniz Hasırcı

Şubat, 2024

Katılımcı Tasarım, çeşitli içerik ve ölçeklerde araştırılan bir konudur. Ancak iç mimari tasarım ölçeğinde, zaman, bütçe ve katılımcıları sürece dahil etme ile ilgili zorluklar yaşanmaktadır. Bu çalışma, sosyal medya ve dijital teknolojilerin kullanımını içeren yeni yöntemlerin, iç mimari ölçekli tasarım sürecine katılımcıları daha aktif ve eşit bir şekilde dahil etme potansiyelini araştırmaktadır. Diğer tasarım disiplinlerine göre, iç mimari tasarım süreci teknik ve sosyal faktörler nedeniyle daha fazla sorunla karşılaşabilir. Bu nedenle, tasarım süreci ile katılımcı tasarım süreci arasındaki ilişkinin iyice incelenmesi, iç mimari ölçekli katılımcı tasarımın verimliliği için önemlidir. Bu bağlamda, tasarım süreci, katılımcı tasarım, dijital teknolojiler ve üretim teknikleri, sosyal medya ve katılımcı tasarım için önemi, yüz yüze ve çevrimiçi eğitim gibi konular literatürde ele alınmıştır. Katılımcı tasarım süreciyle ilgili birçok araştırma yapılmış olmasına rağmen, sosyal medya ve dijital teknolojilerin etkileri henüz yeterince araştırılmamıştır. Bu süreçte, Türkiye Eğitim Gönüllüleri Vakfı ve Yaşar Üniversitesi İç Mimarlık ve Çevre Tasarımı Bölümü öğrencileri üzerinde vaka

çalışmaları yapılmıştır. Bu süreçte gözlemleme, animasyonlar, sanal gerçeklik ve arttırılmış gerçeklik, beyin jimnastiği, dijital modelleme, münazaralar, çizimler, sergiler, oyunlar, görüşmeler, anketler, jüriler, gözlemlemeler, pilot test uygulamaları, araştırma ve incelemeler, seminerler, sosyal medya kullanımı, kullanım testleri ve atölye çalışmaları yapılmıştır. Projenin merkezinde, TEGV Eğitim Merkezi'ni kullanan 6-14 yaş arası çocuklar, aileleri, gönüllü eğitim verenler ve çalışanlar bulunmaktadır. Elde edilen verilerin, çocuklarla katılımcı tasarım süreci, katılımcıların rolü, katılım seviyeleri ve kullanıcılar, tasarımcılar, uzmanlar ve yöneticiler arasındaki etkileşim ve iletişim gibi konularda katkı sağlaması beklenmektedir. Bu çalışmanın sonuçları, sosyal medya ve dijital araçların katılımcı tasarım sürecindeki potansiyelinin anlaşılmasına katkıda bulunabilir.

Anahtar Kelimeler: İçmimarlık, Katılımcı Tasarım, Tasarım Süreci, Tasarım Eğitimi, Sosyal Medya, Dijital Teknolojiler.

Dedicated to Silvia & Elodie

ACKNOWLEDGEMENTS

I am grateful for the chance to spend time with the TEGV organization. I have learned a lot from each of them, and I hope I can reciprocate, through my thesis and the projects, the best part of me.

PREFACE

The ever-changing design landscape necessitates novel approaches that balance established ideas with cutting-edge technologies. The present thesis, entitled "A Participatory Interior Design Method for a Learning Environment Through the Use of Social Media and Digital Instruments," aims to investigate how SM, OP, and DI can transform PD.

This study aims to develop a novel approach to participatory interior design that leverages the benefits of DI while maximizing the dynamics of SM and OP. This project aims to establish an online environment for participatory design processes that involves specialists, facilities, designers, users, moderators, and stakeholders.

The thesis explores how PD has changed, from its Scandinavian roots to its widespread use in general design. The study notes that time, money, and effort constraints make applying current interior design models difficult. However, it also highlights how SM, OP, and DI can help overcome these obstacles.

The primary investigation focuses on co-design principles and how DI and SM can enhance PD. The study investigates the redefining of designers' roles in non-emancipatory settings and highlights conflicts in online collaborations.

In partnership with the Education Volunteers Foundation of Turkey (TEGV), a set of case studies led to the adopting of the Participatory Interior Design Process (PIDP). These studies sought to integrate PIDP with SM, OP, and DI, offer research-based design solutions, and present PD strategies in an educational setting. They also sought to offer valuable tools for implementing the PD structure.

The introduction lays out the framework for a detailed analysis of the design process, PDP, digital design and fabrication methods, and social media's role. Comprehensive case studies are then used to illustrate how DI and SM are integrated into PIDP, providing insights into interactions at the participation level and helping to shape a new online PDP technique.

Subsequent chapters explore DI's potential, SM and OP's effects on PD, and the complex interplay among technology, design, and democratic consciousness. With the help of SM, OP, and DI, interior designers can improve participatory design processes, develop novel techniques, and support democratic design conditions. These are some of the fundamental questions that this investigation seeks to address.

As we set out on this scholarly adventure, I thank everyone who has helped make this research a reality, from participants and collaborators to renowned supervisors.

İZMİR

26/02/2024

<div align="right">Gökhan KESKİN</div>

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LIST OF ABBREVIATIONS

PD   : Participatory Design

PDP   : Participatory Design Process

IDP   : Interior Design Process

PIDP : Participatory Interior Design Process

TEGV : Education Volunteers Foundation of Turkey

YU   : Yaşar University

INAR : Interior Architecture and Environmental Design

SM   : Social Media

OP   : Online Platforms

DI   : Digital Instruments

OEP   : Online Education Platforms

CNC : Computer Numerical Control

CAD : Computer Aided Design

CAM : Computer Aided Manufacturing

CHAPTER 1: INTRODUCTION

Introducing DI, SM, and OP has driven a revolutionary journey for PD in recent years (Bjerknes et al., 1987; Manzini and 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 and Robertson, 2010; Schuler and Namioka, 1993). These efforts require PDPs where designers collaborate with users and empower them to influence the design process (Mulgan et al., 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 and Axup, 2006; Slingerland et al., 2022). PD has evolved, incorporating not only innovative design approaches but also pragmatic and democratic values, as evident in the Scandinavian tradition of the field (Schuler and 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, p. 59). The budget restrictions and time limitations to finalise the projects only sometimes allow an extended PDP (Sanders and 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, the study attempts to investigate how SM and DI can redefine and improve PDPs (Ali et al., 2021). The 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 and Axup, 2006). It is recognized 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 improve the active participants' involvement in the design process.

Research-based design solutions have been developed that empower stakeholders and end users by implementing PDPs that integrate SM, OP, and DI in partnership with TEGV (Bustamante Duarte et al., 2021). The study 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). The goal in incorporating these focal themes is to help research teams engage with community members, build relationships, establish trust, and deal with power dynamics.

In participation with the TEGV, a PIDP approach was adopted to create research-based design solutions to voice the stakeholders and potential users. Within the process, additional aims were;

•   Implement an introduction to the systems and methods of PD and prove the profits of applying this strategy in a learning environment.

- Providing a structure that proves how a PIDP approach can be integrated with SM and digital technologies.

- Providing methodological, conceptual, and practical instruments, suggestions, and resources to implement the PDP structure.

Case studies were practiced with TEGV children, families, volunteers, workers, and YU INAR 3rd-year students. The task was based on TEGV Education Center users between 6 and 14-year-old children, volunteer educators, and workers. Animated videos, augmented reality (AR), virtual reality (VR), brainstorming, digital modelling, digital and freehand drawings, exhibition, games, jury, pilot test, research and analysis, seminar, usability testing, observations, surveys, interviews, discussion, online contribution with SM, online and face to face workshops, and post-evaluation were carried out. Through the case study, the findings provide insights into conducting a participatory process with children, the role of participants, the degree of participation, and interaction and communication among users, designers, specialists, and moderators. Furthermore, the case study's output helped shape the new online method for PDP.

Thus, 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).

CHAPTER 2: DESIGN PROCESS

The knowledge of design processes has developed and has followed design methodology development. Many issues of academic research indicate the affairs of the 'Design Methods' movement with the improvement of systematic procedures for the overall design process management. The design process has been executed in various disciplines of design practice. In academic research, the design process was described and classified as a well-organized method of creativity to solve design difficulties. Designers have improved design processes through design practice for many years. Scholars have developed many theoretical descriptive design processes to answer the following questions: How can a design process be effectively implemented within a design project? What is the function of a design process?

Analyzing the fundamentals of the design features that must be performed appropriately in the design process helps answer these questions. The primary theories behind the design process need to be discussed to understand the purposes and functions of new systems. Examining the design processes and understanding the disciplines involved are critically important when defining a new design process.

2.1. Literature Review

The design process is variable and adaptable to describe the dynamic character of the design activity. In the 1920s, the pioneer articles on project management defined the way within the meaning of the progress of industrial designs (Morris, 1994). During the 1930s and 1950s, the design process of services should be improved to fulfil the appropriate goal for the design (Hollins and Hollins, 1991).

In the 1950s, the design process was described as the groundwork of systems and procedures of problem-solving, management, and practical research. All disciplines need to study the design process for their specific demands. These studies reveal the developing structure of process models, aiming to target problem-solving to develop the aspect of design projects.

In 1984, Archer developed a design process (Table 1) that regarded manufacturing and market fields and described the link between design and design management. The

process is structured on manufacturing engineering and looks for economic advantages as a vital product design purpose by fulfilling client needs. Therefore, which services or products are required through the design process needs clarification.

Table 1. Archer's Design Process

Activity	Stage
- Policy Formulation	Strategic Planning
- Preliminary Analysis - Feasibility Study	Design
- Design Development - Prototype Development - Trading Study	Research
- Production Development - Production Planning	Development
- Tooling and Market Preparation	Manufacturing Marketing Start-up
- Production and Sale	Production

Archer's design process examines the consequences of design practices and implements problem-solving by formulating design experiments and adjusting action methods. According to Jones (1984), the design process endeavours to resolve the struggle between productive thinking and rational analysis. It is pointed out that the design process dealing with design management is included in new product policies (Langrish, 1994, p. 191). Another significant point is the value of the design process, as management is critical to the quality of design products (Sethia, 1994, p. 303). The basic properties of all design processes that identify user needs to design the final product are taken as views. The design processes improved by these scholars are descriptive practices that define and highlight the value of creating clarifications early in the process, showing the solution-focused nature of design thinking. Table 2 contains definitions and descriptions of the design process (Adapted from Austin et al., 1999; Portillo, 1994; Smith and Morrow, 1999; Lawson, 1997; Roozenburg and Eekels, 1995; Wallace, 1990; Jones, 1984).

Table 2. Selected Definitions and Descriptions of Design Process

Author	Year	Definition
Austin, Baldwin, Li, and Waskett	1999	An aborning model completes a planning procedure with an analytical design planning approach.
Smith and Morrow	1999	A critical function of technology-based firms.
Lawson	1997	An analysis, synthesis, and evaluation activity reconciles the design problem and solution.
Roozenburg and Eekels	1995	A fundamental model of problem-solving
Portillo	1994	A design standard can be accepted as a measure of value to conceptualize, test, and evaluate the project intention.
Zeisel	1991	A well-devised complex activity contains other imaging, presenting, and testing activities.
Wallace	1990	A physical system that can deliver adequate data and methods to complete manufacture, assembly, and testing requirements.
Jones	1984	A means of resolving a conflict that exists between logical analysis and creative thought.

Moreover, the design processes were described as "rational methods," including all viewpoints from problem definition to design (Cross, 1998, p. 45). His process model forms the data links between the problem and the solution. Ulrich and Eppinger (1995, p. 34) point out that the engineering process behind the methodology is to generate a high-quality data route between customers in the target business and the designers or engineers of the product.

This design process theory proposes that designers and engineers consider user needs during the design process. The design process approach can be described in the following points:

- The design's cost, performance, and reliability should be improved through the design process to satisfy the users' needs.
- The main criteria for a successful design are performance, cost, marketability, manufacturability, reliability, and maintainability.

- Perspectives of the entire design process should include marketing and manufacturing and delicately analyze design, specification, manufacturing, and delivery restrictions.

Despite dissimilarities in determining these procedures' scopes and design conditions, they all offer the primary succession of design activities based on design specifications. Those models depend upon successfully gathering designers' necessities and mapping them onto a practical framework. Bruce Archer (1984, p. 64), an industrial designer, proposed a model of design (Figure 1). He developed a seven-stage problem-solution model that uses thinking methods to analyze design data and problems that establish theoretically based design principles. His study builds a systematic set of problem-solving techniques in which theoretical design processes are structured to form a sequence of intuitive, discursive steps and interactive feedback-based phases. Figure 1 shows a theoretical approach sample adjusted from Archer's finding, interested in problem-solving.
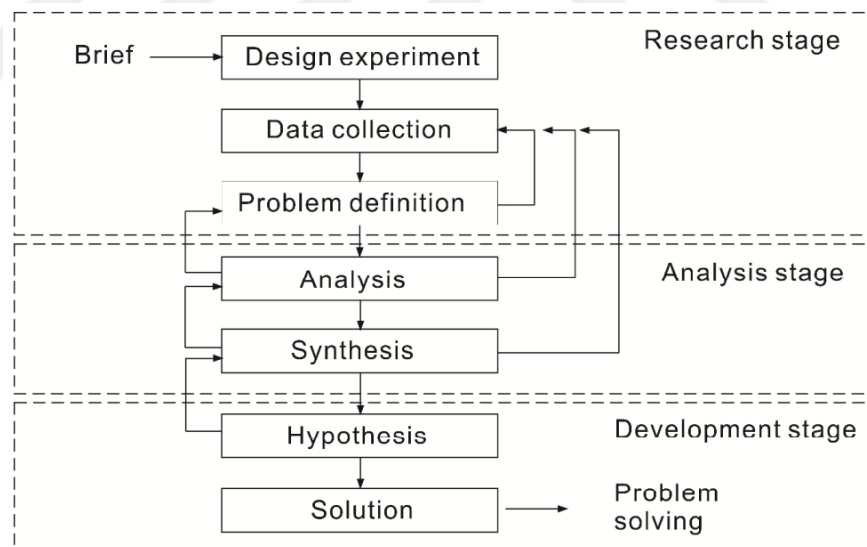
Figure 1. Archer's Theoretical Design Process (Source: Archer, 1984, p. 64)

Asimov also represented the horizontal sequence as a cycle that began with analysis and proceeded through synthesis and evaluation to communication (Rowe, 1991) (Figure 2). He also implies that communication evolves from abstract to concrete through the process.
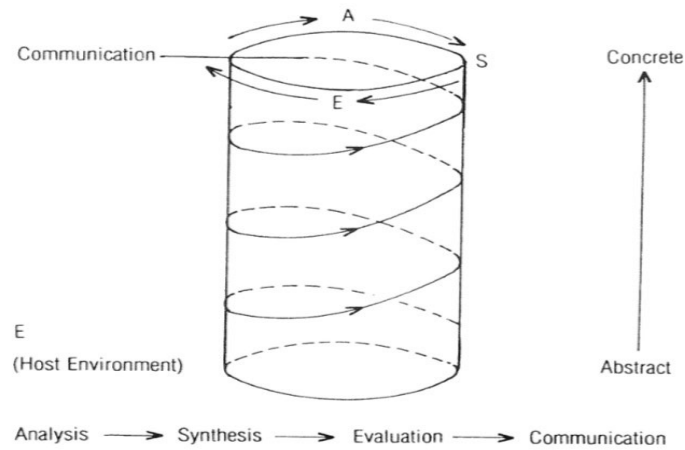
Figure 2. Asimov Design Model (Source: Rowe,1991)

2.2. Managing the Design Process

The design process is handled at two statuses: Corporate and project levels (Topalian, 1980, p.9). Topalian begins by defining the problem in the design process. The design process can be seen as a management problem, essential to design duties and the design result (Cooper and Press, 1995, p.7; Mallick, 2000, p. 69). The problem must be adequately understood before designers start with a design solution. This approach refers to understanding difficulties that guarantee communication among designers and customers to make the design process more effective (Topalian, 1980, p.9).

Hollins (1994, p.155) defines those standard models as using comprehensive lists to encourage users to understand what they must do. From this point of view, in 1984, the British Standards 7000 design process was publicized. BS 7000 was chosen as an essential, general procedure that describes the outcomes of every step and gives the data for the following stage. The BS 7000 "Guide to Managing Product Design" successfully unveiled the idea that there should be other standards based on the original one but focused on the different fields. These guides helped the designers to concentrate on the management of design.

A look through the history of standards will clarify its importance. In the 20th century, a significant number of national standardization organizations were founded, including

organizations that are recognized as the British Standards Institution (BSI) and the American National Standards Institute (ANSI) (Russell and Bolin, 2005). The purpose of these organizations was to formulate sets of rules for the design process to help the firms finalize their designs. International standards were essential in the second half of that century. The International Organization for Standardization (ISO) was founded in 1947. It serves large documents of standards such as standardizing processes of quality management (ISO 9001), environmental systems (ISO 14001), risk management (ISO 31000), and social responsibility (ISO 26000). These actions by ISO have influenced two essential factors of organizations: organizational structures and administrative procedures. Also, several civil society associations have appeared for the standardization; examples include Fairtrade International (Vifell and Thedvall, 2012), which sets standards for a wide array of products, and the Forest Stewardship Council (Council and Boström, 2010), which sets standards for sustainable forestry all over the world.

2.3. Interior Design Process (IDP)

The IDP needs to be studied to clarify each step for the new method for PDP. The IDP can be classified into the following phases: conceptual design, schematic design, design development, prototyping, presentation and evaluation, detail development and construction documents, bidding, and construction administration (McGinty, 1979). The design process is not static and thus must be continuously experimented with.

In the schematic design phase, the general features of the building are approved. Essential issues are named, and initial design decisions are made. At the same time, the design development phase, the figure, and the purpose of the whole project are defined. The prototyping, presentation, and evaluation phase is a repetitive process during which proposals are presented for client review and design decisions are finalized. Following the approval of the design, details are developed, and construction documents are produced. As the construction reports near completion, they are released for bidding, and a builder is selected. The final phase of the design process is when the designer administers the construction, interprets changes, and judges performance (Campbell and Wells, 1994) (Figure 3).
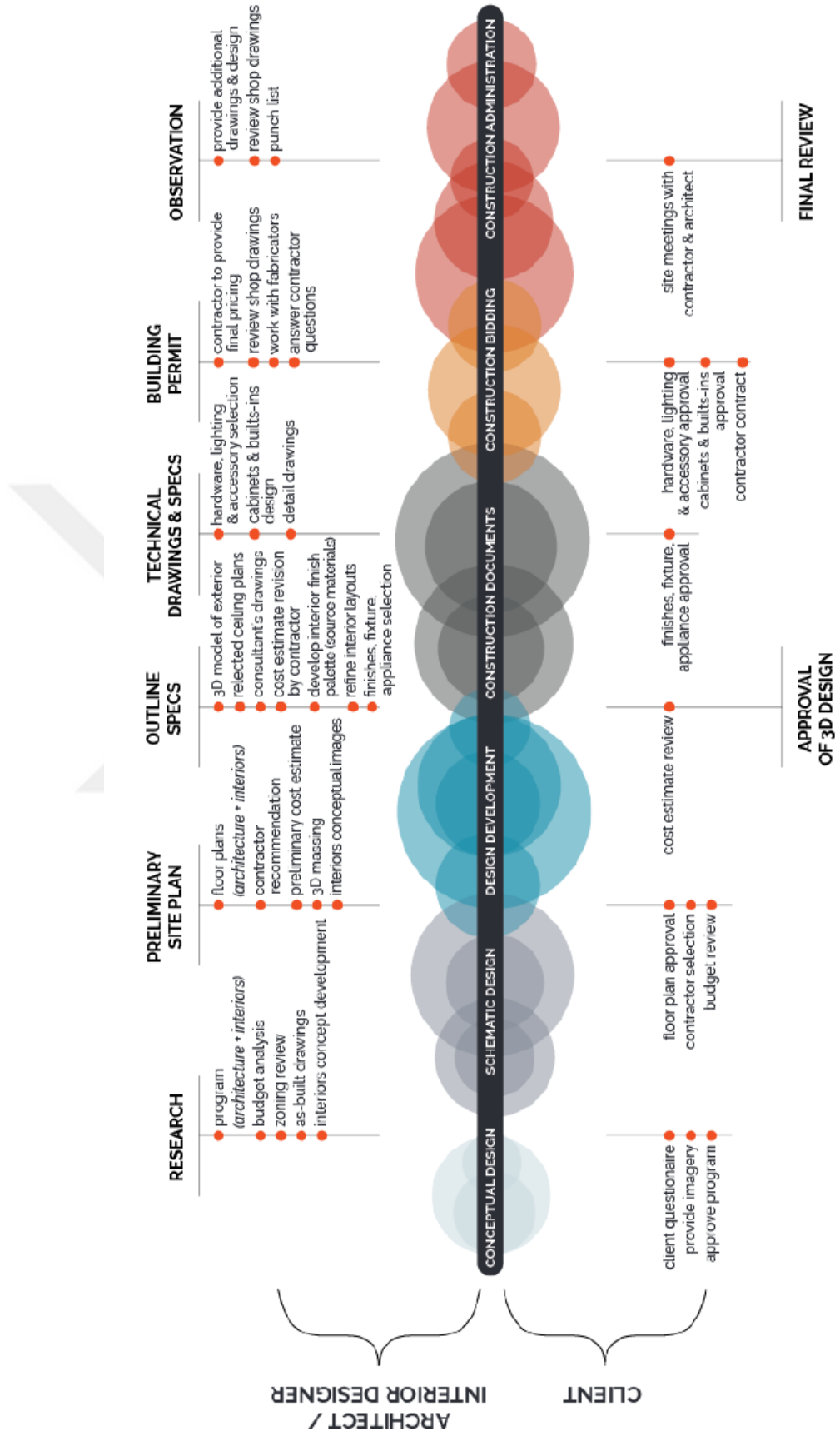
Figure 3. Chart of the design process

Parallel to Cochrane and Munn's process model (2016), the current study's stages consist of concept development, spatial development, technical drawings and model, detailing and three-dimensional representation, and finalization.

IDP implies elaborating ideas, space solutions, and design elements to solve a spatial problem. According to Stein (1953, p. 312), "the creative experience" or "the creative process" that designers undergo before the final design idea is crucial. During the creative process, designers follow specific steps to reach a creative idea, even though how it is physically conceived in the human mind is still debated. Gero (1994) shows that the design process itself stimulates the generation of creative solutions. In addition, existing research points out that when primary resources are combined, they incisively affect the creative new ideas (Baughman and Mumford, 1995; Boden, 1998; Estes and Ward, 2002).

In interior design, educators sustain that design education should be based on determining design process leads and promoting creativity. Nonetheless, some aspects of the design process can be subjective due to students' styles of ideation, preferences, and tendencies. Thus, there is a need for a systematic, structured approach that does not oppose the more accessible method in the interior design process. Various studies have focused on the relationship between cognitive methods and creativity (Meneely and Portillo, 2005; Pei-Shan et al., 2009). However, how different cognitive behaviours and the structured combinational ideation process interact once previous concepts, ideas, and knowledge are combined remains unexplored.

2.4. Proposed Method
According to the design process chapter analysis, the proposed PDP is split into seven steps: investigation, initiation, interaction, live workshop, post-interaction, findings, and post-evaluation. Archer's Theoretical Design Process has three stages: research, analysis, and development (Archer, 1984, p. 64). The Asimov Design Model has four stages: analysis, synthesis, evaluation, and communication (Rowe, 1991). Both models have a similar approach to the design process. Even though the process has a linear timeline, there may need to be several reassessments that may cause it to go back to the previous step/s. Like other design processes, IDP also starts with the research part that includes the first two steps of the proposed PDP. In the proposed model, the first

step is called the "Investigation" part. In this step, Moderators work on the problem definition, data collection, and data categorization to prepare a detailed brief for the designers. The second step is called the "Initiation" part. In this part, moderators work with designers to analyze the collected data. They work on the PDP to decide how to proceed. The third step is the "Interaction" part, which is when users start being part of the PDP. Interaction, Live Workshop, and Post-Interaction are parts that all parties can contribute actively. Moderators and designers work on the findings in the last two steps and analyze the post-evaluations. The new PDP model proposes the Design Process and PD in a consecutive relationship (Figure 4).
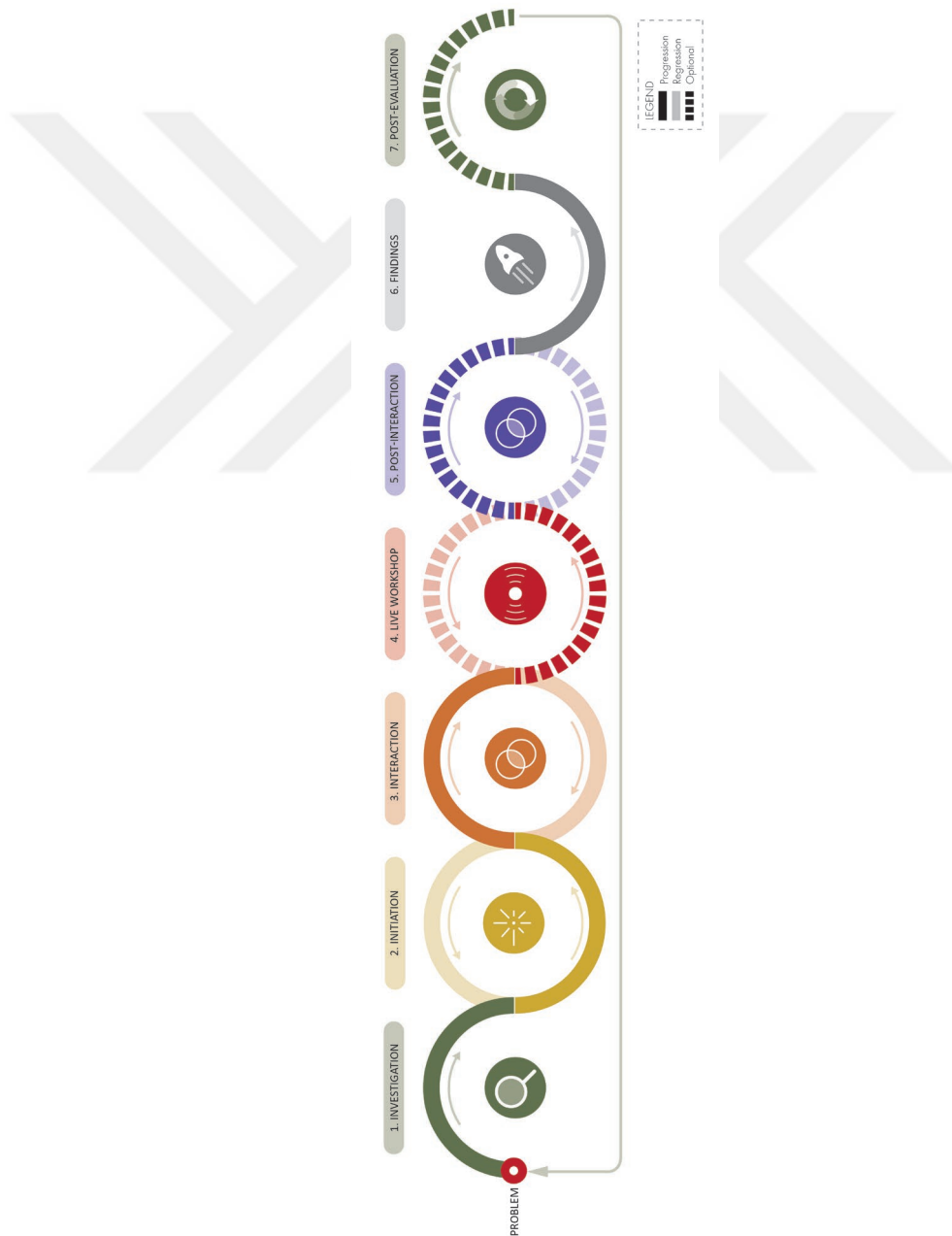
Figure 4. Design Process Proposal

CHAPTER 3: PARTICIPATORY DESIGN (PD)

PD is a method to bring all stakeholders and users into the design process through a collaborative approach. Typically, the design process only involves the user and designer, but a PD approach also includes all stakeholders as active participants in the design process. The history of participatory design can be traced back to Plato's Republic. In theory, citizen participation can affect public decisions through a democratic process based on freedom of speech, voting, and equal representation (Sanoff, 2011). PD was faced with different challenges in each new decade. First, workplace disagreements associated with information technology where strategies for a mechanic were concerned by the PD field (Bjerkness et al., 1987). Later, PD has become more involved in public fields and daily life with the current tools and strategies. Relaxation and pleasurable engagements take roles as much as work-oriented productive activities, but this does not mean productive design activities are not concerned. The public scale process and the field of innovation bring considerable difficulties for PD (Björgvinsson et al., 2010).

The concept of participation is a broad category that includes various forms of decision-making (Wulz, 1986). It can be effectively addressed by considering the goals and responsibilities of the participating group. For instance, if the goal is to involve citizens, then the concept should be conceptualized as asking simple questions. Who should be involved in the planning and implementation of participation activities? Individuals, groups, and specialists should be identified to ensure they are involved in planning and implementing the activities. The program's goal should be clearly defined so the participants can understand their participation during the process. For instance, if the goal is generating ideas, the program should be geared toward generating positive attitudes. Where do we wish the participation road to lead? What are the goals? People should be involved in the planning and implementation of participation activities. The methods used should be designed to meet the objectives and requirements of the program. For instance, community workshops and charrettes can allow diverse groups to participate in the program. However, public hearings can provide little or no

information and do not promote community support. Before planning begins, the parties involved must be informed about the program's scope and goals.

The primary purpose of participation is to provide information exchange and resolve conflicts. It also facilitates the design process by allowing the participants to participate actively. It reduces the participants' anonymity and management concerns. The goals of participation are:

- Being involved in the design process can also increase people's confidence in the decisions made. It can also make them more likely to accept the plans and decisions.
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- Being involved in the design process can also increase people's confidence in the decisions made. It can also make them more likely to accept the plans and decisions.

The design process should also be transparent and open to maximize the learning process. This can be done through effective communication media that can help people feel that they are participating in a process designed to involve them in making decisions.

3.1. The Meaning of User Participation

In the 1960s, a sense of community consciousness defined a new movement, which arose in social responsibility and participation in defining the built environment. Davidoff articulated strong arguments that the field of planning needed to widen its focus from the physical plan to the many aspects of the urban political system, and he often contended that an integral component of this was the development of a different type of planning education (Rao, 2012, pp. 226-241). Davidoff is possibly best recognized for his seminal article, "Advocacy and Pluralism in Planning (1965),"

which captured the soul of a new change in the area and motivated a generation of young planners to express the opinions of the disadvantaged. The advocacy planning movement arose in the UK and USA; under Paul Davidoff's intervention model, community design centres emerged to include disadvantaged people in developing their planning goals. Design and planning professionals refused traditional intervention methods to advocate the rights of all citizens to participate in the implementation of the physical environment. The government financed these programs by encouraging non-professional citizens to participate in the design process based on voluntary participation (Sanoff, 2005).

At the beginning of the 1970s, northern Europe adopted participatory practices. In Norway, computer professionals and members of the Iron Metalworkers Union fought for workers to significantly influence the design and introduction of computer systems in the workplace (Spinuzzi, 2005). In Scandinavia, many projects were developed to increase the quality of work-life through the collaboration of computer-system designers and worker organizations. The design philosophy of Pelle Ehn, "Tool Perspective," defines a dependent relationship between experienced users – who have a practical understanding of tools and materials – and design professionals – who know new technical possibilities. Thus, computer-based tools can be designed more effectively if the process involves the practical knowledge of users (Ehn, 1992).

PD is a conceptual approach that uses various tools and systems to create complex yet under-designed systems. For Fischer and Giaccardi (2006), Metadesign is a conceptual framework. Metadesign is a strategy that can help designers avoid mistakes and keep their participatory design processes flexible. They also argue that a Metadesign strategy is necessary as designers usually need to learn how to communicate with users effectively. They believe this strategy can be done by under-designing a system so users can easily modify it.

In their 1996 paper, Star and Ruhleder argue that the beginning of design can be traced back to systems and tools. This idea is that new tools and infrastructures can be considered relational ideas. They also acknowledge that processes and practices constantly evolve, suggesting that systems development should be regarded as a process of infrastructure. The infrastructure approach refers to developing systems and

tools, constraining what can be designed. In his 1994 paper, Heinrich Berg stated that new techniques and tools should be seen as a continuous convergence process, where the methods and settings consistently change.

The PD has various methods, techniques, and practices that support mutual learning. These include but are not limited to co-design, participatory approach, and Metadesign. The topic of participatory work has remained a prominent one. Research in the PD focuses on various aspects of participatory work, including the micro-dynamics of sessions and the shaping of relations (Light and Akama, 2012). The literature shows multiple ways to arrange participatory work (Sanders et al., 2010). Over the years, various issues related to PD have been addressed, such as school PD (Barendregt et al., 2016) and special needs children (Makhaeva et al., 2016). As a result, the various disciplines within the PD have developed their own set of methods and practices.

In interior design, there are three principal attitudes toward the meaning of user participation (Negroponte, 1975, pp. 353-366). The frequently used expression outlines the first one: "We need more information," which stands for lack of information about the users' needs, preferences, and opinions regarding their residential environment (Sanoff and Sawhney, 1972). The information is usually obtained through 'scientific' methodologies. The knowledge acquired with these methods is manipulated and superintends the findings, which are partly correct and generalized. The architect is the final arbiter of design solutions due to his/her education. Rubinger (1971) claims that there are better and worse ways to attempt design intentions, and professionals are supposed to be masters in design.

The second attitude toward participation is "advocacy planning," a defender of professionalism and is concerned with fiscal and political mobility. Users' needs must be heard and seriously considered to affect the design solution and bring renewals. A small group or a single professional are the "decision-makers" over a broader group. This case makes it hard for each citizen to attain satisfactory results. In the third approach, the Yona Friedman paradigm, each individual is the architect, and to each of them is conferred what Wellesley-Miller (1972) defines as control. Thus, the architect is displaced from the role of translator.

There are many benefits to be gained from participating in a community's design and planning process. 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). The professional also benefits from the involvement in the design and planning process. It provides them with up-to-date information and makes them more likely to make informed decisions.

Since there is a diversity of expression during the design and planning process, a transparent solution will be needed to ensure that the decisions made by the community are understood. This can be done by establishing public forums that encourage participation. Aside from receiving as much input as possible, the involvement of the user group and the professional in the design process helps strengthen the product.

Different levels of participation can be expected depending on the nature of the project and the circumstances. According to Burns (1979), participation can be categorized into four categories to help the community agree upon the project's direction. Participants can understand the world and the various factors influencing their decisions. This process can also help them communicate effectively with one another. Through this process, participants can also understand the various factors that affect their lives and the project. It can be done by sharing information and ideas to ensure the project's goals and objectives are preserved most in the planning process. The next step is decision-making, where participants work from their awareness and perceptions to develop a program for the situation they are considering. This stage involves coming up with physical designs based on their priorities. Implementing community-based planning processes can also result in fatal results as they stop people from making informed decisions. This is because they ended up with a project that failed to meet the community's expectations. To avoid this, participants should stay involved in the project and take responsibility for the results.

Different people have distinguishable levels of participation. For instance, depending on the nature of the project and the circumstances, people are expected to have varying levels of involvement (Sanoff, 2000). The goal should be communicated to the

community to carry out the task effectively. The planning process should also include a determination of the project's objectives. For instance, if the project aims to generate ideas, the participation should focus on that objective. Other objectives include reviewing a proposal or identifying a particular area of conflict.

3.2. *Types of User Participation*

Different types of participation are also associated with different circumstances. For instance, a person can help shape a building by acting as its client. Different factors, such as the project's complexity and the client's expectations, can affect a person's participation. For instance, acting as a client can be a subtle participation form. The complete form of participation is when people design their end product. It can be viewed as experiences that can help them envision the future. These include goal setting, programming, and design.

People can also participate in issues in response to their perceived interests. As long as their interest persists, they can still be involved. Different groups of people will also participate in various types of issues. They can be categorized into economic, environmental, and political interests. People can be involved if they see themselves as being affected by an issue or are interested in the outcome of a decision. They can also be involved if they perceive a potential health risk or environmental hazard caused by the proposed action. The composition and size of the people participating in decision-making will vary depending on the process (Creighton, 1996).

Participants should have the necessary expertise and interests to be involved in the decisions made. There will always be varying levels of involvement due to various factors such as the level of expertise, the willingness to commit time, and the roles they play. People are more likely to participate in some parts of the process than others. In some technical regions, people with expertise in analyzing data and conducting studies may be instrumental in making decisions. On the other hand, in other parts of the process, people may be more inclined to participate in making decisions.

Sherry Arnstein's ladder of Citizen Participation, published in 1969 in the Journal of the American Planning Association, is accepted as one of the most prominent

participation theories (Figure 5). Using the concept of the "ladder of citizen participation," Sociologist Roger A. Hart (1992) wrote a book called Children's Participation: The Theory and Practice of Involving Young Citizens in Community Development and Environmental Care for UNICEF. This work put the work of young people and adult partners worldwide in the meaning of global action for participation. The "Ladder of Children's Participation," also called the "Ladder of Youth Participation," is one of many essential instruments from the book. It is designed to encourage people working with children to think about the purpose and nature of the activities that they participate in. According to Hart, activities that involve children in predetermined roles should be distinct from those that involve them in actual participation. While it is possible to have a positive and uplifting experience with children participating in various activities, it is also essential to ensure that the activities are adequately organized (Hart, 1992) (Figure 6).
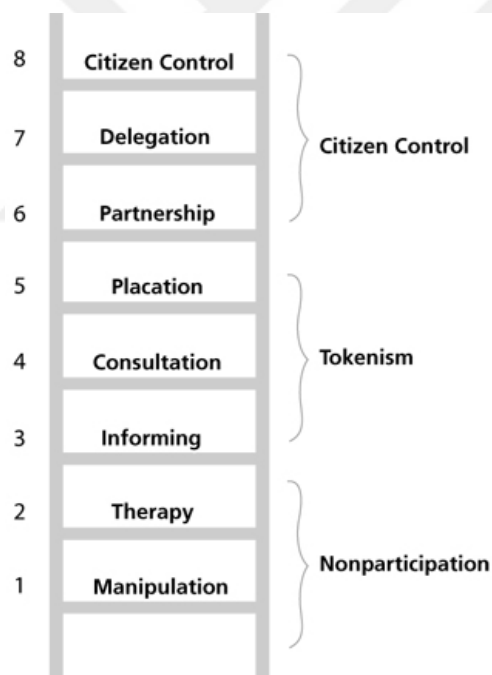
Figure 5. Arnstein (1969) Ladder of Citizen Participation
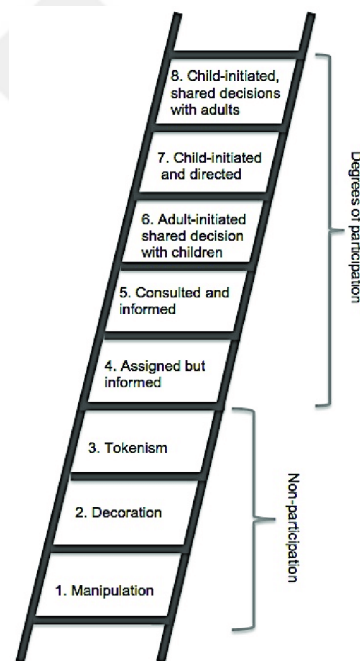
Figure 6. Hart's (1992) Ladder of Participation

Hart's Ladder is divided into two main parts: non-participation and degrees of participation. At the non-participation level, if children do not understand their parents'

or other adults' roles and responsibilities, this manipulation is not an appropriate way to introduce democracy. It can also lead to adults needing to be more confident in influencing a particular issue. This type of manipulation is not transparent to the children and could also prevent other adults from participating. Children may be asked to create their ideal playground but are not given feedback in another situation. Instead, adults come up with a design they claim is children's.

On the other hand, a drawing competition would not be manipulative since the criteria would be explicit. At the level of decoration, although children are being informed about the cause, they have yet to be given a say in the event's organization. In another instance, adults pretend that children do not inspire the cause but are still using them to boost the cause. In tokenism, children are often invited onto a panel and are given a voice, but they need to be given a choice about the topic or the communication style they use. They are also not allowed to discuss their ideas or formulate opinions.

The second step of the Ladder is to establish if a project is genuinely interactive. This can be done by looking at the various levels of participation.

- Do children understand the intention of the project?
- Do they know who made the decisions about their involvement and why?
- Do they have a fundamental rather than decorative role?
- Was the project explained to them before they were invited to volunteer?

The level of participation that children are assigned varies depending on the project. They can only make limited changes to their role at the assigned but informed level. Children are involved in a project as consultants for adults at the consulted and informed level. They have a voice, and their opinions are taken seriously. At the adult-initiated level, children are involved in decisions that adults make. Although adults usually start projects, the decisions made by young people are shared. Even when children come up with an idea, it can be hard to let them do it themselves. There are

many examples of child-initiated projects where children develop their ideas and carry out complex tasks cooperatively. However, there are also many community projects where adults direct the project.

According to Hart, the last level, where the decisions made by adults are shared, is also rare. He also states that these types of projects rarely happen because adults tend to be less attuned to the interests of young people. This means these projects are usually only used by older teenagers with the necessary skills to carry out the projects. An essential point of discussion is how these projects are viewed as an advance compared to child-initiated and directed.

The current research on design management has made essential attempts to examine a user-centred design (Chayutsahakij and Poggenpohl, 2002; Vredenburg et al., 2002; Veryzer and Borja de Mozota, 2005). Some scholars insist that design research gradually shifts from a user-centered to a participatory approach (Muller and Kuhn, 1993; Schuler and Namioka, 1993). The Sanders map is critical to see the participatory design's place and the other methodologies (Figure 7). In Figure 7, the vertical elongation describes the purpose of the design research paths. The horizontal elongation describes the mentality of those who practice and teach design research. User-centred design is an approach to designing and developing software or products where a professional team focuses on user needs iteratively throughout the product lifecycle (Norman and Draper, 1986). It has focused fundamentally on activities and methods at design time in the systems' original development. In user-centred design, designers create solutions that assign users to passive roles. User-centred design is considered because it allows charming users to inspire innovative ideas.
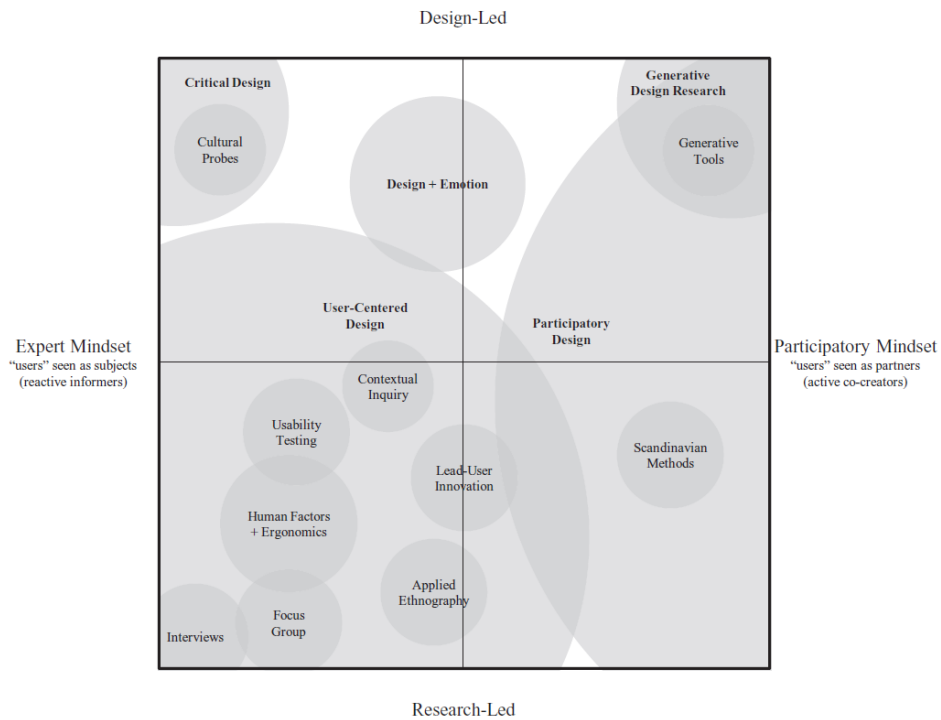
Figure 7. Map of Design Research Methodologies Adapted from Sanders

User participatory design is when users either contribute to the design and content development process or manage the entire development process independently. Users become more actively involved in the process and become a key group of stakeholders. They own the end product in a way they usually do not in the more traditional user-centred design approach (Schuler and Namioka, 1993). It involves users more deeply as co-designers by empowering them to propose and generate design alternatives. The PD supports diverse thinking, planning, and acting, making work, technologies, and social institutions more responsive to human needs. It requires the social inclusion and active participation of the users. Participatory design has focused on system development during the design process by bringing developers and users together to envision the contexts of use. Despite the best efforts regarding the design process, systems need to be evolvable to fit new needs, account for changing tasks, and incorporate new technologies.

The degrees of participation can vary. Phil Treseder's model re-works the five levels of participation from Hart's Ladder of youth participation in two remarkable ways (1997). Firstly, Treseder moves away from and returns to some of the most common judgments of the ladder metaphor, demonstrating that there is neither a continuous

hierarchy nor a precise sequence in which participants should constantly be developed. Secondly, Treseder claims that their demands are more comprehensive than the involvement of young people. However, they cannot engage in youth-started and directed projects. They must be enabled adequately to participate thoroughly (Treseder and Smith, 1997) (Figure 8).
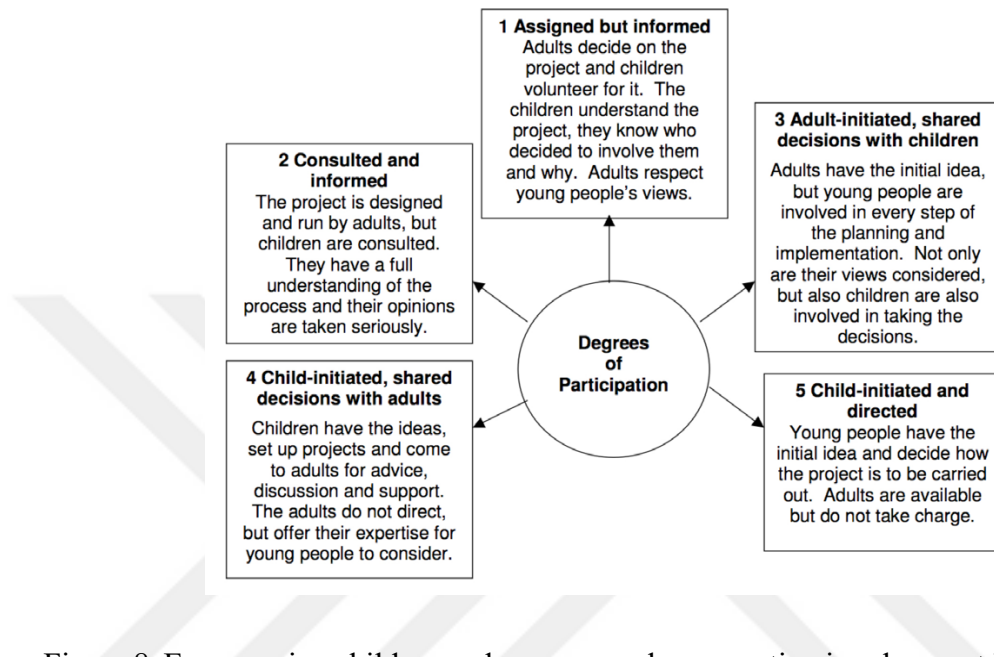
Figure 8. Empowering children and young people: promoting involvement in decision-making (Source: Treseder and Smith, 1997).

Although public participation programs usually involve the general public, they should also be informed about the issues so that the general public can make an informed decision. People should also be informed about the consequences of not participating. This level of participation should also involve the involvement of all groups within the community.

3.3. Identification of User Needs and Variety of Users

The complexity of the interaction between the various components of the design process and the citizen participation is far more important than the sum of its components. Planning methods can handle the various needs of people or groups regarding their environment and culture.

There is also a need for more knowledge about the mechanisms that guarantee just and active participation in the design process. Creating a laboratory where the user's emotions could be created would be very helpful for the architect in solving the design problem.

Most of the time, making the user part of the design process is unsuccessful. If the participant is not part of the design process, the data collection process should not continue. The architect or researcher must contact the client to ensure the user fully understands the process's importance.

The user types have the most demanding and long-term goals when designing a project. The other clients can be private or public sectors, local authorities, or public institutions. The main difference between their interests and the users' needs is their different constraints and goals.

The designer should also identify the types of users affected by the project. These include people already known to the organization and potential new users. The former refers to individuals already expected to be users of the interior space, while the latter is for those who have yet to learn about the organization (Alexander et al., 1975). Different types of external users can be identified depending on their connection to the project. For instance, transitional users might leave the environment but still stay. On the other hand, adjacent users might be affected by being in the same environment. The project's goal is to create a user-friendly system designed to meet the needs of external and internal users.

Through participatory processes, children and youth can become more socially productive and contribute to society. They can also develop a sense of belonging and participate in community activities. Due to limited opportunities, children and youth often need help making themselves more socially productive. For instance, a school can prevent them from participating in community activities and developing their responsibility.

Isolated environments can also prevent children from developing the necessary social skills and behaviours. For instance, they might develop an unhealthy relationship with

their peers due to the lack of external validation (Kurth-Schai, 1988). The development of children and youth is also closely related to the well-being of communities and families. Both are long-term strategies that can help reduce the number of children and youth experiencing various social problems. Community youth development was conceptualized as a framework to strengthen the ties between young people and communities. It was also designed to help them develop responsibility and social skills (Pittman, 1996).

One of the essential steps that children and youth can take to become more positive and contribute to society is to develop their conceptions. Through community youth development, children and youth can also become more involved in the decisions that affect their environment. They can also contribute to the development of their local communities.

3.4. Roles of Participants

The fourth edition of "The Citizen's Guide to Community Planning" is the official guide to community planning. As the role of the citizen has become more significant, the number of actors has also increased. The role of the citizen has become more complex. Instead of being a top-of-the-pyramid decision-maker, the citizen now becomes a pyramid-maker. This new structure allows professionals to create the conditions for implementation, but they no longer have the final say on the results (Duerksen et al., 2017).

Citizens get bogged down by the technical details of the project. According to Surowiecki (2004), the crowd's wisdom can dissolve the power of an expert. He claims that expertise is incredibly narrow, and while it can be used to perform surgery and fly planes, the decisions must still be made with the group. Sanoff (2000) argues in his book that experts must make better decisions than the community. He claims that many decisions are complex and require the expertise to analyze and comprehend them.

In Building Democracy, Towers (2003) noted that collective architecture could be considered a chimaera if the group relies heavily on an expert designer. This could also lead to the group missing the vision of the state and the region. Communities that design themselves can provide a comprehensive view of current affairs. However, they

need help seeing the potential solutions or the conflicting policies between different levels of government. Without an expert in the field, it is no wonder that the contradictions between different policies often emerge.

While Surowiecki claims that the professional is more likely to be effective at identifying and solving problems, Sanoff (2000) claims that the ordinary individual is less likely to be able to do so. The concept of community participation is a remnant of the old model of community involvement, where the community was only used to gather information and ideas, leaving the planning and implementation to the professionals. The point is that collective members are often more intelligent than the individuals they are helping.

The role of the professional is broader than identifying and solving problems. Instead, it involves providing a framework for exchanging ideas and formulating practical solutions through a process known as facilitation. Participants should be organized and coordinated to generate helpful information through people-centred practices. According to Anirban Pal, the skills needed for this process include those skilled in communication and people-centred practices. While studying the various aspects of public participation in India, Pal discovered that the issues that arise during the process are usually cultural. To effectively address these problems, the facilitator should thoroughly understand the people's cultural backgrounds (Pal, 2008).

In his 2008 book, Patrick Condon advises that the facilitator should lead without leading. This idea is similar to the saying, "Be invisible." He also uses a chapter from the Tao Te Ching to explain this concept. According to Lao Tzu, the best leaders are those who are not known to exist. He said the leader should remain silent as he or she watches for signs of failure, such as people acting too aggressively or leaving the conversation without talking. A leader should only speak once during a meeting, and he or she should only ask targeted questions. After the group stops talking, the leader should get the group going again.

3.5. Difficulties Related to User

The increasing number of people participating in design has led to a demand for more involvement in public projects. However, despite the importance of citizen involvement, it is still the most common source of conflict and confusion in communities. While the process is the main factor preventing people from participating in planning and design, other factors, such as assumptions about participation, can also prevent them from doing so. Participants are often discouraged from participating in planning and design processes due to the need for more expertise and the potential conflicts that could arise during the project. The complexity of planning and design issues can also prevent people from participating. For instance, if a planning organization defines a problem as too technical or complex for non-professionals, it could create political passivity and ignorance (Forester, 2018).

Another reason people cannot participate in design processes is because they are so similar. Despite different people's preferences and needs, ignoring these differences can lead to dissatisfaction. Being involved can also threaten the role of professionals and managers in the design process since it implies they will lose their authority over the decisions made. One of the most effective ways to improve collaboration in the design process is by having everyone share their expertise.

Another area for improvement is the absence of a common language due to the difference in the researcher's and participants' backgrounds. Even if the users have the same language, their language may be kept from the designers when developing a project. For instance, the designer's view of the environment differs from the user's. The user's values need to be transferred to the designer world. The user may need help recognizing and communicating his values to the designer. This communication group must be established to enable users to explain their goals and interests clearly.

Another main issue for the PDP is the need for more interest. Most people want to avoid participating in the design process since it affects their lives. This is mainly due to time constraints and a need for more interest. Also, minority groups are not likely to join the design process since they are already fighting for a living.

For a public-scale project, many participants can create a possibility of ending up in chaos. Participants have to feel that their words are heard. Keeping them in the decision process increases the feeling of belongingness. Being involved can also be very time-consuming and expensive. Relying on professionals with specialized knowledge and broad experience can also be costly.

Every effort should involve people affected by the decisions made regarding the design and planning of projects. This usually involves contacting individuals and groups and schools and clubs.

During the PDP, there may be conflicts between various groups and individuals. One theory states that conflicts occur when people are involved in projects that do not align with their goals (Moore, 2014). Individuals tend to conflict due to their varying goals and values. They may also have different strategies and actions when making decisions. These conflicts can also be caused by their varying information and values (Lozare, 1990).

Although conflicts can be very harmful, they can be resolved through cooperative problem-solving. The only adverse effect of avoiding conflicts is undermining the participants' effectiveness. By managing conflicts, people can reduce their time doing the same tasks and improve efficiency. It also helps them understand the other person's perspective. Confronting and resolving conflicts helps people feel more empowered and confident. It also helps them develop a better understanding of their fellow humans. Learning how to manage conflicts can improve the well-being of individuals and organizations (Tjosvold, 2000).

3.6. Overview of the Main Participation Models

Each participatory design process is unique because of the site's uniqueness, users, moderators, and designers. Even uniqueness is one of the biggest challenges of the PDP; throughout history, academicians have latched on to too many different participation models to clarify the PDP. In that part of the research, participation models will be listed. The ones related to similar topics will be analyzed starting from "1969 Sherry Arnstein Ladder of citizen participation" until the 21st century (Table 3).

Table 3. Participation Models

	Participation Models	
Year	**Name**	**Author**
2020	The Patient Leadership Triangle	David Gilbert
2019	Balanced E-Participation Index	Ali et al.
2018	Lansdown's Model	Lansdown et al.
2017	The Community Engagement Components Practical Model	Ahmed et al.
2016	Canadian Union of Skilled Workers (CUSW) Participation Model	CUDW
2016	Les Robinson's Curiosity-Ometer	Les Robinson
2015	The Engagement Triangle	Capire Consulting Group
2015	Parliament's Public Participation Model	Parliament of the Republic of South Africa
2014	The International Association for Public Participation (IAP2) Australasia "Community Engagement Model"	IAP2
2014	Scotland's Digital Participation Pathway	The Scottish Government
2012	Bryer's Model of Social Media Participation in Urban Infrastructure Projects	Thomas A Bryer
2012	Kaizen's Archetypes of Community Participation	Kaizen Partnership
2012	The Yinyang Model	Shier et al.
2011	Typology of Youth Participation	Wong et al.
2011	Six Principles of Online Participation	Tim Davies
2010	Changing Views on Participation	Pedro Martín
2010	Ladder of Online Participation	Bernoff & Li
2010	Online Participation Across Age	Rick Wicklin
2010	Three-Lens Approach to Participation	DFID-CSO
2010	Behavior Grid	BJ Fogg
2010	The Participation Tree	Harry Shier
2009	Key Dimensions of Participation	Driskell & Neema
2009	Matrix of Participation	Tim Davies
2009	Pathways Through Participation	NCVO & IVR
2007	Participation 2.0 Model	New Zealand
2007	Spectrum of Public Participation	IAP2
2007	Engagement in the Policy Cycle	Diane Warburton
2007	Online Participation Behaviour Chain	Fogg & Eckles
2007	Lundy's Model of Child Participation	Laura Lundy
2006	Four Cs of Online Participation	Derek Wenmoth
2006	Power Law of Participation	Ross Mayfield
2006	Levels, Spaces and Forms of Power	John Gaventa
2006	The CLEAR Participation Model	Lawndes & Pratchett
2006	Four L Engagement Model	Tony Karrer

Table 3 (Continued). Participation Models

2005	Varieties of Participation	Archon Fung
2005	Silverman's Citizen Participation Continuum	Robert Silverman
2005	Five Components of Participation	Robin S Smith
2003	Ladder of volunteer participation	Adam Fletcher
2003	Youth Engagement Continuum	FCYO
2002	Triangle of Youth Participation	Jans & de Backer
2002	Youth Participation in Society	Jans & de Backer
2002	Dimensions of Youth Participation	David Driskell
2002	Seven Realms of Participation	Francis & Lorenzo
2001	Active Participation Framework	OECD
2001	Pathways to Participation	Harry Shier
2001	Crity Model of Participation	Clare Lardner
2001	Strategic Approach to Participation	UNICEF
1998	Wheel of Participation	Scott Davidson
1997	Degrees of Participation	Phil Treseder
1997	Rocha's Ladder of Empowerment	Elizabeth M Rocha
1996	Typology of participation	Sarah White
1995	Typology of Participation in Development Programs and Projects	Jules Pretty
1994	Framework for Participation	David Wilcox
1993	Ladder of Participation for Waste Management	Peter M Wiedemann & Susanne Femer
1992	Ladder of Children Participation	Roger Hart
1969	Ladder of Citizen Participation	Sherry Arnstein

Sherry Arnstein's ladder of citizen participation, published in 1969, was mentioned to emphasize its importance for the PDP approach. In 2019, the publication of Arnstein's "A Ladder of Citizen Participation" celebrated its 50th anniversary. It has been regarded as one of the most influential articles on public participation in planning history. Over the years, numerous other models have emerged from the book. More than two decades later, Roger Hart 1992 re-organized the ladder for children and youths in his book "Children's Participation: The Theory and Practice of Involving Young Citizens in Community Development and Environmental Care for UNICEF." The popularity of Hart's ladder of participation has also led to new models that claim to help people understand participation in various ways. In 2012, Karsten published A Chase through the Maze of Participation Models (Corney et al., 2022). In 2023, Abbott and Touchton presented various models covering various aspects of public participation. While these are not all applicable to every situation, they are helpful in

some way to working with young people (Abbott and Touchton, 2023).

George Box's words apply to the many possibilities in statistical analysis. None of the available models can fully represent the diversity of the expected outcomes from statistical analysis. In considering how models can be helpful, it is essential to remember that all of them are wrong (Box, 1979, p. 201). According to various citation indices, statistical models have become more prominent due to their accuracy. They are not necessarily more accurate than other models because they are valuable tools for policymakers and scholars. This research aims to discuss the various models used in youth work practice.

The most well-known model in the field is the ladder created by John Hart in 1992. The work of Arnstein inspired his work. This began a series of conceptual models describing public participation design. The model's eight rungs are Manipulation, Decoration, Tokenism, Young people, Informed, Adult-led, Youth-led, and directed. Today, many of the issues Hart addressed in his model remain relevant to practitioners. One of these is the concept of shared decisions. Both adults and young people also share decisions. Despite the conflicting arguments, Hart argued that allowing young people to collaborate and share their decisions would give them a more influential voice in democracy. He also noted that this would give them more influence over adults' decisions (Hart, 2008). This idea is similar to Pope's social capital theory (2011). He states that activities that promote bonding capital outside a person's habitual group can help develop skills and extend their influence. Pope also argues that activities that strengthen a person's within-group ties can only strengthen their bonds. Following Arnstein's (1969) work, Hart's ladder model has three types of non-participation: manipulation, decoration, and tokenism. This concept highlights how young people are manipulated into subordinate positions to legitimize their decisions. Despite the scholarship and practice around these types of false participation, they persist in some forms of youth work.

The popularity of the ladder model has been attributed to its ability to make it easy to understand and apply. Despite this, it has been criticized for its tendency to marginalize young people and adult groups and not explicitly link democracy and citizenship. One of the criticisms of the model is that it tends to homogenize both adults and youth,

ignoring the varying power structures within groups of young people (Cooper, 2009). Shier's (2001) 'Pathways to Participation' model was built on Hart's ladder, adding a dimension to the discussion about how adults can influence the participation and opportunities of young people. According to Shier, there are three distinct stages of commitment that adults can make to improve their involvement. These include Opening, Opportunities, and Obligations.

One of the criticisms of the pathways and Hart's ladder is that they are too linear, with hierarchical and sequential levels. In 2008, Hart wrote about this issue, and he explained that it was never his intention to imply that participation should automatically move up the ladder. After publishing the pathways model, Shier collaborated with young people in Nicaragua to develop a new model that takes an evolutionary approach. The Participation Tree model suggests that young people can make the most of their opportunities by developing a strong sense of ownership (Shier, 2010).

The Organization for Economic Co-operation and Development (OECD) published a handbook in 2001, "Citizens as Partners: Information, Consultation, and Public Participation in Policymaking," showing how to create a PDP. One of the most important outputs of the handbook is categorizing the level of citizen involvement and influence on policymaking.

In the OECD's handbook, strategies, tools, principles, and tips create an active participation level between citizens and administrators. OECD divided the participation process into three according to the participants' level of involvement in the process: information, consultation, and active participation. The information part and non-participation, consultation part and tokenism, active participation, and citizen power are similar levels of Arnstein's Ladder participation.

In 2006, Derek Wenmoth developed a "4 C's Online Participation" diagram to explain how people participate in online communities. The diagram consisted of four titles - Consumer, Commenter, Contributor, and Commentator- and three subtitles for each - Motivation, Behaviors, and Outcomes- to demonstrate how many participants in the online context move through stages as they obtain perception and faith (Figure 9)

(Ham et al., 2007). In the same year, 2006, Tony Karrer brought up another approach called the Four L Model: Leading, Learning, Lurking, and Linking. Karrer's and Wenmoth's approaches to grouping the users' profiles are similar. Leadings-Commentators are at the core of a community as leaders. Learnings-Contributors are regular visitors who contribute to the community regularly. Lurkings-Commenters are often the most significant part of society. These people are irregularly part of several activities and follow the group activities. Linkings-Consumers are guests who find a community by one means or another.

Consumer

Motivation:
- To gain insights, gather information and be exposed to new ideas.
- To understand how the community thinks and operates

Behaviours:
- Visits forums and reads posts
- Reads blogs
- May operate an RSS feed reader

Outcomes
- Develops knowledge base
- Increases understanding

Commentor

Motivation:
- To share opinion and experiment with making a response to someone else's ideas

Behaviours
- Seeking clarification
- Asking questions
- Testing opinion
- Suggesting ideas
- Encouraging
- Offering feedback

Outcomes
- Increased confidence
- Greater clarification
- Affirmation of thinking

Contributor

Motivation:
- To 'test' new ideas and personal opinions
- To receive critique and feedback
- To 'publish'

Behaviours
- Original posts added
- Offering 'drafts' for review
- Sharing of new ideas
- Elaboration of thoughts
- Responses to comments

Outcomes
- Contributions to the knowledge base
- New ideas tested and refined

Commentator

Motivation:
- To see the community grow and flourish
- To provide leadership within the community

Behaviours
- Analyse/ synthesize contributions
- Makes comparisons, draw conclusions
- Critically evaluate
- Directing, prompting, facilitating.

Outcomes
- Vibrant, self-sustaining community
- Leadership role(s) affirmed and encouraged

Figure 9. The 4C's of participation online communities (Source: Ham et al., 2004)

Another model that avoids discussions about levels of participation is the one proposed by Lundy (2007), which focuses on four critical elements that enable young people to participate in decision-making:

Space: Young people and children should have a safe space to discuss, share, and debate their ideas. This can help them make informed decisions and improve their skills.

Voice: Young people and children should also be able to have the necessary

support to make their voices heard. This can be done through suitable media and other resources.

Audience: The people responsible for making decisions that affect children's and young people's lives should be available to listen to what they have to say.

Influence: Believing that children and young people have a right to have their voices heard, decision-makers should consider their views when making decisions that affect their lives.

The online Participation Behavior Chain (Figure 10) was promoted through over fifty online services (Fogg and Eckles, 2007). These services were observed to understand how they motivate users to participate actively. It is formed in three phases: discovery, superficial involvement, and genuine commitment. The Online Participation Behavior Chain discovery phase aims to make users aware of the Web service and convince them to revisit the site. The superficial involvement phase is expected to influence the users to start with the service. In phase 3, conducting more profound research about users contributing value, involving others in the service, and continuing to be active and loyal users is necessary.
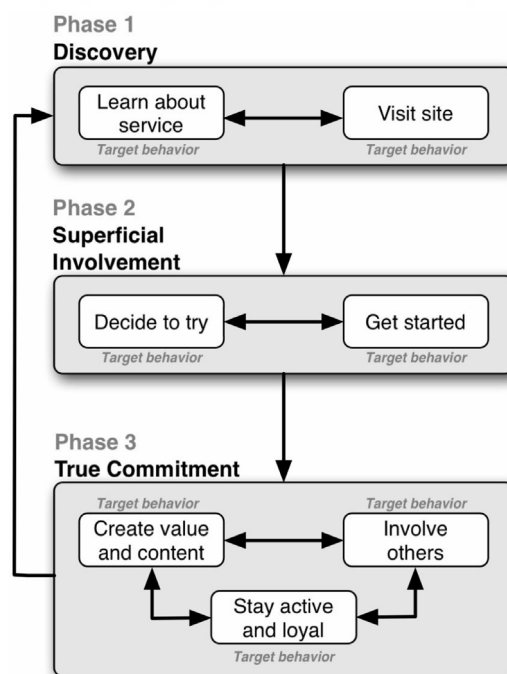
Figure 10. The Behavior Chain for Online Participation: How Successful Web Services Structure Persuasion. (Source: Fogg and Eckles, 2007)

Pedro Martín (2015) compared the context of a guide for e-participation models at the regional level to understand the differences between three models that are Sherry Arnstein-Ladder of Citizen Participation (1969), International Association of Privacy Professionals (IAPP)-Spectrum of Public Participation (2000), OECD-GovermentandCitizen Relations (2001) by drawing a chart (Figure 11). Martin's chart shows that the active participatory approach of the OECD barely reaches the level of "Citizen Power" that Arnstein classified. Thus, Martín says that the OECD model almost disregards citizen control and sharing equal power. Martin's defence of the idea of power and control distribution is a crucial point in avoiding an unsuccessful PDP. Otherwise, much time and money might be spent during PDP without enough impact.
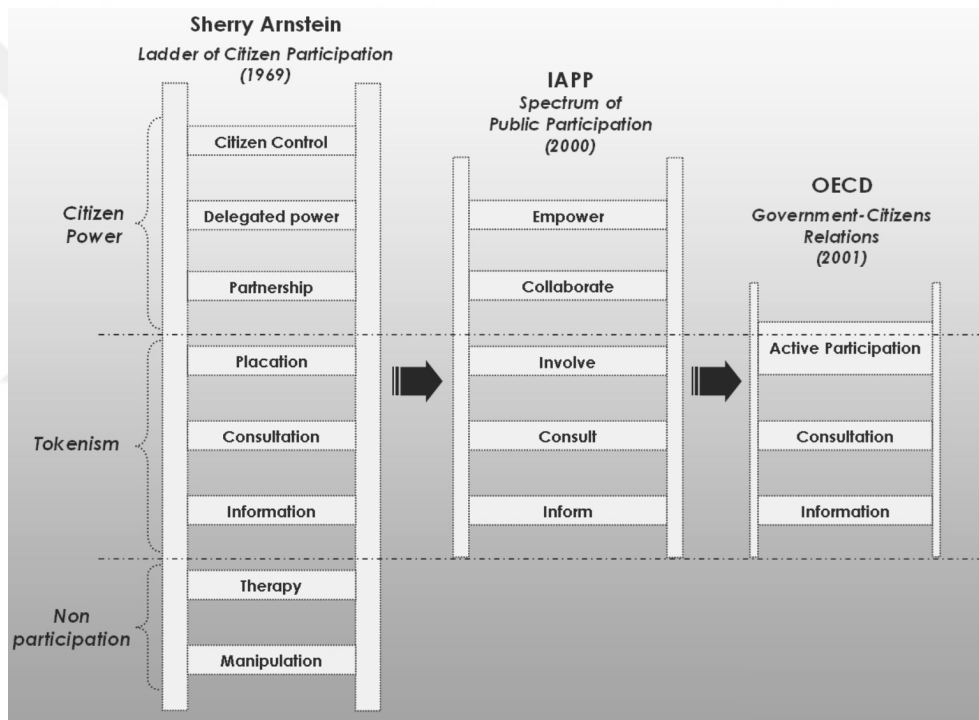
Figure 11. Martin's comparison of the three models (Source: Martín, 2015)

Bernoff Josh and Charlene Li stated their ladder of online participation in 2007 and updated it in 2010 to reveal novel judgments. The theory is structured on social technographics, known as the study of online activity according to participation at several levels. Each e-participant may be a member of more than one level. These are inactive spectators, joiners, collectors, critics, conversationalists, and creators.

Rick Wicklin (2010) published "How does participation in SM vary with age?" to

answer how participation in SM differs across age groups and among these participants and the distribution of their roles according to age. Wicklin's chart (Figure 12) shows that using SM is very common among young people, but older people have yet to embrace it at the same level.
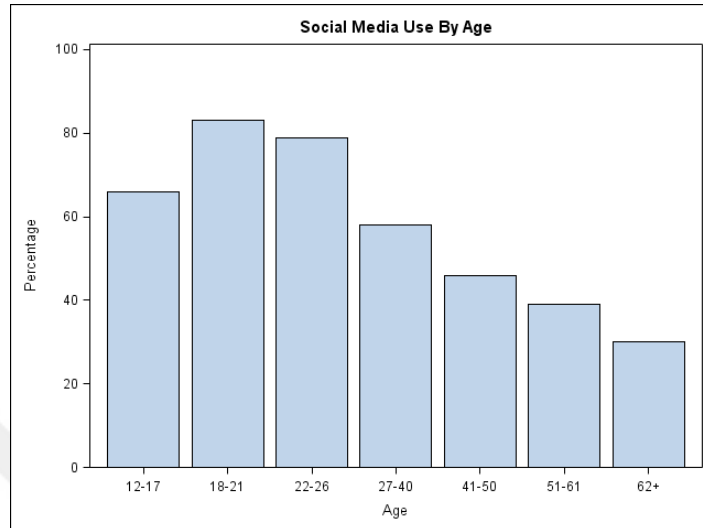
Figure 12. SM Use by Age (Source: Wicklin, 2010)
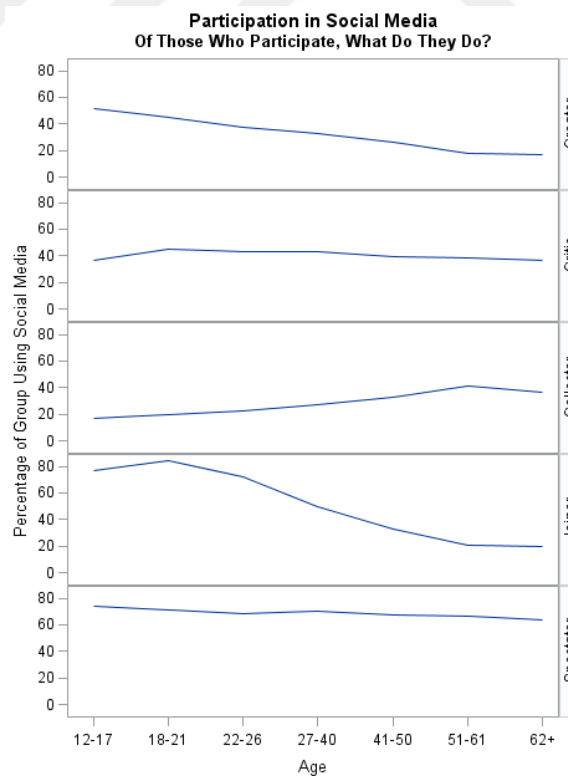
Figure 13. Participation in SM of Those Who Participate, What Do They Do? (Source: Wicklin, 2010)

The other chart (Figure 13) explains that older people who participate in SM are critics and spectators like younger people. Young people are more in the creator and joiner part than older people; on the opposite, older ones are in the collector part.

Six principles of online participation (Davies et al., 2011) are published to address this by proposing six principles that fit the UN Convention on the Rights of the Child (UNCRC) three classes: protection, participation, and provision. These six principles support digital citizenship, empowering young people, responding to risks, promoting resiliency, and providing positive spaces. Youth-shaped services should be sought by any project addressing young people's online participation (Figure 14).
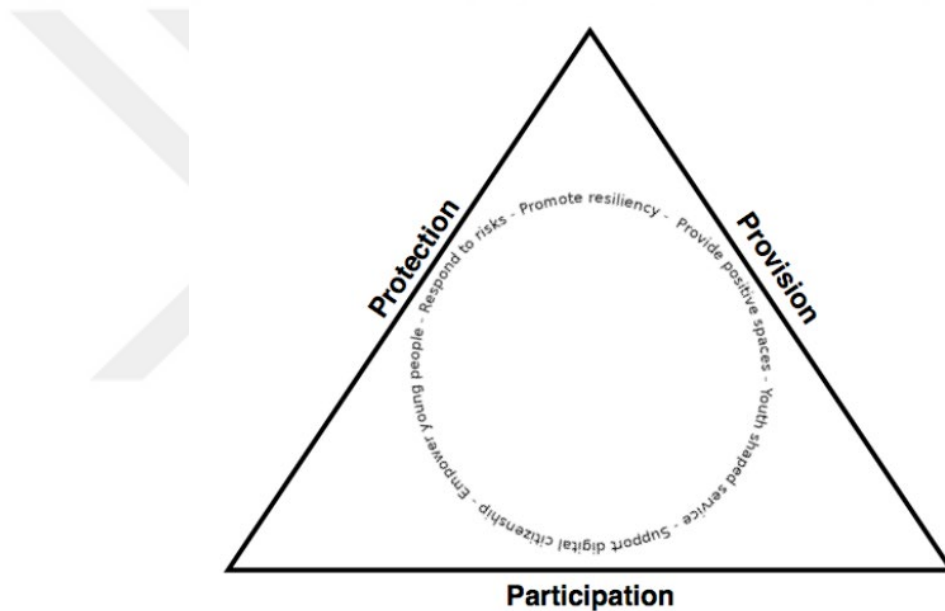
Figure 14. Six Principles of Online Participation (Source: Davies, et al., 2011)

Starting from 1969, these models were analyzed to create a new pathway for the PDP. This pathway represents the possibilities for youths to progress their engagement within an application bordered by a social environment and design process. The application will clarify to youths how they can progressively become more involved. Policymakers and practitioners have widely used the model in various settings worldwide. For instance, in 2015, the government of Ireland adopted this model as part of its national strategy for children's participation. The model helps youth workers understand the dynamics of participation by encouraging them to ask questions about the space. These include how voices are produced and expressed, who is listening, and

the influence (Department of Children and Youth Affairs, 2015).

The Lansdown model (2018) helps describe the various aspects of participation in a given context. Unlike other models that try to capture the complexity of participation, it focuses on three basic categories:

- Consultation: Participants are not involved in decisions made by adults. They are only asked for their ideas.
- Coordination: Both adults and young people work together to plan and carry out activities.
- Youth Action: These are activities that young people themselves run.

The Lansdown model can elicit ideas about participation from young people. It can also be used to create planning tools and evaluation systems for the involvement of young people in research. For instance, they can evaluate the participation of young people in development projects. Models that focus on the role of adults in developing programs and activities can address the power relations between young people and adults. Back then, most models believed that power was something adults could control and shared between them and young people (Cooper, 2009). Shier's (2001) and Hart's (1992) works discussed how adults could give and receive power as they wish. Although Arnstein's ladder had the title of "Citizen Control", the concept of power is not as simple as it sounds. It is believed that power can be given or taken by others.

Newer models, which are more recent than those previously studied, can present a different type of power analysis focused on the interactions between people (Gaventa, 2003). Instead of being presented as a static force controlled by a single hierarchy, power can be conceptualized as constantly changing within networks. Despite the similarities between power and resistance, this new approach allows for various forms of resistance. For instance, it can describe the various forms of resistance within organizations, such as public service and education (Cahill and Dadvand, 2018; Holdsworth et al., 2020).

Although this section has focused chiefly on developing and implementing participation models exclusively for adults, it is also important to note that young

people are also involved in various ways and at varying levels. This includes participating in various ways without adult support (Reddy and Ratna, 2002; Vromen and Collin, 2010). This is because many well-intentioned models can become embedded in an adult system or service, restricting or channeling young people's participation (Francis and Lorenzo, 2002; Malone and Hartung, 2010). When youths seek out applicable models, it is essential to note that they should be designed to support and enhance the experiences of young people. This means they should be able to make decisions and participate in beneficial projects. It does not mean that adults are taking advantage of the model's capabilities to label, measure, or package the complexity of youth participation. However, the role of adults in these processes is still vital for the model's success. This is because the capacity of young people to participate in these models remains essential.

3.7. Guiding Principles and Strategies

Barbara Faga (2006) says that the PDP is very successful, but there are no right ways to carry it out. There are various ways to make it work. In 2000, Henry Sanoff talked about various forms of community participation. Some of these included advisory boards, surveys, and interactive cable TV. 2010, there was a significant omission from this list – no mention of the Internet. Despite the technological advancements over the years, the core practices of group participation are still the same. The Internet provides a framework for further developing these practices.

Sanoff's (2000) Participatory Action Research is a process that combines various actions into one cohesive whole. It can be initiated by raising awareness through exhibits, walking tours, and news media. Another step is to implement group participation initiatives. These include surveys, mapping studies, and interactive group interaction. The concept of participatory cable TV is very effective for people incapable of interacting with others. It can be performed similarly to a survey or questionnaire. Despite the advent of social media, it is still more accessible for people to use their televisions and telephones than to interact with others through online platforms. For instance, if an older person calls a hotline, the service would be more beneficial than a website. Even telephones and televisions can accommodate a larger audience by overcoming the physical boundaries of time and space.

Through group interaction workshops, which are also part of Sanoff's PAR strategies, groups regularly engage in face-to-face discussions. These are designed to generate and reformulate ideas and then circulate them through the group until they are agreed upon.

The first step in establishing goals and objectives is to define them. They should be categorized into two categories: general goals and specific objectives. The goal and objectives of a group interaction project are the first things a group should consider when planning. They should be set as the group develops the process. The goal of using the community to develop the group's creative potential is to enable the goals to adapt to the varying opinions of the group. The goal-setting process is open-ended and supports the group's creative potential. It can be organized in various ways, such as by creating goal statements listing the various environmental and building conditions the community should maintain. This format gives the group a framework to discuss its collective goals.

The goal of an organization is to address a specific target area. Through objective-making, community members can act as informants, providing them with valuable data that can be used to improve the organization's performance. Using a dynamic format, such as the necessity vs. threat, citizens can quickly identify areas of concern and develop effective strategies to address them. For instance, by developing action words such as "increase, upgrade, or reduce," residents can quickly identify areas of their community that they want to improve.

A good understanding of goal setting is also crucial for the facilitator to start the participatory process. However, recognizing consensus is also very helpful in helping the facilitator see the end of the tunnel. It often needs to be understood by those who try to participate in the community. Barbara Faga, an urban planner, coined the term civic theatre in 2006. Although it is a venue for discussion, the people who attend it are often hostile and defensive. This became challenging for consultants as it made it nearly impossible to gather meaningful input (MacCallum, 2016).

The difference of opinion is often the main factor that causes controversy. However, group diversity is also critical to effective group decision-making. Susan Feinstein

(2010) argues that democracy can be genuine if there are diverse groups. In this case, inclusion requires a critical mass, which means that people must be included to avoid a process that will yield disappointing results (Leighninger, 2006). The value of consensus is proportional to its inclusion level, yet the more diverse the people are, the harder it becomes to reach consensus. It is important to note that failure to reach a consensus does not equal absolute failure.

A perfect solution may only be feasible for some multi-faceted problems today. This is why many people gravitate toward convergent thinking instead of divergent thinking. Convergent thinking offers a single answer that must be proven correct before implementation. Although divergent thinking can produce many solutions that are not easily proven, it is still important to note that reaching a consensus matters most. This is the process of talking, listening, and considering other points of view to reach a consensus.

3.8. Proposed Method

According to the literature, participation may vary among young people in PDPs. For instance, some may participate in various activities, while others may not. While promoting youth participation, youths should also be sensitive to the diverse backgrounds of young people (Batsleer and Davies, 2010; Sapin, 2013). They should also consider the various principles of youth responsibilities, such as the importance of voluntary participation and anti-oppressive practice. The concept of voluntary participation undermines the point of youth work and undermines the rights of young people. It is also important to note that the obligation to participate undermines the point of youth work (United Nations Committee on the Rights of the Child, 2009). In 2010 and 2012, Farthing argued that making participation a compulsory process undermines the rights of young people and functions as a form of social control.

Participatory design projects can vary depending on how they were designed. In the traditional PD, participants are limited to providing designers with access to participants' talents and knowledge. The participants have little control over the design process or its result. Here, projects are initiated at the behest of moderators or design experts. Participants are asked to participate in those factors of the project where their

intake is considered helpful but left out of most of the decisions. Many PD researchers view this restricted level of participation as insufficient to meet the goals of a participatory design project. What is missing is a dedication to the potential of real participant impact over the direction and outcome of the process (Greenbaum and Kyng, 1991).

According to the design process chapter analysis, the proposed PDP is split into seven steps: investigation, initiation, interaction, live workshop, post-interaction, findings, and post-evaluation. Archer's Theoretical Design Process has three stages: research, analysis, and development (Archer, 1984, p. 64). The Asimov Design Model has four stages: analysis, synthesis, evaluation, and communication (Rowe, 1991). Both models have a similar approach to the design process. Even though the process has a linear timeline, there may need to be several reassessments that may cause it to go back to the previous step/s. Like other design processes, IDP also starts with the research part that includes the first two steps of the proposed PDP.

In the proposed model, the first step is called the "Investigation" part. In this step, moderators work with stakeholders on the problem definition, data collection, and data categorization to prepare a detailed brief for the design process and the moderators and stakeholders. This part also includes the agreement process among all the parties.
The second step is called the "Initiation" part. In this part, moderators, stakeholders, designers, and, if needed, specialists and facilities work together to analyze the collected data to decide each step of the PDP in detail. The user profile is decided according to scale, methods, and type of project.

The third step is the "Interaction" part, which is when users start being part of the PDP. Interaction, Live Workshop, and Post-Interaction parts are parts that all parties can actively contribute. Moderators and designers work on the findings in the last two steps and analyze the post-evaluations. The new PDP chart proposes a consecutive analysis of the design process and participatory design (Figure 14).

Understanding the nature of participation in a context is very important for youth participants. They need to identify the boundaries of what is possible and what is not within those boundaries. They also need to be able to negotiate and manage the various

options available to them at a given time and place. The United Nations Convention on the Rights of the Child's best interests principle can help youth participants make informed decisions when making difficult decisions. It is essential to consider the various consequences of their decisions and the benefits they will get from them. Being able to open up to and dialogue with young people with different viewpoints is very important for youth workers. This can help them make informed decisions. Unfortunately, this can sometimes lead to challenging encounters. The welcoming of "convenient voices" only manipulated outcome and participation processes. This issue has implications for how youth workers use participation models. It can also affect how they approach addressing the needs of young people.
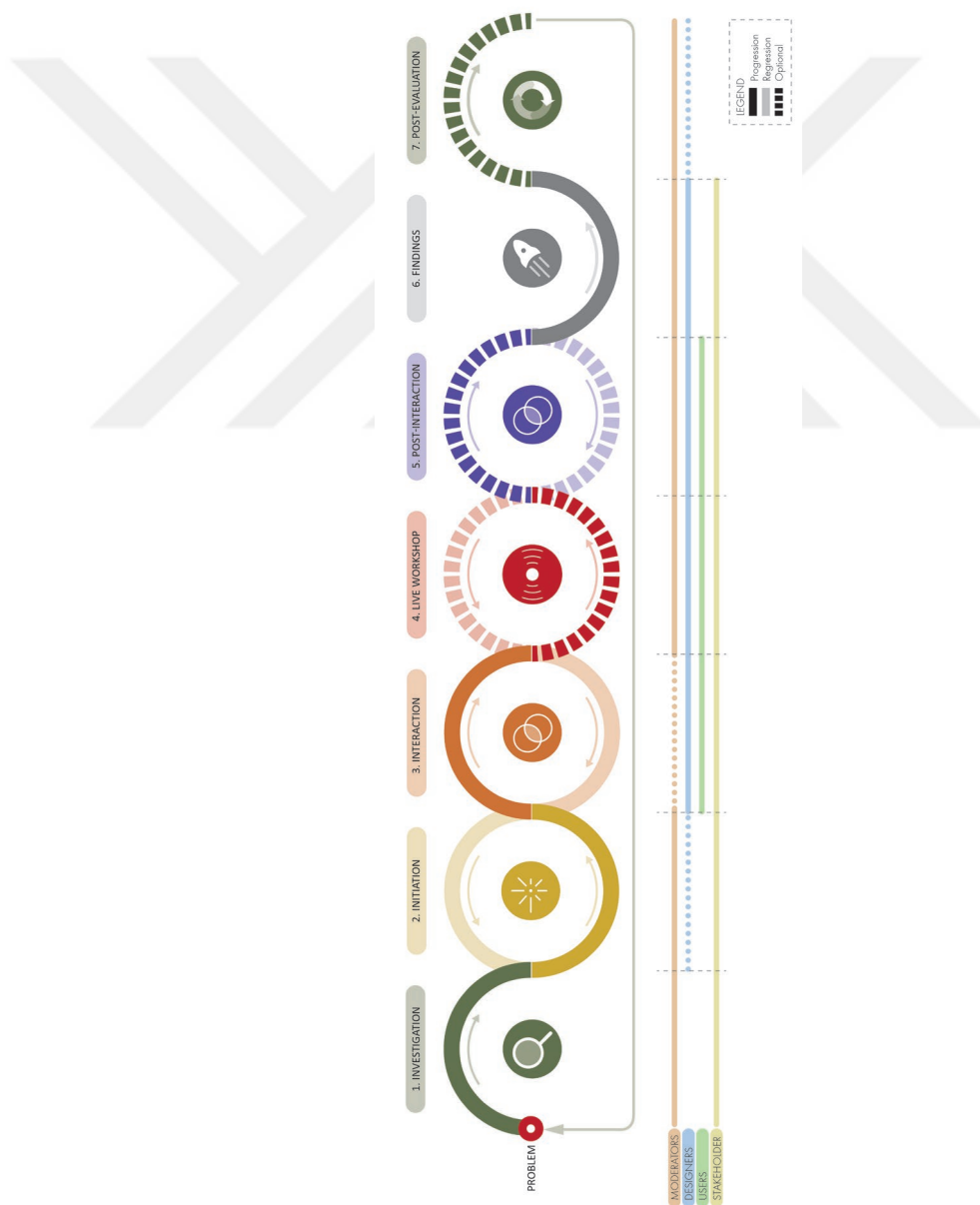
Figure 15. Participatory Design Process Proposed Method

CHAPTER 4: DIGITAL DESIGN AND FABRICATION TECHNIQUES

In this chapter, Digital design and digital fabrication tools will be analyzed to understand how these tools have changed traditional design tools. Design is a hybrid activity that combines various elements, such as art, science, and mathematics. Although there are various terms for creativity, it usually refers to developing something new. Following the rise of modernism, the divide between the maker and the designer has become more apparent. The designer has been disconnected from the contractor. Designers and producers are associates of a crew that gathers together to solve issues. The industries have started implementing collective engagement models involving new intelligence tools.

4.1. Digital Design and Fabrication Tools

According to archaeologist J. J. Coulton, there is evidence of pre-historic buildings that have been entirely constructed using "paradigm" (means full-scale models of the elaborate construction components). With the help of 3D models, builders could construct detailed representations of pre-historic buildings without conversions and scaling. Since several elements of a building were duplicated, the idea of reproducing its original design was already embedded in architecture during its early stages. The material process of building construction has remained rooted in time and space constraints. It has also remained bound to its unique character and function. In digital fabrication, this process has raised the bar for architectural production. It challenges the notion that the process of building has a certain immutability. Although digital fabrication allows designers to produce quick and precise prototypes, it also reduces the possibility of replicating an existing structure. The building industry's future is marked by uncertainties and changes that might affect both the designer and the built environment.

Digital age tools continuously evolve due to technology's rapid transformation, which affects all organizations. Designers frequently need help comprehending the increasing gap between digital design methods and digital design tools (Netcoh et al.,

2017). As a solution for that struggle, user-friendly software interfaces are designed by developers to increase the designers' ability. The latest prototyping and visualization tools enable designers to produce models and explore various designs that are more satisfactory to users' essentials and aspirations (Loyola-Gonzalez, 2019). Using technological tools, modelling and rendering, making videos, online archives, and digital platforms are helpful for participation practices. Digital design tools have brought many advantages to the interior design process. Computer simulations of the structural environment allow people to walk through spaces. 3D-modelled design elements make it easier to understand the final product before the design is finalized. Simulator games let people create their designs with an easy interface. 3D scanners can bring hand-made designs into the 3D virtual world. Technological tools are being improved each day with infinitive new options. It is crucial to understand how these tools can be used to develop new methods for the participatory design process (Sanoff, 2000).

Large and small prototypes are also featured in architectural exhibitions. These objects are often displayed in the form of models of finished products. The models produced in these advanced modelling labs are more accurate and durable than those made by traditional model makers. Advanced technologies in these labs parallel how robots are used in the aerospace, shipbuilding, and automobile industries. More efforts are also made to experiment with their potential applications in the construction industry. The computer helps a design team calculate and build various building components. It also helps prepare formal studies that feed into the design stage (Leach, 2002). Such rapid processing demonstrates a form of modelling that will be adopted more widely within the construction industry.

In addition to having the advantage of a fast prototype, flexibility is another significant benefit of the digital design tool. The ability to design and build physical objects that can be produced in infinite variations brings a new dimension to the definition of an architectural project. Instead, it uses the concept of entelechy, which refers to translating an image or a series of drawings into a physical object. Within this new paradigm, digital images can be translated into physical objects without requiring the translation of text or symbols.

The employment of Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM) has grown over the last few decades. It has aided in automating tasks and managing information, especially in the later phases of the design process (Furness, 1987). However, CAD has had little impact on the earlier phases of design. Thus, there is a point in the design process when architects and designers must mentally leap from sketches and study models to CAD representations in two or three dimensions. Research focuses on studies to inspire the development of CAD methods to allow architects to use them earlier in the design process (Lansdown, 1994). A project's reception depends on the tool's quality and ability to provide a more realistic depiction of space (Janusz, 2019)—the choice between a mobile device and a hardware environment used to be the same. The intention was associated with high costs and low quality in both cases. As for VR, the designer faced the same issue when choosing between a headset and a professional set (Calderon-Hernandez et al., 2019). The reasons provided here are closely connected and reflect essential aspects of the needs of digital technologies during the design process, especially in the early stages, to create a bridge between designers and users.

Only within the last few decades have the advances in digital fabrication tools (e.g., 3D printing, 3D scanning, CNC milling, laser cutting, and robotics) started to impact architectural design and building practices. They opened up new opportunities by enabling the production and construction of very complex forms. Until recently, they were challenging and expensive to design, produce, and assemble using traditional construction technologies (Kolarevic, 2001). The increasing interest in making among users and designers has led to new technologies such as personal fabrication. These can be found in the growing number of informal design spaces (Ratto and Ree, 2012). The design needs to comply with technology. Building Information Modeling (BIM) is gradually becoming in each step of the construction process for building design, and all project data are generated and managed by software (Irizarry and Costa, 2016). The new idea for automated building construction is scaling up additive manufacturing systems. Additive manufacturing is making 3D models by joining materials by layering (Berman, 2012).

The following chapter argues that by integrating the stages of design and making, creative results might be achieved using digital fabrication tools.

4.2. How Digital Design and Fabrication Techniques Changed Traditional Design Process

It has been argued that digital tools impose excessive control over their users. On the other hand, non-digital tools can facilitate the experimental design. In 1998, McCullough noted that craft and digital work are similar to traditional and digital practices. Therefore, using digital tools could lead to an exploratory and improvisational approach.

During the 1960s, the rise of computer technology and artificial intelligence led to the development of a new scientific method for design. This method replaced repetitive work with technological solutions (Celani, 2012; Langrish, 2016). The innovation of the scientific method and the rise of computer technology led to the establishment of a new design process that was regarded as a means of devising practical solutions to problems. In contrast, digital tools can be regarded as a means to implement control and quality in the design process.

The rapid changes in society and technology during the past two decades have presented various challenges to the practice of architecture (Kolarevic, 2004; Oxman, 2008; Corse, 2010). The rapid changes in society and technology during the past two decades have presented various challenges to architectural practice. The speed of information exchange has made it possible to create genuinely global designs (Hensel and Nilsson, 2016).

PDPs, where designers have to harmonize with others to acquire anything accomplished, are extensively harder than simply sharing, but the outcomes can be more profound. New instruments permit large parties to collaborate by taking advantage of non-financial encouragements and permitting significantly different contribution levels.

The use of advanced technologies has led to a new generation of practitioners. The rigour of the thought process has also been emphasized in the design process. The importance of the thought process in the design process is as great as making shapes. This process requires a detailed account of the interactions between the designer and

digital media (Oxman, 2006). Much of the material world in the 21st century, from the most straightforward client outcomes to the most cultivated aircraft, is designed and constructed using a method in which design, examination, illustration, fabrication, and assembly are evolving into a moderately seamless collaborative method that is exclusively dependent on digital technologies (Kolaveric, 2003). As a result, the changes brought about by the emergence of digital technologies have significantly impacted how architectural practice is conducted. The approach of design practice is changing in interesting, pluralistic, productive, and novel ways.

Despite the positive effects of digital fabrication, new technology applications have raised questions about the theoretical model of control. 2006, Oxman and Sass noted that rapid prototyping and generative design could be integrated seamlessly. Also, in 2006, Oxman noted that non-deterministic design methods could be observed. In 2011, Carpo focused on the importance of digital form-finding instead of prescriptive design solutions. According to the studies' authors, the design does not develop in a predetermined direction and must respond to various factors to produce possible ideas (Holzer, 2008; Harrison et al., 2015).

The rise of non-deterministic design processes is evidenced in the research on new production methods. In 2016, Drfler and colleagues at ETH Zurich presented a large-scale 3D printing technique that involved using robots to create various components. Instead of building a replica of a pre-defined design, the robots controlled the structure's design parameters and built it using sensors. This method is similar to Ingold's 2013 concept of medieval masonry. It allows the robots to modify the settings of the structure. The rapid emergence of digital technologies has led to new ways in which design could be used to revive the benefits of pre-industrial processes. For instance, emergent designs could be produced robustly and efficiently.

Due to the increasing number of boundary-breaking activities, it is vital to consider the emergence of informal new design environments where maker and designer identities can overlap. One of these is the maker movement, centred around the availability of fabrication tools. The maker movement is centred on the idea that people can create physical and digital artefacts for use (Papavlasopoulou et al., 2016; Chu et al., 2017). Initially, the maker movement focused on fabricating physical and digital artefacts in

facilities such as factories and make spaces. However, as interest in the movement grew, design spaces expanded to include schools and museums. The dualist role of the maker movement is related to the shift in the design process. While making is still a part of the process, it is no longer a reducible component (Christensen and Iversen, 2017).

As digital fabrication tools grow in popularity, the designer becomes more involved in their creation. This is because they are now more than just users of these tools; they also contribute to developing their fabrication tools. According to Aish (2003), the designer has a new role in the design process as a tool builder. In 2006, Oxman stated that the designer has a new role in producing customized design media. This concept is similar to the saying that making does not just refer to producing objects but also involves the creation of new tools.

Using digital fabrication in the design process can lead to considerable productivity gains for the design studio. In this context, digital design and fabrication can be defined as a new endeavour that utilizes computer-controlled tools and procedures to recast digital designs and materials directly into end products. The challenges posed by digital fabrication and other forms of design practice are immense. They should be explored to question the foundations of education and practice in interior design.

The interior design course has entered a period in which digital design and fabrication technologies have a significant position in construction. In this period of digital fabrication, through the intersections of form, material, and technique, digital fabrication can create new architectural effects. The true promise of digital technologies is that they allow architects to retain control over the design process and the construction of their buildings. This allows them to collaborate with local contractors without leaving the design studio.

4.3. *An Emergent Design Process Using Digital Fabrication*

The discussion centered on how designers can use emergence to identify and capitalize on potential opportunities during the design process. In order to analyze the concept of emergence, Preston (2012) presents an alternative model that focuses on the role of the improvisational agent. This agent can coordinate their work by using various

resources. Instead of prescriptive strategies, Preston focuses on the habits and practices of the improvisational agent. This model also emphasizes the non-explicit patterns of activity that can be used to govern the design process. Preston proposes three main strategies that collaborative or solitary agents can use. These include appropriate and extend, proliferate and select, and turn-taking.

The various strategies will be examined to understand how they can facilitate the development of emergent practices in a design process using digital fabrication. It is also believed that the tool can create variability in some cases. The strategy aims to identify the various ideas that can be built upon to create new structures. It also allows the improvisational agent to extend and modify the existing structures. For instance, designers can provide a partial model or inspiration to create a solution in digital fabrication. This strategy can be used to develop new ideas and create new structures. For example, Preston shows how Nathan Sheppard could complete his song lyrics for "Lying in Grass" after his co-performer, Will Greene, provided him with the first two lines.

In 2013, Blikstein discussed the importance of providing semi-structured advice to designers but cautioned that examples should avoid becoming too prescriptive. He also noted that designers focus on one type of solution instead of exploring non-trivial alternatives. The author also referred to the Keystone Syndrome, where designers focus on one type of solution instead of exploring the entire design process. The study suggests that a partial solution facilitates improvisation during the design process. The study is consistent with the findings of extensive research on the design process, which suggests that using physical examples during the initial stages may limit the possibilities of developing solutions.

The second strategy is composed of two key activities: proliferate and select. According to Preston, trying out several possible solutions before settling on one is referred to as the proliferate. However, in some cases, proliferation can be beneficial. It can reduce the time involved in the design process and allow designers to develop their ideas. For instance, a design repository could be used to gather ideas in digital fabrication. In addition, Preston noted that distraction could encourage more potential

unintentional productions. These productions can inspire creativity and provide an opportunity for designers to come up with their ideas.

New design environments, such as maker spaces, could provide opportunities for creative "unintentional productions." El-Zanafaly (2016) presented the concept of improvising, iterating, and improvisational design that encourages designers to use digital fabrication. In this way, the designer starts by imitating other designs but then deviates from the original to create something entirely new. This approach is referred to as unfaithful copying. The designers can learn how to modify a particular feature while creating their ideas through this process. Although the model provides a good foundation for imitation, it needs guidance on how to proceed and improvise. Participants and designers only copy one precedent, and it provides limited guidance on how to iterate and create new ideas. The three main findings of this study suggest that the accessibility of ready-made and partially-made could encourage inspiration, while external inspirations could encourage improvisation. It also suggests that imitation could create new, not merely appropriated, ideas.

In his third strategy for improvisation, Preston draws on the concepts of baseball teams and jazz groups to create a framework for developing new forms of collaboration. It is believed that high levels of the organization can be achieved through the actions of the members of an organization, who behave according to the norms of their local community. In a review of making, Rosenbaum and Resnick (2013) argue that the maker should engage with people in materials, strategies, and methods. Petrich and colleagues (2013) also argue that solidarity is essential to making, allowing the makers to share and contribute to each other's work. In 2005, Youmans and Ohlsson argued that groups are better than individuals at identifying complex problems. They also suggested that group communication can help identify potential design issues and facilitate the emergence of new practices.

In 2016, Pinochet argued that using intelligent fabrication machines and interactive design can help close the creative gap and reconcile the two design forms. These perspectives provide a framework for understanding how to exploit spontaneity in digital fabrication. They also signal a shift in thinking about the design-in-making process, which is more akin to a model of experimentation.

4.4. Proposed Method

Chapter 4 initiates the PDP's transformation by immersing the reader in Digital Design and Fabrication Techniques. The relationship between modern technologies and collaborative methods—more significantly, the exploration of CAD and CAM—is revealed.

Initiating the process with an "Investigation," digital design tools—especially CAD technologies—take the lead in defining the problem and organizing the data. With the help of CAD, moderators and stakeholders can now collaborate more effectively to create a comprehensive design brief. The advantages of CAD are clear since it makes it easier to represent spatial environments accurately, which sets the foundation for later phases.

Sliding smoothly into "Initiation," the combined work of experts, designers, and stakeholders is deeply integrated with the potential of CAD and CAM technologies. At this stage, data analysis and digital complexity come together, and CAM provides insights into the manufacturing viability of design concepts. This user-centric methodology is transformed into a symphony with CAD and CAM serving as essential partners.

As the process moves forward into "Interaction," CAD plays a crucial role. Live workshops and interactive sessions become dynamic platforms where end users interact with 3D models, simulations, and digital prototypes made with CAD. The ability to work in digital environments enhances the participatory ethos, and CAD makes it easier to visualize design concepts.

"Live Workshops" highlight Chapter 4's significant impact, evident in how CAD and CAM technologies are used. In these workshops, designers, stakeholders, and end users come together to take advantage of the transformative power of digital tools.

CAD guarantees precision in design representation, and CAM provides insights into the feasibility of imagined designs.

Going into "Post-Interaction," Chapter 4 leaves a lasting impression. Equipped with insights generated by CAD, moderators and designers combine findings and post-evaluations. The wealth of information from CAD technologies directs the extracting of comprehensive insights essential for later design phases. CAM offers insightful commentary on the viability of converting digital designs into tangible objects in response.

Finalizing in a "Post-Evaluation," it is evident how digital design is iterative, mainly when using CAD and CAM. Inspired by the insights presented in Chapter 4, this phase assesses the effectiveness of the PDP and provides a reflective platform for ongoing improvements. CAD and CAM technologies catalyze ongoing innovation in collaborative projects, allowing the digital and physical domains to merge.

Chapter 4 goes beyond conventional participatory paradigms by integrating the core of Digital Design and Fabrication Techniques. CAD and CAM become essential partners as the PDP moves toward a more dynamic, user-centric, and data-informed course. This digital integration adds a responsive and iterative dimension to the participatory ecosystem while improving the accuracy of design representation.

Chapter 4's influence can be felt at every turn in the PDP, redefining the mutually beneficial relationship between technology and design collaboration. As CAD and CAM technologies are smoothly incorporated into the participatory fabric, the PDP is led toward increased efficiency, creativity, and inclusivity. This chapter's narrative transcends the digital sphere to shape participatory design's fundamental resonance in the physical spaces it aims to alter (Figure 16).
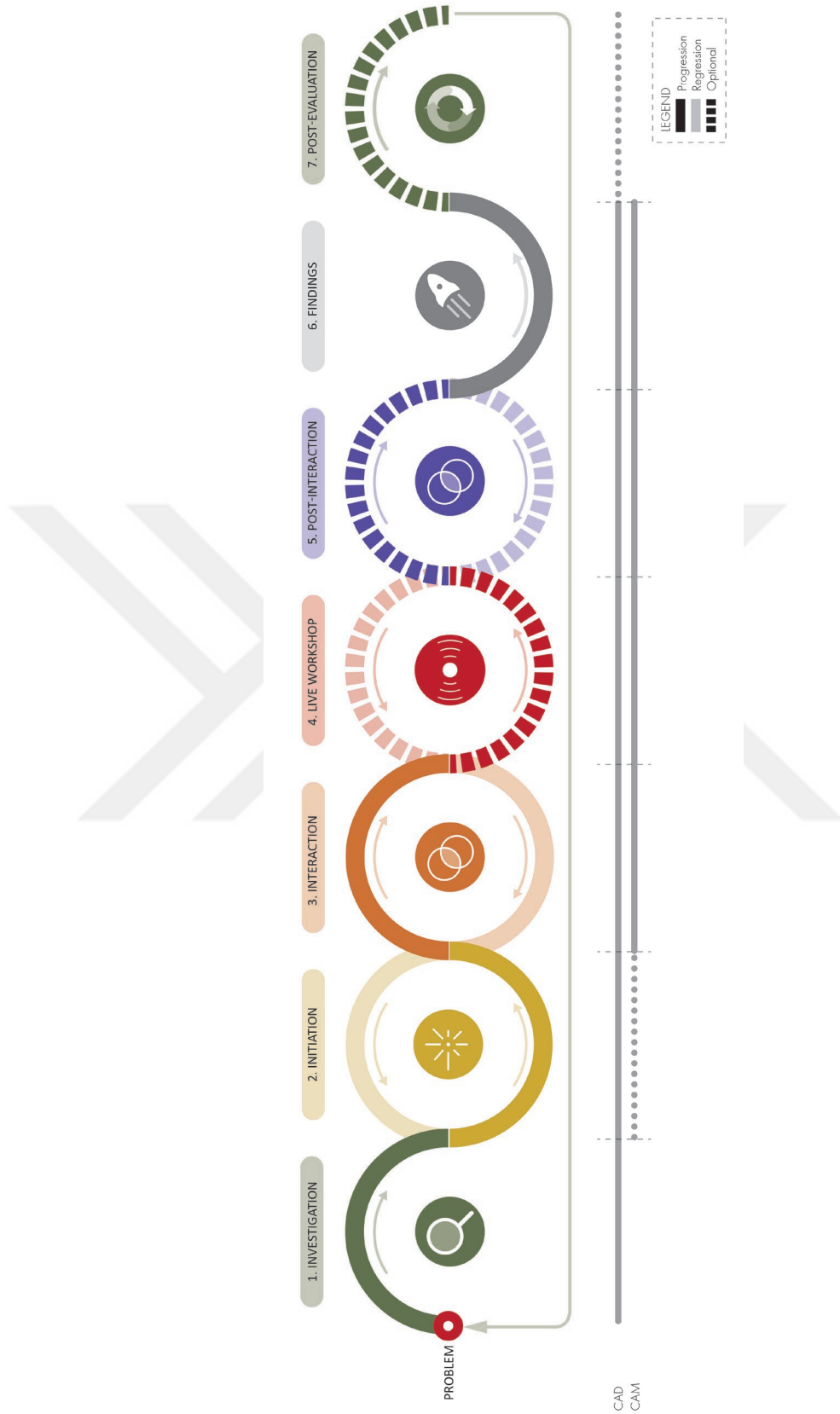
Figure 16. Participatory Design Process Proposed Method by Using Digital Design and Fabrication Techniques

CHAPTER 5: SOCIAL MEDIA and ITS SIGNIFICANCE for PDP

SM combines related terms such as social platforms and technologies (Hagen and Robertson, 2010; Näkki et al., 2011). These have been used to describe applications that enable individuals to gather, communicate, and share information on the Internet (Boyd, 2009; Hagen and Robertson, 2009; Kaplan and Haenlein, 2010). Various social media platforms are designed to illustrate different uses, such as blogging, content communities, virtual game worlds, and social networking sites. All of these platforms share the common goal of supporting the voice of their users (Kaplan and Haenlein, 2010).

There are many perspectives on the various aspects of online platforms. Some researchers have studied the personalities and motivations of users who connect with sites, while others have looked at how these platforms demonstrate the opposite (Ross et al., 2009). Others claim that social networking sites are designed to be something other than a networking tool for everyone. Instead, they are intended to maintain existing relationships, demonstrating how different people use them (Boyd, 2009).

The position that SM occupies concerning participation is not clearly defined. One can argue that the internet puts the users at the center of the system, supporting a participatory approach (OECD, 2007). However, it is also claimed that the design of SM is often unclear, and the developers retain greater power than the users. However, designers have to refer to influential commercial figures that control application programming interfaces, app stores, and data (Petersen, 2008). Today, open sources and open data materials are quite diffused (Tapscott and Williams, 2010).

Since PD research is expanding toward new fields of participation, it is possible to investigate how non-traditional tools can contribute to participation when the main aspects are transferred to a new field and how these tools fit in the new context.

Through SM, people have become more connected and knowledgeable about how they can share information (Hagen and Robertson, 2009). Through digital spaces, people have been able to have a louder voice in the design process. It is similar to how PD helped workers have a say in the design process. Despite the similarities between the methods used in PD and the use of SM, the concept of PD has yet to be widely adopted. This paper aims to understand better how this method can be translated and used in different contexts.

The study by Kepios found that around 5 billion people globally use the internet today. For instance, in April 2022, there were approximately 4.65 billion social media users. This is about 58.7% of the global population. The number of social media users has continued to grow over the past year, with over 300 million new users joining the platform in 12 months (Figure 17).
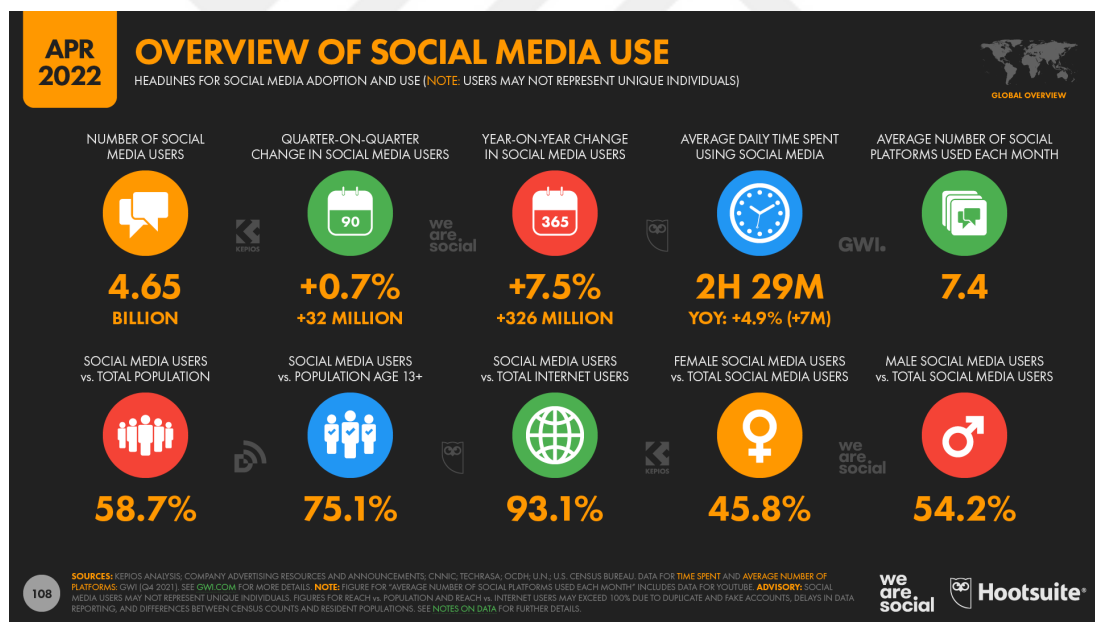
Figure 17. Overview of Social Media Use (Source: Kemp, 2022).

Although the number of people using social media is growing, it is essential to note that these figures sometimes represent only some individuals. For instance, due to duplicate accounts, the number of social media users may be greater than the actual population. It is also important to note that the exact number of people using social media does not always represent the entire population. For instance, most social media

platforms only allow users to access their services to people aged 13 and above.

A recent GWI (Global Web Index) study revealed that the typical social media user spends about 212 hours daily on the platform. They also actively use around 7.4 different social media sites each month. People are believed to sleep around 7 to 8 hours a day. Based on this figure, it is estimated that people spend about 15% of their waking hours on social media. The daily time people spend on social media platforms is equivalent to over a million years of human existence. Despite the dominance of Facebook, multiple social media platforms claim over a billion monthly active users. Meta owns half of these. According to data from Meta in its Q3 2021 earnings announcement, Facebook is still the world's most popular social media platform. As of October 2021, it has over 2.91 billion users. Despite the platform's limitations in China, its monthly active users grew by a solid 6.2% during the past year. Even though it has already reached more than half of its potential audience, this is true. Despite being outpaced by Facebook, YouTube has closed the gap between itself and the social media giant over the past year. The platform now has over 2.56 billion users, which is more than enough to make up for the difference between its total and Facebook's. The figures used to measure YouTube's monthly active users are based on the platform's ad audience.

In contrast, those used to measure Facebook's monthly active users are based on the company's data. Although Meta has not released official updates regarding WhatsApp's user numbers in the past year, the platform is widely believed to have around 2 billion monthly active users. Instagram is currently the fourth most popular platform globally and has experienced some of the fastest growth in the past year (Figure 18).
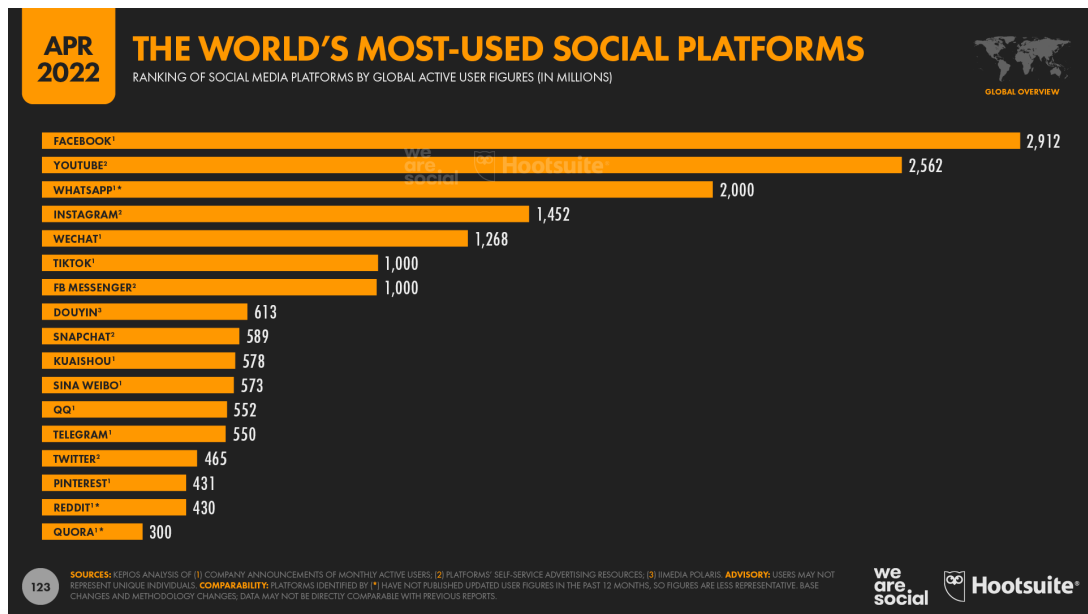
Figure 18. The World's Most-Used Social Media Platforms (Source: Kemp, 2022).

The study, which analyzed the usage of various social media platforms such as Facebook, Instagram, YouTube, and WhatsApp, found that users' use of each platform differed. One of the ways users used Facebook was to communicate with each other. For instance, it announced the activities' details and connected with the participants. On Instagram and YouTube, it was used to create a bridge among all users by displaying various images and videos. It was used to create group chats on WhatsApp and fasten the process through its designers and moderators.

One of the most critical factors researchers consider when choosing the right social media platform for their study is its potential. According to a survey conducted by "Our World in Data" in 2019, Facebook's growth rate has decreased but is still first (Figure 19).

Number of people using social media platforms

Estimates correspond to monthly active users (MAUs). Facebook, for example, measures MAUs as users that have logged in during the past 30 days. See source for more details.

Our World in Data

2 billion
1.5 billion
1 billion
500 million
0

2004 2006 2008 2010 2012 2014 2016 2018 2019

+ Add
Facebook
YouTube
Whatsapp
Instagram
WeChat
Tumblr
TikTok
Reddit
Twitter
Pinterest
Snapchat
MySpace
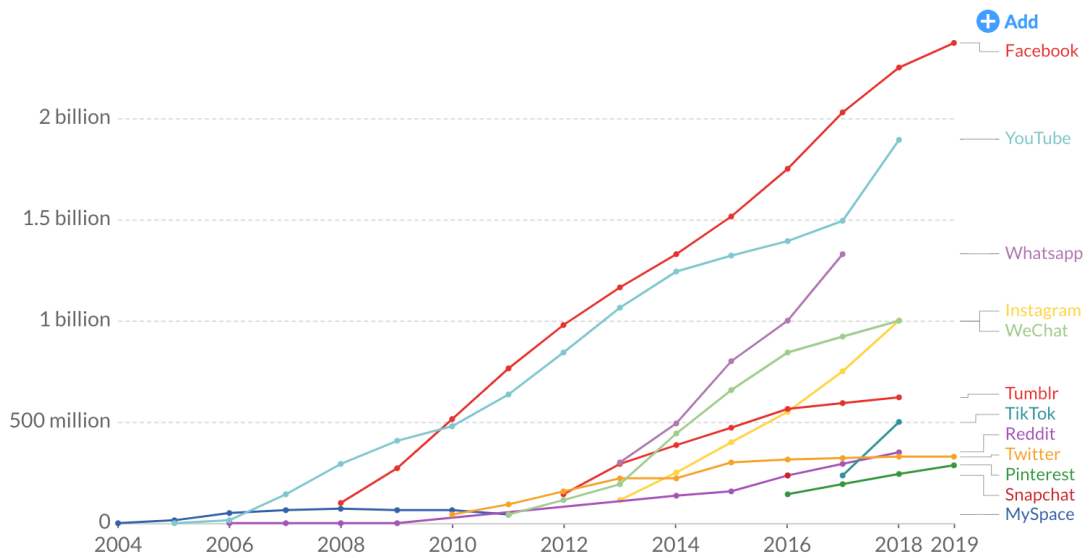
Source: Statista and TNW (2019)   CC BY

Figure 19. Number of People Using Social Media Platforms (Source: Chaffey, 2022).

The numbers presented by social media platforms are undoubtedly impressive, but they do not capture the full story of how social media has changed the world. The world's connected population makes use of various social platforms each month. This means there will be significant overlaps between the advertising audiences of different platforms. Figure 20 below shows the multiple overlaps between the advertising audiences of other social platforms. The data collected by GWI provides valuable insight for anyone planning to build a comprehensive digital marketing strategy.

1
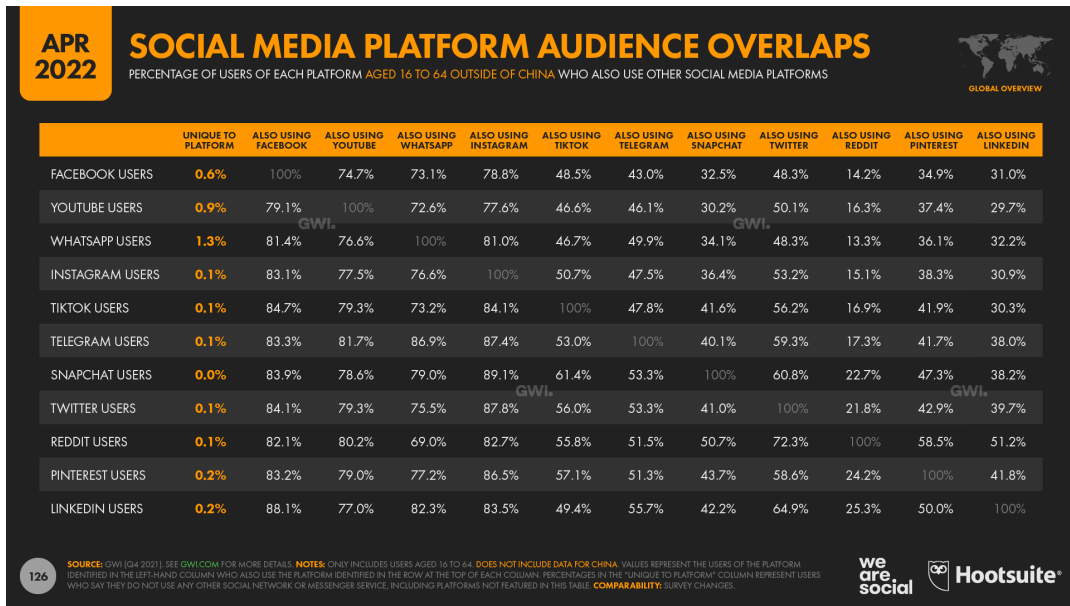
Figure 20. Social Media Platform Audience Overlaps (Source: Kemp, 2022).

Although reach is not the only thing a marketing plan should consider when building a social media platform mix, some studies revealed that different platform aspects could create a personalized and relevant marketing campaign. Different people will have different needs when it comes to social media platforms. Researchers must consider these needs and find the best platforms for their goals. Figure 21 below provides an excellent overview of why people use social media. However, it should also be noted that these motivations will vary depending on the country and age group.
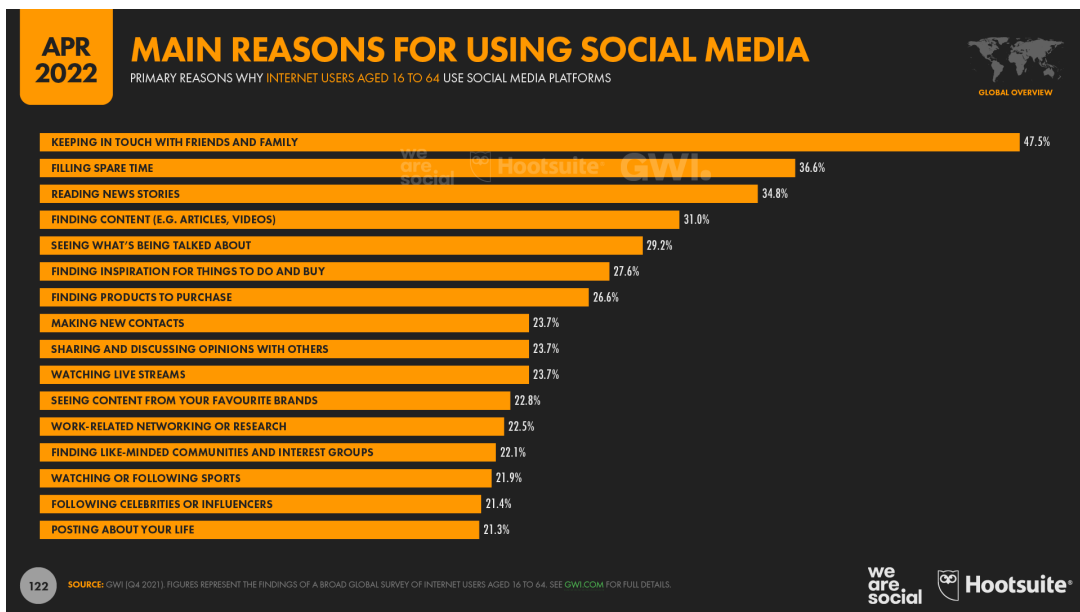
Figure 21. Main Reasons for Using Social Media (Source: Kemp, 2022).

The diversity of users on social networking sites such as Facebook, WhatsApp, Instagram, YouTube, and OP inspired this study to create a translation and design process for the case studies. The various ways these platforms are used demonstrate that design can be influenced by how people use them (Boyd, 2009). Instagram and YouTube are the most popular networking platforms and visual communication platforms. Despite the challenges of attracting users to an online environment, it was decided that the design should be brought to the existing one.

Instagram has become more widespread since its inception in 2010. The platform now has over 300 million users and is used by people worldwide to share and capture instant photos. In 2013, it introduced the ability to share videos. This attracted marketers, allowing them to discover this platform's various opportunities (Heine, 2013). The platform's rapid growth can be attributed to its multiple features. Some of these include its user-friendly app, the ability to create a community around a specific hashtag symbol (#) (Jordan, 2013), and the ability to share photos and videos with various creativity.

The latest data published in Meta's advertising resources shows that Instagram's reach has jumped by an impressive 21% over the past year despite essential changes in how the company reports its ad audience numbers. Meta's data suggests that more than a quarter of a billion new users joined Instagram in 2021, pushing the platform's global ad reach to almost 1.5 billion users by 2022. Instagram's audience has continued to grow, with 85 million users signing up in just 90 days. This indicates that its growth rate is accelerating. Instagram's impressive quarterly growth rates have been observed for some time now. According to our analysis, the platform's ad reach has increased by almost 60% over the past two years.

Instagram is a powerful tool for individuals and businesses, allowing them to connect with the world. In this era of digital transformation, it is becoming more visual. According to Jordan (2013), the rise of social media sites like Instagram and Pinterest has ushered in a visual revolution. He stated that these sites had taken the old saying about "do not tell" and have shown people how to show off their creativity. Heffernan also stated that the images on Instagram had become units of speech and function similarly to a colonial patois. According to him, old-school photography is the native

language of digitization, while the images on Instagram are the building blocks of a visual vocabulary.

Due to the increasing importance of visual imagery on Instagram, brand managers have started using it as a tool for their marketing efforts. The Digital 2022 Global Overview Report features data for Instagram's environment, which will be helpful for marketers who are exploring the platform's various opportunities. According to the study's authors, visual representations are more emotionally salient than verbal representations because they can convey an immediate response. The number of ads that appear in Instagram's home feed is almost all of the platform's active users. These placements are the most effective way to reach the platform's large audience. Instagram Stories has become one of the most popular platforms on Instagram, with more than a billion users watching ads every month. With the addition of creative options and the ability to run multiple ads simultaneously, the platform's environment is now more compelling.

The discovery of the Explore tab has added value to the marketing efforts of new brands and products on Instagram. It suggests that users are more likely to browse through new content and ideas in the platform's environment. Despite the success of Stories, Instagram Reels has yet to gain the same momentum. According to data collected by the company, over 675 million users still see ads in the platform's dedicated video tab each month. Instagram is a powerful tool that can be used to achieve the goals of various communication campaigns. Its ability to be planned, implemented, and maintained makes it an ideal choice for marketing (Figure 22).
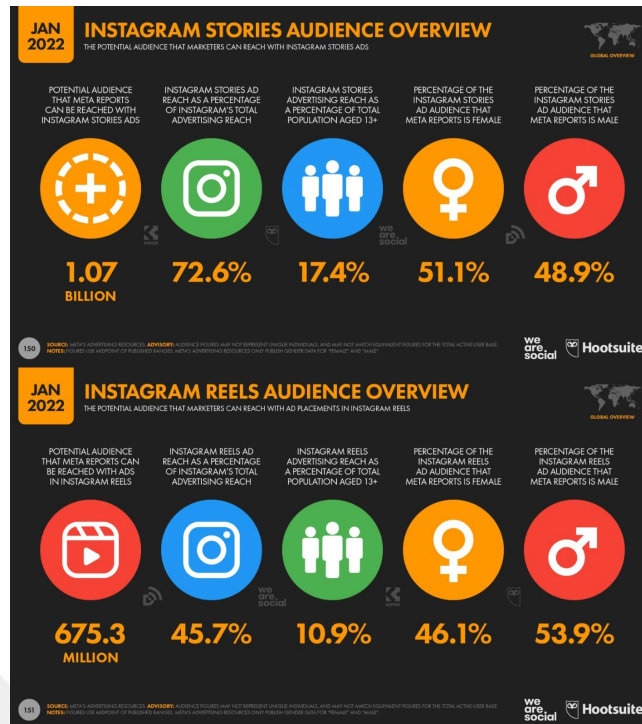
Figure 22. Instagram Stories and Reels Audience Overview (Source: Kemp, 2022).

According to a new analysis, the number of people watching ads on YouTube has increased by 11.9% over the past 12 months. However, these figures only represent a small portion of the people watching YouTube ads. There is also a chance that the ad reach is much higher. The report also noted that the number of people watching advertisements on YouTube has increased by 11.9% over the past 12 months. The site now reaches around 1 in 3 people on Earth. For instance, YouTube ads reach over 80% of all adults in 14 nations and over 75% in Western Europe. By the numbers, the site can reach over three-quarters of all adults in Western Europe and over 90% of all adults in various other countries (Figure 23).
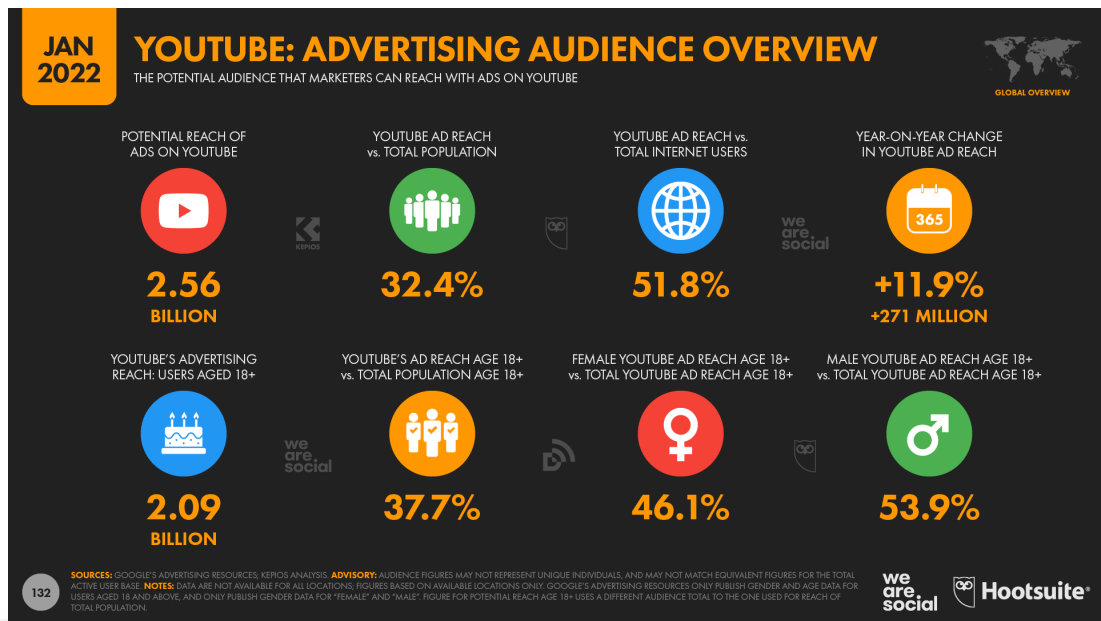
Figure 23. YouTube Advertising Audience Overview (Source: Kemp, 2022).

1.1. *What Social Media Changes in Participation?*

The rise of PD has been linked to the democratization of work and technology. It was founded in the 1970s and 1980s on the idea that people could work more freely (Greenbaum and Kyng, 2020). The rise of the Internet has led to new ways of participating in society. Traditional methods of participation may no longer be feasible (Johnson and Hyysalo, 2012). The effects of social media on the design process are not limited to the design process. According to Jenkins (2006), the boundaries between consumers and media producers have shifted due to new media's convergence and collective intelligence's emergence. In 2008, Bruns noted that users could quickly move across the various participation levels in a social media site. He also stated that there is no limit to how users can participate with existing content. Shirky (2008) presented several examples of how social media can achieve goals. She also discussed the informal approach to the design process. In 2010, Robertson and Hagen discussed the various tools and practices used on SM platforms. These include Facebook, YouTube, and WordPress. They define these as practices that enable users to increase their capacity to share and communicate. Social media platforms' various features and functions bring up various issues related to the design process. These include the intersection of design and use, the complexity of applications, and the designer's role in the context.

The complexity of the user context has changed significantly since the 1980s and 1990s, with a growing number of situations and participants participating in the planning phase. This change has challenged the attempts to define and encourage future use. In 2009, Isbister and Höök noted that the complexity of the user context is too many. Much research has been conducted on diverse groups involved in technology studies. Due to the increasing number of social technologies and the complexity of their users, more research is being conducted on the use context of these platforms. Some of these include the geographic distribution of users and the anonymity of their users.

The software engineering concept is usually focused on the development phase, often called the emergent design phase. This approach differs from the traditional model, which focuses on the maintenance phase. The concept of emergent design is commonly used in the design process of software platforms such as Twitter and Facebook. Due to their users' interactions, these platforms have changed their original ideas about designing their applications. In the 1990s, the concept of personalization, appropriation, and tailoring was studied in PD. These topics were related to the emergent design principle (Balka and Wagner, 2006; Mørch, 1997; Nardi, 1993).

The designer's role is vital in developing new technologies and work practices in the social technologies field. It is also crucial that the technical platform is included in the planning process to ensure that the users are involved in developing the system (Botero and Saad-Sulonen, 2008).

The design and use of social technologies are interrelated. They must be analyzed and considered together to develop effective and efficient systems. Because of the users' contributions, design can change unpredictably during the development cycle (Williams et al., 2005). The increasing popularity of SM and the emergence of new forms of participation have prompted a new reading of the users' needs in terms of participation (Johnson and Hyysalo, 2012, pp. 71-80). New forms of participation have emerged in the market for SM. One is learning the patterns of users' behavior in different types of products and services, such as online forums and real-time statistics. In 2008, Näkki and colleagues explored the various aspects of participation and facilitation when conducting participatory activities online. They stated that it is easier

for users to participate when it occurs through the Internet as it allows them to do so whenever they want. However, they added that this practice has some drawbacks, such as the lack of community and the missing feeling of belonging. One solution to these problems is to use a full name and profile picture on Facebook (Näkki et al., 2008).

In 2009, Robertson and Hagen explored the various aspects of social technologies and how they can be used to design and develop new products and services. In 2010, they discussed participants' challenges and opportunities in online activities. They created a Mobile Diaries method to help designers overcome these issues (Hagen and Robertson, 2009, p. 130).

Despite the various warnings about the potential of social technologies, it is still vital for designers to address the multiple challenges they might encounter when using them online. Due to the nature of traditional methods, it is only sometimes possible for designers to follow the same steps and techniques when using social technologies. For instance, they might not need help implementing the same strategies and methods online. In 2010, Sanders and colleagues noted that traditional methods could benefit designers as they can help them develop new ideas and designs (Sanders et al., 2010). Aside from being beneficial for design, social media also has various other potential applications that professionals can use. For instance, it can support organizational collaborations (Steinfield et al., 2014). Despite the increasing popularity of social media, some organizations are still reluctant to adopt it for professional purposes (Abeysinghe and Alsobhi, 2013). Integrating it into existing work practices or designing new ones can take time and effort. For instance, it can be challenging to establish a network for new users and manage the various tasks related to social media (Heikkilä et al., 2011). Due to the nature of social media, it is often confused about its various characteristics and functions. Some of these characteristics might not be appropriate for specific professional organizations. For instance, self-organization or openness might not be appropriate for many organizations. Social media has become a part of our lives and has evoked various emotions and interpretations (Talsi, 2013).

1.2. Exploring Online Participants

The platforms users use to share ideas, such as YouTube, Instagram, and Online Education Platforms (OEP), were built on narratives that place users as creators who are encouraged to explore and discover new ideas (Linder et al., 2014).

As social media platforms evolve, designers must consider leveraging these technologies to engage with their various stakeholder groups (Scolere and Humphreys, 2016). This study explores the dynamics of co-design within the professional design context. It shows how the designer is often viewed as the lead in the creative process and where the 'designing for' mindset persists (Sanders and Stappers, 2014).

The rise of social media platforms such as Instagram, YouTube, and OEP has created an environment where everyone is considered creative, and co-design is often presented as a part of the design process. This study explores the dynamics of this discipline within these platforms.

Participation has been analyzed in several aspects. Bossen et al. (2010) identify participation under the following aspects:
- Roles: moderator, designer, user;
- Type: direct or indirect;
- Degree: source of information or co-designer, according to the role of the users during the DP;
- Duration: procurement, initial design phase, throughout the project;
- Arena of participation: project, organization (Gärtner and Wagner, 1996).

On the other hand, Social Technographics analyzes online participation. Bernoff and Li examined online participation and developed an explanatory ladder of participants (Bernoff and Li, 2007; Li and Bernoff, 2010). It emerges that seven grades span from spectators to creators. The level of participation increases at each step. However, it does not indicate a progressive sequence. Rather than segmentation, it provides grades of participation – or roles – that can extend from one to another. The roles may overlap as participants operate in multiple ways, approaches, and strategies (Figure 24).
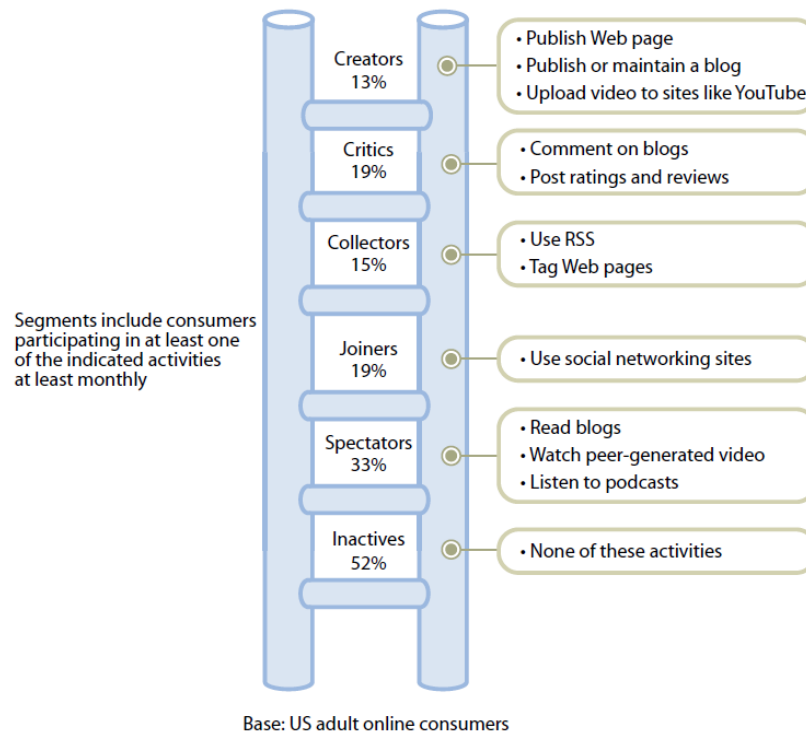
Figure 24. Social technographics revisited – mapping online participation (Source: Bernoff and Li, 2010)

Starting from the top of the ladder, the Social Technographics participants are respectively:

Creators: participants who administer and publish content on blogs and websites at least once a month. This category is represented mainly by young adults (average age of 39). Gender does not affect contribution, and in terms of kind of activities (e.g., publishing on their webpage or a blog, uploading videos on YouTube, managing a website), creators contribute differently.

Critics comment on blogs or review websites, such as online shopping pages. They select where they want to share their opinion and mostly use others' web pages as platforms. Around 60% of critics review, rate, or comment on blogs, but 22% do both. 40% of critics are also creators. The activity intensity is below the creators,' and their age is older on average.

Collectors are mainly represented by users who save web pages and bookmark contents on social (around 65%) or use RSS feeds (more than half). Their activity is essential for organizing the vast amount of content created by creators and critics, as

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it establishes a re-directory among web pages. They are mostly males, and 15% of the collectors are adults.

Joiners are characterized by one behavior: using social networks (e.g., Facebook). Even though socials are very diffuse, the youngest adult population is engaged chiefly. 56% of them also read blogs.

Spectators (33% of the online population) read blogs, listen to podcasts, and watch videos. Spectators can also be creators; they may contribute differently in different fields. However, spectators are hardly located on the higher steps of the ladder. Indeed, 31% of the Spectators do not have any role as Creator, Critic, or Joiner.

Inactives represent 52% of online adults who do not engage in any social computing activity. Their average age is fifty, and they are primarily women. Inactives may be influenced by SM only when news media publish SM content.

Social Technographics profiles may significantly differ according to the age of the participants. In this context, beneficial is a categorization based on generations, which includes groups of people born around the same time and raised in a similar context. The members of these groups usually have similar preferences and values. Accordingly, Generation Y, Generation X, and Boomers are defined. Table 4 shows that youths are the most engaged group of creators in social computing activities, while among Generation Y online participants, joiners are the majority (Li and Bernoff, 2007).

Table 4. Percent of each generation in each Social Technographics category (Source: Li and Bernoff, 2007).

	Youth (12-17)	Youth (18-21)	Gen Y (18-26)	Gen X (27-40)	Young Boomers (41-50)	Older Boomers (51-61)	Seniors (62+)	Total
Creators	%34	%37	%30	%19	%12	%7	%5	%13
Critics	%24	%37	%34	%25	%18	%15	%11	%19
Collectors	%11	%16	%18	%16	%15	%16	%11	%15
Joiners	%51	%70	%57	%29	%15	%8	%6	%19
Spectators	%49	%59	%54	%41	%31	%26	%19	%33
Inactives	%34	%17	%21	%42	%54	%61	%70	%52

Wicklin (2010) analyzes the use of SM among age groups and the significant type of activity. The graph shows, once again, that the most engaged group in SM is between

18 and 26 years old, and as the age grows, the use of SM decreases.

Just as different generations watch different shows and read different magazines, necessitating marketers to have different media plans for each group, each generation's unique Social Technographics profile also requires varying social strategies. Teenagers create more than any other generation. Joiners dominate Gen Yers.

Simonsen and Hertzum (2008) propose that PD develop with the support of systematic change management. Four are the main challenges for participation:

- Attaining appropriate conditions and focus for PD;
- Managing a large number of stakeholders;
- Managing a stepwise implementation process;
- Conducting realistic large-scale PD experiments.

1.3. PD in Social Media Contexts

Through social media, people can connect and interact with each other, creating a lasting and vibrant cultural exchange. This concept is a new generation of living heritage practices (Giaccardi, 2012). Social media sites allow people to share and discuss information about themselves and their lives. They can also use multimedia tools to create a personalized and interactive experience. These sites allow people to create and exchange content and converse with others. They can be categorized into various forms: blogs, microblogs, forums, social networks, virtual worlds, and news sites. These tools also feature interactive communities, digital storytelling, and video sharing. Social Media Networks allow users to create a profile and access a list of people they want to connect with. They can also view and navigate their connections. It has been stated that these sites help strengthen the offline relationships of users (Nasir et al., 2012).

In 2012, researchers from Singapore conducted a study to determine how the citizens' participation in government control affects the use of social media in the city-state. They found that as traditional media was used by parties campaigning for elections, people started using social media (Skoric et al., 2012). The researchers found that the

use of social media was associated with the likelihood of citizens attending political rallies (Bollen et al., 2010, October).

Due to social media platforms' rapid emergence and evolution, users can easily access and customize their services. The results of the studies may be affected by various factors, such as the project's context, the product's novelty, and users' familiarity with the service. In a study conducted in 2002, Williams and Russel discussed the idea that specific patterns can be identified within a technology project even though the temporal and social context of the project varies. They also noted that these patterns are commonly referred to as the various aspects of a project. The study's authors focused on the concept of the symbolic interactionist, which states that concepts widely used to describe certain phenomena can be used to examine the conditions under which they might be encountered. Their findings suggest that the concepts commonly used to describe certain concepts may be less relevant in another domain (Star and Clarke, 2008).

SM encourages forming 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 developers and collaboration with user-owned related resources and services. Furthermore, the employment of digital user trials augments the asymmetrical relationship between users and developers, eventually causing losses in users' loyalty.

Designers' strategies may benefit from users' feedback and wishes by allowing open evolutions. These strategies imply a shift toward a design strategy that considers after-launch developments. On the other hand, this implies a special preparation for rapid interface changes. An important issue is the centrality of user-generated content and the users' inputs in service evolution. While these have changed from SM services to date, user-owned related resources and services are a central issue.

Designers must consider the role of participation in social media when planning and designing for professional contexts. This role is essential due to the nature of the platform, which is based on the sharing, discussion, and networking of content (Lietsala and Sirkkunen, 2008). Unlike traditional technologies, social media is user-driven. It allows users to design social media networks and content that eliminates technical expertise and provides a low-cost alternative to traditional practices. Through the availability of free or low-cost social media tools, organizations can easily take advantage of new tools and participate in design processes. Because the tools are easy to implement, they are also very user-friendly (Hagen and Robertson, 2010).

1.4. Proposed Method

The nature of SM makes it necessary for design processes to involve people from different backgrounds and interests. This involvement is done through PD, which is interested in bringing together experts from different fields. Although many factors make a PDP successful, combining the various backgrounds and interests can be challenging. This study tries to find ways to involve people from different backgrounds in the PDP. Through PD, participants can also embrace various aspects of their participation that allow them to improve their understandings and take-for-granted assumptions. One of the recommendations that this study makes is to involve people from different backgrounds in the design process. To make the most of SM's opportunities, it is also essential that participants take a critical look at how they can become and belong as participants.

Instead of a traditional approach to participatory design (Bødker and Kyng, 2018), this study explores how an online platform allows professional designers to experiment with their end-users (Sanders and Stappers, 2014). It draws attention to the various ways and platforms, such as Instagram, YouTube, and OEP, in which collaboration and participation are integrated into a more traditional design process. The findings of this study reveal how the platform allows designers to experiment with their end-users. It also suggests the potential for new social media logic in co-design.

Participatory design was a method that sought to counter the traditional design processes that are geared toward project-based methods (Bjögvinsson et al., 2012). It emphasized the involvement of the public in the development of projects, as well as

the infrastructure needed to support their social impact (Dantec and DiSalvo, 2013). Aside from helping people influence significant issues, participatory design can also help shape a more inclusive discourse. According to Bødker, Bardzell, and Bannon (2019), it is beneficial to reimagine the method as a continuous dialogue.

The concept of the PD suggests that the user is viewed as an expert in their field, and the designer can help facilitate the design process. This new approach also involves working with a professional designer with specific expertise in design. Co-design occurs when multiple stakeholder groups come together to form a design process. This can be done using various tools and resources such as generative tool kits and probes. Despite the multiple insights presented about the interactions between users and designers on social media platforms, there still needs to be more understanding of how these processes are conducted in professional design communities.

The saying "a picture is worth a thousand words" is very persuasive when applied to the modern world, where pictures and photos are becoming a common language. Because of the emergence of a multicultural environment and the disappearance of borders, people can easily communicate with each other through pictures and photos. The idea of pictorial superiority has been acknowledged long before. In 1976, Nelson, Reed, and Walling discovered that photos are more memorable than words. In many recall tests, people are more likely to remember a photo than a word due to its visual significance. This phenomenon could be explained by the link between the visual and its meanings.

On the one hand, visual information is more evocative than words because it provides a deeper understanding of the human condition. On the other hand, it is more emotionally salient due to its historical significance (Amit et al., 2014). Because of all these reasons, social media based on visual representations was selected for this study. The distinctive nature of SM underscores the importance of incorporating individuals with diverse backgrounds and interests into design processes. This inclusivity is achieved through PD, which aims to unite experts from varied fields. While several factors contribute to PDP success, harmonizing diverse backgrounds and interests remains a formidable challenge. This study endeavors to identify strategies for involving individuals from different backgrounds in PDPs. Through PD, participants

can explore various dimensions of their engagement, enhancing their understanding and challenging preconceived assumptions. An integral recommendation from this study is to engage people from diverse backgrounds in the design process, urging participants to assess their roles for optimal utilization of SM opportunities critically. In contrast to the conventional approach to participatory design (Bødker and Kyng, 2018), this study delves into how online platforms enable professional designers to experiment with end-users (Sanders and Stappers, 2014). It sheds light on diverse platforms such as Instagram, YouTube, and Online Education Platforms (OEP), illustrating how collaboration and participation seamlessly integrate into traditional design processes. The findings underscore the platform's experimental capabilities to designers, proposing the potential for a novel social media logic in co-design.

The PD originated as a method challenging traditional project-based design processes (Bjögvinsson et al., 2012), emphasizing public involvement in project development and the necessary infrastructure to bolster social impact (Dantec and DiSalvo, 2013). Beyond empowering individuals to influence significant issues, participatory design fosters a more inclusive discourse, suggesting a shift toward continuous dialogue (Bødker et al., 2019).

The participatory design concept positions the user as an expert in their field, collaborating with a professional designer possessing specific design expertise. Co-design materializes when diverse stakeholder groups converge to shape a design process, employing tools like generative tool kits and probes. Despite numerous insights into user-designer interactions on social media platforms, further exploration is needed to comprehend these processes within professional design communities.

The adage "a picture is worth a thousand words" is relevant in our modern visual-centric world, where images have become a universal language. Communication through pictures and photos has become increasingly prevalent as our global community transcends borders. The concept of pictorial superiority, established by Nelson, Reed, and Walling in 1976, affirms that photos are more memorable than words. Visual information's evocative and emotionally salient nature and its ability to provide a deeper understanding of the human condition justifies the selection of social media platforms based on visual representations for this study.

In alignment with the theoretical framework, this study takes a hands-on approach to demonstrate the application of SM platforms within the PDP. A chart outlining the seven fundamental steps of PDP – investigation, initiation, interaction, live workshop, post-interaction, findings, and post-evaluation – provides a visual roadmap. This comprehensive PDP model is specifically tailored to capitalize on the unique strengths of diverse SM platforms.

The Investigation phase initiates on Instagram, leveraging its visually rich interface for preliminary exploration of user experiences, trends, and preferences through compelling visual content.

Moving to the Initiation phase, YouTube introduces project goals and design objectives, fostering community engagement through video content that conveys complex ideas and sets the tone for collaborative involvement.\WhatsApp takes center stage during the Interaction phase, providing a real-time communication hub for ongoing discussions, idea exchanges, and collaborative engagement essential to participatory design. Zoom becomes pivotal during the Live Workshop phase, offering a virtual space for real-time collaboration. Its video conferencing capabilities enable synchronous interaction, facilitating co-creation, discussions, and ideation.

Transitioning to the Post-Interaction phase, Miro, a collaborative online whiteboard, supports the visual mapping of concepts, organization of findings, and contribution to the collective representation of the design process.

The Findings phase finds a home on OEPs, where structured environments support the documentation, analysis, and presentation of insights, ensuring accessible and shareable knowledge.

In the Post-Evaluation phase, WhatsApp re-emerges as a platform for reflections, feedback, and continued discussion. This step contributes to the iterative nature of participatory design, fostering ongoing dialogue for future enhancements.

This integrated use of Instagram, YouTube, WhatsApp, Zoom, Miro, and OEPs underscores the versatility of SM platforms in every stage of the participatory design

process. It enhances user engagement, amplifies collaborative and iterative design aspects, and aligns with the study's objective to explore the intersection of social media and professional design practices (Figure 25).
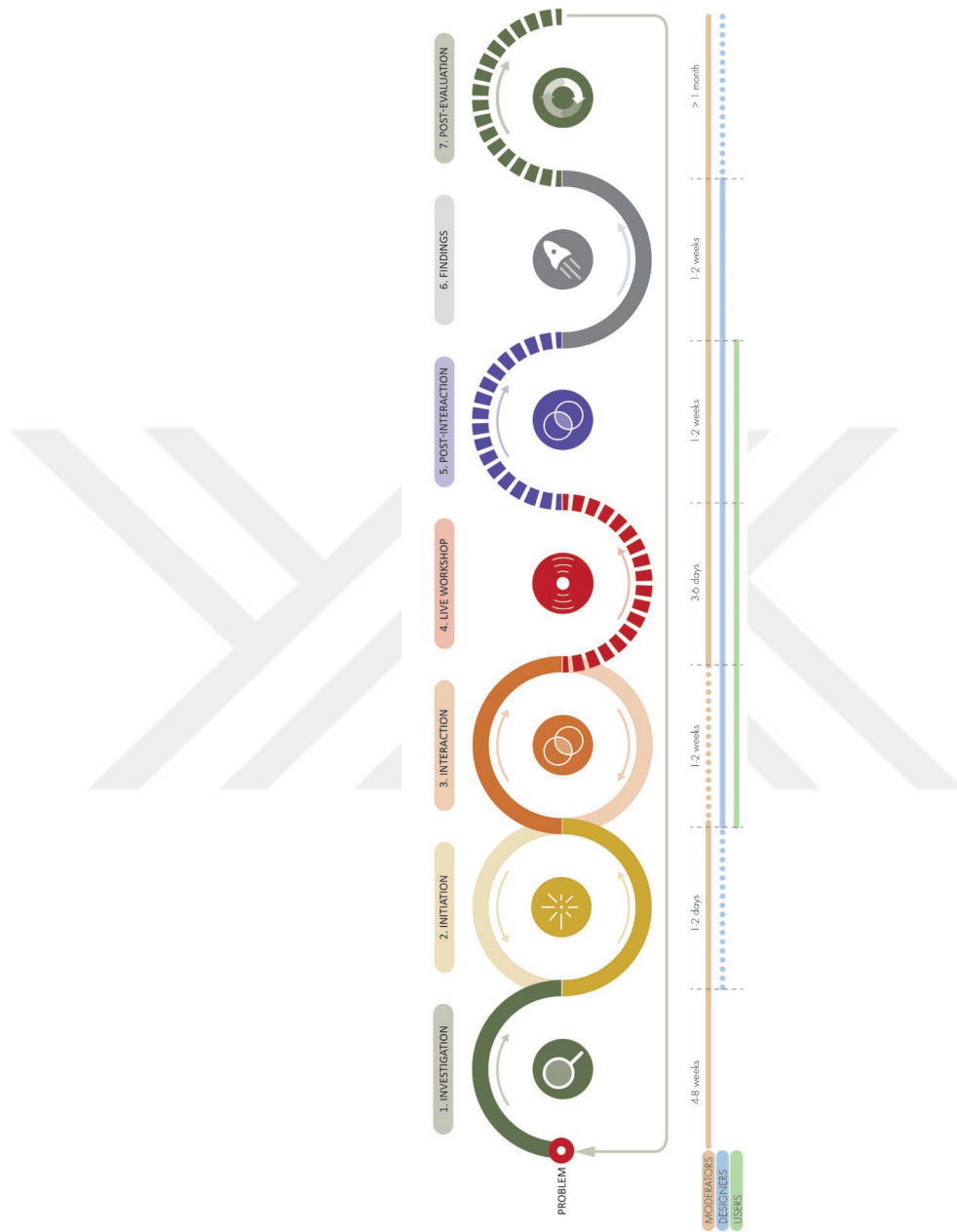
Figure 25. Participatory Design Process Proposed Method by Using Social Media and Online Platforms

CHAPTER 6: CASE STUDIES

Interior designers have been involved with people's needs. The industrialization of the construction processes has reduced personal contact among designers and users. PDP benefits users and designers by allowing people from different backgrounds to come together. They can also be fruitful, providing valuable lessons and insight into the design process. This study addressed the various problems that can arise during a process, such as sequencing, organization, and communication.

The concept of children having a right to participate in decision-making dates back to the 1800s. According to Hart (1992), participation is a fundamental right of citizenship that everyone in a community should have. He defined it as sharing decisions that affect one's life and the community.

The projects aimed to explore the new PDP method supported by DI and SM in learning environments that can find a place in each interior design process to increase participation and quickly establish many participants as active co-designers.

These projects were carried out during the spring semester of 2018-2019 and 2019-2020 within the course INAR 3302 - Furniture Design, INAR at Yaşar University (YU), Izmir – Turkey. The task was based on the TEGV Education Center. TEGV has supported more than two million children, particularly in areas with limited educational possibilities, with the potential for education for more than twenty-five years. That allows the study to reach a broad spectrum of participants. Caploonba Furniture Firm, with years of experience assembling children's furniture, was the third party to sustain the project. Aside from the moderators, designers, and users, facilities and specialists were also involved. All the participants were required to have their consent before the process started. The study also addressed the various problems arising during a participatory process.

The projects' durations were eighteen to twenty-four weeks, which consisted of four to eight weeks of preparation (Phase 0), fourteen weeks of the design process (Phase 1, 2, and 3), and several weeks of the exhibition and usability testing. In addition to

those periods, the post-evaluation continued for several weeks.

The challenge of the case studies was managing the vast number of participants and data during the limited time of the design process. In the first case study, Zoo Project, the project kept a local scale. TEGV Çiğli Education Park was chosen because of its scale and location. Education Parks are the most significant settlements of the TEGV organization. Çiğli Education Park is close to YU, making it easier to access for all parties. During the first PDP, seven moderators/lecturers, 90 designers/students, 188 users, four stakeholders, seven specialists, and two facilities attended. The main issues of the first case study were creating a common language among designers and users and using DI to speed up the process. The second case study, the Empathy Project, was conducted internationally with many participants. During the first PDP, five moderators/lecturers, 59 designers/students, 236 users, ten stakeholders, 18 specialists, three facilities, more than 2500 YouTube contributors, and around 3000 Instagram contributors attended. The primary purpose of the second case study was to manage a considerable number of participants and increase the participation level by using social media.

All furniture elements were manufactured by using plywood as the primary mandatory material. The manufacturing process integrated digital fabrication techniques, such as CNC fabrication – Computer Numerical Control – and, optionally, 3D printing for additional accessories. Each project was designed by working in a team of two interior students.

Including the users in finalizing the design ensures that some design solutions are reached within the design process. Thus, users have the power to implement their decisions, and there is a high possibility of getting feedback about the result of the design process.

Two case studies were practiced with the (TEGV) and YU INAR for two years (Figure 26).
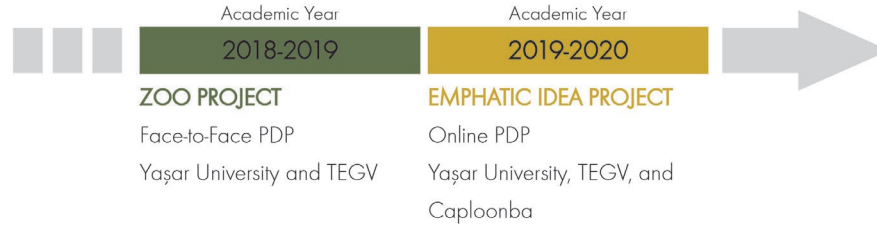
Figure 26. Case Studies' Timeline

The task was based on TEGV Education Center users between 6-14-year-old children, volunteer educators, and workers. TEGV has supported more than 2 million children, particularly in areas with limited educational possibilities, with the potential for education for more than 20 years. That allows the study to reach a broad spectrum of participants. Animated videos, AR/VR, brainstorming, digital modeling, discussions, drawings, exhibitions, games, interviews, questionnaires, juries, observations, pilot tests, research and analysis, seminars, SM, surveys, usability testing, and workshops were conducted. Through the case studies, the findings are expected to provide insights into conducting a participatory process with children, the role of participants, the degree of participation, and interaction and communication among users, designers, specialists, and moderators.

The study results will benefit all design field researchers and interior design researchers in understanding the potential of the DI and SM on the PDP. Compared to more traditional PDP methods, these methods do not respond to modern-day needs. However, they include a more strategic exploration of what could provide meaningful value for moderators, designers, and users.

6.1. Problem Statement

Participants are expected to perform their duties with due diligence and commitment to the project. Due to the complexity of the project, it usually requires the support and professional assistance of others. Aside from planning principles and design guidelines, other factors, such as community involvement and professional help, are also considered during the development phase. With guidance, community groups can be able to address the issues they face. Because of that reason, problem statements must be made clear to the groups. People interested in participating in a PDP are

usually motivated by the belief that change can happen. Participation can function if it is active, directed, and motivated by a sense of achievement. However, it is also essential to re-examine the planning and design procedures to ensure that participation is more than just confirming the professional's intentions.

DI and SM have the potential for the design field to create more interaction between all parties inside the design process. Even though DI and SM have a broader impact on the other design fields, there is still great potential to be explored in the interior design field. The main reason for the limitations in the interior design field is the scale of the work. Scale issues bring time, budget, space, and draft prototyping limitations during the PDP. In addition to that, participants' willingness to attempt the PDP is also affected by scale-related issues.

This study uses SM and DI to overcome some of the main obstacles for the PDP in the interior design scale. The new platform based on SM allows all parties easy access to PDP. Another aim of using the SM is to increase the users' sense of belonging and bring awareness of their environment.

6.2. Method

The study encourages people to become more aware of problems and improve their decision-making process. This process can be done through participation through lectures, workshops, and demonstrations (White et al., 1994). Through participation, people can learn about various environmental issues.

The designer's role is to help the group reach its goals and facilitate the process, allowing them to make informed decisions. It also includes developing resources that will benefit the members of the community. A moderator is a person who helps people come together to determine what they want to do. He or she can then help them find ways to work together to make the desired changes. This type of facilitation can also be done using various techniques, such as group facilitation.

It is imperative that planning for participation involves careful analysis. While examining all goals and objectives is only sometimes necessary, various techniques

can be utilized to achieve these goals. Over the years, various organizations have been working toward increasing their knowledge about the various techniques that can be used to achieve participation goals. These include various forms of surveys, task forces, and public hearings. The effectiveness of these programs can vary depending on the nature of the plan. It is also essential to consider the various aspects of community participation when planning for participation. Since it is a complex concept, it requires much thought to develop an effective program.

During the study, two different case studies - Zoo Project and Empathic Design- were executed over two years. Case studies were practiced with TEGV and YU INAR. Animated videos, AR/VR, brainstorming, digital modeling, discussions, drawings, exhibitions, games, interviews, questionnaires, juries, observations, pilot tests, research and analysis, seminars, SM, surveys, usability testing, and workshops were conducted. Through the case studies, the findings are expected to provide insights into conducting a participatory process with children, the role of participants, the degree of participation, and interaction and communication among users, designers, specialists, and moderators. Furthermore, the case studies' output may help shape new hybrid methods for PDP.

The study results were beneficial for all design field researchers and interior design researchers to understand the potential of the SM and digital tools on the PDP. Compared to face-to-face PDP methods, these methods must respond to modern-day needs. However, they include a more strategic exploration of what could provide meaningful value for moderators, designers, and users.

One thing that separates PDP from other qualitative and quantitative strategies is using generative methods that allow users to participate in the design process. These may be combined with techniques that allow users to decide and contribute feedback on design suggestions or notify our mentality of the range from users' perspective. Researchers can utilize these principles to assess and select methods when organizing PDP activities (Table 5 - Participants are D: Designer; M: Moderator; EU: End-User; SP: Specialist; ST: Stakeholder; F: Facility). These different capabilities have been translated into the following four criteria.

Create Through: These methods allow participants to be part of the design activities and create alternatives to present proposals or fresh ideas that grow the design process.

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

Hear out: These methods are proper for reaching data and feedback from participants about their memoirs and expertise but are primarily based on ideas within the capacity to produce new chances and options for the future.

Feedback: These methods benefit experiment designs formed from more initial design analysis, such as usability testing.

Table 5. Methods and criteria (D: Designers, EU: End-Users, F: Facilities, M: Moderators, SP: Specialist, ST: Stakeholders)

METHOD	Description	Create through	Learn from	Hear out	Feedback	Participants
Animated video	Enable to communicate with participants	x			x	All
AR/VR	Enable to communicate with participants in the virtual environment	x			x	All
Brainstorming	Gather ideas spontaneously	x		x		D, M, EU, ST
Digital modelling	Develop a design idea	x				D, M, SP
Discussion	Enable feedback and discussion from a range of participants around specific topics, over a structured time frame		x	x	x	All
Drawing	Develop a design idea	x				D, M, SP
Exhibition	Enable feedback and communicate with end-users.			x	x	All
Game	Enable feedback and input into language and information design	x	x	x		All
Interview	Understand issues and topics and gain feedback on possible design proposal			x	x	All
Jury	Enable to gather opinions and feedback from the participants		x		x	All
Observation	Gather data of phenomena in their natural setting			x	x	D
Pilot Test	Verify the performance of a product	x			x	D, M, EU, SP, F
Post-Evaluation	Gather information about users' responses to the final design				x	All
Research and Analysis	Gather input to be used in the design process		x			D
Seminar	Share information		x			D, M, SP
Social media	Communicate with the participant and collect feedback			x	x	All
Survey	Gain an understanding of user profiles and opinions			x	x	All
Usability Testing	Capture responses to design or prototypes				x	D, M, EU, SP, F
Workshop	Evaluate and generate concepts, ideas, and prototypes	x	x	x		D, M, EU, SP, F

6.3. Analysis of Participants' Profiles

Defining the people using the design is difficult for most designers, especially in large projects. It is also a more challenging task to empathize with the users. That is why designers must have the necessary knowledge to help people understand new ideas. The study explored the feasibility of design facilitators becoming more involved in the design process. Aside from being able to help people understand new ideas, they also became more involved in the social aspects of the design process.

For two years, the study was based on TEGV Education Unit users between 6-14-year-old children, their families, volunteers, educators, and workers. TEGV was chosen as a case study because it is widely extended in Turkiye with 67 education centers. That was important to reach a wide range of Turkiye, which is divided into seven regions, each with various cultures. The study was conducted within the YU INAR Department Furniture Design Course with around 60-90 students (designers) and 5-8 lecturers (moderators).

The PDP, YU INAR Department, TEGV, and the Caploonba firm took several roles. In this part of the study, each party and their roles during the process will be explained in detail.

YU was established in 2001 and started the academic year of 2002-2003 in Izmir, Turkiye. The faculty of Architecture, which includes the Department of Architecture and Department of Interior Architecture and Environmental Design, is one of the faculty of nine faculties under the YU. Departments of the Faculty of Architecture aim to educate qualified and ideal specialists well provided to design projects that will form the future built environment.

The Department of INAR has been active since 2004 in educating interior architect candidates. Furniture Field is one of the sub-fields under the INAR Department. There are compulsory courses that take part in the 3rd-year schedule. These courses aim to educate students about relations between interior spaces and types of furniture roles during the interior design process. The first-semester course focuses on furniture basics by analyzing existing furniture and re-designing it with new production techniques.

The second-semester course allows the students to design furniture through the case and needs of the users. For this study, the Furniture Design course was selected because it allows for designing specific items tailored for children in the educational environment.

TEGV, one of the leading foundations, celebrates 25 years in 2020. In 1995, a group of businessmen, directors, and academicians, led by Suna Kıraç, founded the Education Volunteers Foundation of Turkiye (TEGV). The first purpose of the TEGV is to provide education for children who cannot reach a high quality of education. TEGV focuses on providing "out-of-school education" assistance to primary school students. With the passing years, TEGV has become the leading educational non-governmental organization. In 1996, TEGV's first Educational Park was opened in Fındıkzade, Istanbul. In 2007, TEGV began to train volunteers through local tutors. A new program was initiated for the Fireflies. The NBA supported TEGV. In 2009, TEGV was announced by the National Assembly as one of the foundations allowed to organize charity collections without prior permission. In 2012, TEGV started to send volunteers to the European Volunteer Services Program after the accreditation. The Education Truck, which covered 112,214 kilometers and reached 720,098 children, was sent to Macedonia and Kosovo to introduce TEGV's educational programs. In 2017, TEGV started algodijital.com with Google.org to introduce children to coding. In 2019, TEGV attended the European Parliament in Brussels for the "Faces of Turkey" Exhibition. TEGV organization tree shows the structure of the foundation management (Figure 27).
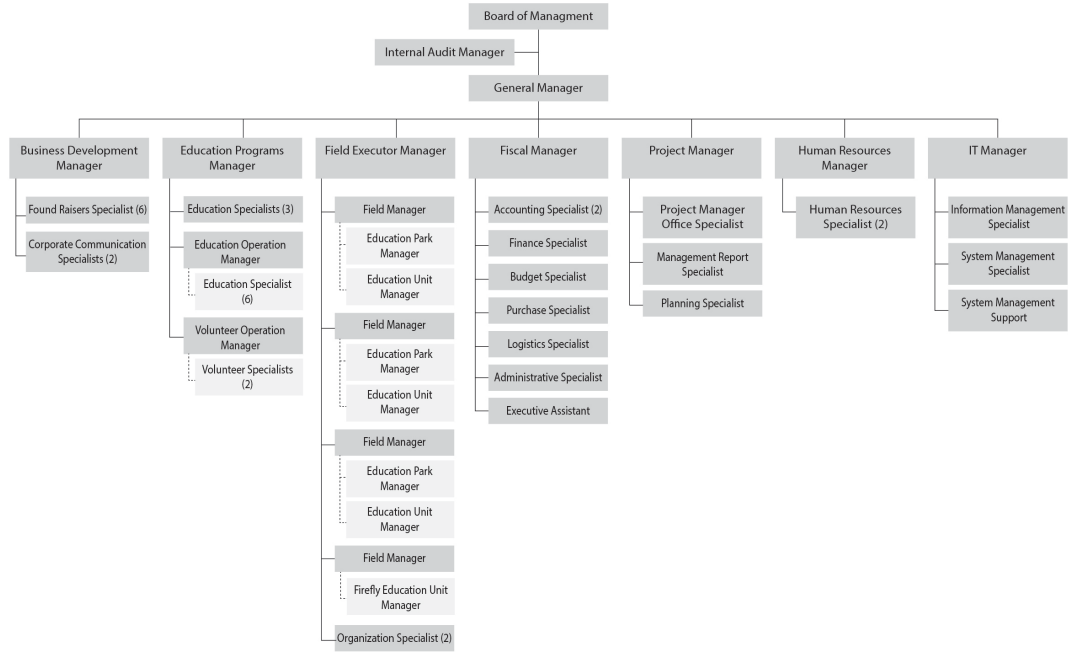
Figure 27. TEGV Organization Tree

Education programs management and field executor management contributed to the design process. General Manager Sait Tosyalı was part of since the beginning of the process during the agreement period. In addition, business development management supported the project through SM.

Today, TEGV has a total of 10 education parks (Two in İstanbul and one in each of the following cities: Ankara, Antalya, Eskişehir, Gaziantep, İzmir, Samsun, Şanlıurfa, and Van.

Education Parks are built on spacious grounds allocated by the local authorities, and they have all the spatial and technological capacities to support a versatile education. The parks have 10-20 acres of open space and 1200 m2 of indoor space. Each year, about 3500 children attend activities at the education parks. There are soccer pitches, basketball courts, etc., in the outdoor areas, and the indoor areas have ten activity rooms, two computer rooms, and a library.

Education Units are on a smaller scale. They are set up in cities and municipalities where education opportunities are limited. The units are established in sites allocated by individuals or local authorities. The education units have about 250-300 m2 of

indoor space and serve around 700 children annually. The education units have four activity rooms, each designed for a different purpose, one technology room, and one library.

Firefly Mobile Education Units reach children without education parks or education units. Firefly Mobile Education Units started with the Hope 2000 Project after the 1999 Earthquake so the children in the disaster area could continue their education. Later on, those vehicles were developed and converted into Firefly Mobile Education Units, and they reached all cities. The Istanbul, Our Home education truck joined the team as the first Thematic Firefly. Fireflies are set up in truck trailers and serve around 2400 children annually. Each Firefly has 12 technology rooms with computers, a free activity room, and a free area.nIn addition to Standard Firefly Education Units, TEGV has 3 Thematic Fireflies: Science Firefly, Dream Traveler Firefly, and Traffic Firefly. This Firefly runs activities to help children gain basic science knowledge and skills and to help them think scientifically, solve problems, and have a positive attitude toward science.

The Caploonba Firm is the third part of the project to support the design process by workshops, production methods, prototypes, and final product. The Firm brought an excellent advantage for the other two parts.

Orpak Furniture Co. started its activities in Izmir in 1983 and became a growing brand by producing innovative furniture. It produces furniture in many fields, from personal to industrial use, and exports its products to over 20 countries. Orpak Furniture started its infrastructure and RandD process in 2002. It established the Caploonba brand in 2004 to create an "expert brand" that produces products for babies, children, and young people.

There are several parts during the design process, such as moderators, designers, end-users, stakeholders, specialists, and facilities. The roles of each part during the design process are explained in the following titles (Figure 28).
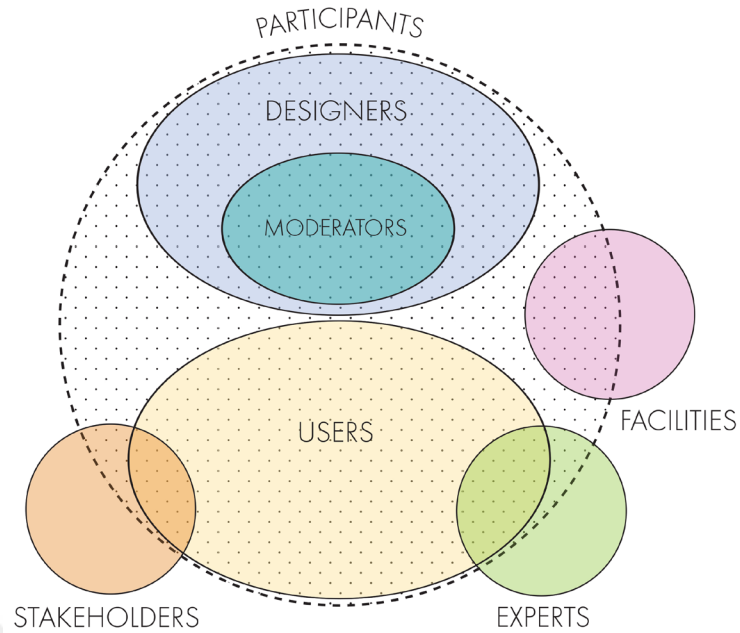
Figure 28. Participation during the design process.

6.3.1. Moderators

In this study, designers can have several roles, one being a moderator. Moderator/s and designer/s create a layout of the PDP in the application to form a clear explanation for all parties. The moderator's role starts with the Investigation Part by defining the problem/s, collecting data about user needs, space, and previous studies, categorizing data, and analyzing data to prepare the project for the second part, Initiation. During all other processes, the moderator always follows each step and contributes. In this study, Furniture Design Course lecturers were moderators. Each year, there were 5-8 lecturers during the semester. Even though the team had minor changes, the core team was protected during the case studies for two years.

6.3.2. Designers

Designers are in charge of executing the process based on the demands of other parties. First, Designers and Moderators work together to formulate a draft of the PDP in the application to form a clear explanation for all parties. Designers need to create a bridge between users, specialists, stakeholders, and facilities. In this study, designers are Furniture Design Course students. Each year, there was a new group of students. In the Zoo Project, there were 90 students, and in the Empathic Design Project, there were 60 students.

6.3.3. End-users

An end-user refers to the person who finally uses an appropriate product. In some scenarios, the end-user may also be the client who performs the purchasing transaction. If a single person purchases and uses the product, that person is both an end-user and a client. In a public-scale project, the definition of the end-user should be carefully clarified. When the project is over, there might be unexpected end-users who have an essential effect on the project design process.

The primary users of this case study are the children. More specifically, the members of TEGV, a foundation that groups many children around Turkiye. TEGV aims to support young children between 6 to 14 years old with educational programs and activities. All the activities are supplementary to school and carried on by volunteers. The primary purpose of TEGV is to overcome the lack of public education and to support it to guarantee that all children receive equal life opportunities. Indeed, the children who participate in TEGV organizations mostly come from families that cannot afford private education or are from regions where educational opportunities are limited.

In addition to TEGV children, TEGV workers, volunteers, guests, and families are also end-users who must be concerned about the design process.

6.3.4. Stakeholders

In this study, stakeholders have been defined as an individual or firm that is interested in a business and can either affect or be affected by the business. The prime stakeholders in a typical enterprise are its investors, workers, clients, and suppliers. However, the current idea goes beyond this original thought to include additional stakeholders such as a community, government, or trade association. Stakeholders can be divided into external stakeholders who do not have a direct relationship with the company but are affected by the operations and internal stakeholders who are considerably influenced by the business outcome. In this social responsibility project, the internal stakeholder is the TEGV, and the external stakeholders are the TEGV community, the end-user.

6.3.5. Specialists

In this study, the specialist has been defined as someone with unique knowledge or ability associated with an appropriate topic. According to the PDP, there might be a need for different types of specialists. According to the project topic and case, specialists may be needed to support the participants. In this study, the design-related specialists, child development specialists, child communication specialists, pediatrists, child psychologists, social psychologists, pediatricians, and education specialists were part of the PDP.

6.3.5.1. Facilities

Facilities with an essential role are the places that serve for workshops, production, and tests during the PDP. In this study, several types of facilities help with the production process. These are factories, design centers, ateliers, and digital fabrication laboratories (FabLab). These places are not the only places that help during the final product but are also part of the process by helping solve technical issues, making fast prototyping, managing mass production, and using advanced technologies.

6.4. Process

Two different case studies - Zoo Project (Phase 1) and Empathic Design (Phase 2)- were executed during the study process over two years. The YU INAR Department, TEGV, and Caploonba Firm took several roles in this process.

6.4.1. Phase 1 - Face-to-face Participatory Design Process - "Zoo Project"

This project was carried out during the spring semester of 2018-2019 within the course INAR 3302 - Furniture Design, Department of Interior Architecture and Environmental Design at Yaşar University, Izmir – Turkiye.

INAR 3302 intended to contribute to social responsibility in favor of TEGV. The aim was to design and produce 1-to-1 scaled prototypes of furniture elements envisioned for the final users, the children who frequent TEGV Çiğli Education Park, Izmir – Turkiye. At the end of the semester, selected final prototypes were donated to TEGV for the testing phase. The follow-up of users' interaction with all donated furniture

elements generated valuable data to improve and optimize all products.

6.4.1.1.   Brief

The selected theme of the project was the 'Zoo.' The students were asked to envision different types of furniture by conceptually referring to the animal world. The goal was to promote a more significant personal attachment between users and furniture elements and, at the same time, to contribute to the materialization of animated indoor spaces. The students were asked to contextualize their design of two primary spaces of TEGV Çiğli Education Park: the library – or reading room – and the lobby – or common indoor area. Concerning those spaces, students were required to finalize the design of the following furniture types:

- seating elements of different sizes and purposes,
- tables of different sizes and purposes,
- bookshelves,
- stools,
- easels,
- coat racks.

All furniture elements were manufactured by using plywood as the primary mandatory material. The manufacturing process integrated digital fabrication techniques, such as CNC fabrication – Computer Numerical Control – and, optionally, 3D printing for additional accessories. Each project was designed and fabricated by working in a team of two students.

The semester was structured in five main phases. These are one preparation, three design, and one analyzing phase. Preparation for the design process (Phase 0) involved the moderators and stakeholders in making decisions about the design process. During the Conceptual Phase (Phase 1), the students approached the project by visiting TEGV Çiğli Education Park, and then they started developing a scenario and a storyboard. Each group identified project goals and design inspiration. At the end of this phase, the students presented their ideas to moderators.

The second phase was dedicated to the design development of the furniture. The students came up with the initial design ideas and produced drawings and models in

scales 1:3 or 1:2. At the end of this phase, the students introduced their projects to the moderators, stakeholders, specialists(I), and end-users at TEGV Çiğli Education Park. Finally, during the third phase, the students worked on the prototype of their project and advanced with their design based on the children's feedback. During this phase, the students participated in a workshop intended to introduce prototyping techniques to them and produce some scaled mock-ups with 3D printing integration. During this phase, the students received final feedback from specialists (II) and moderators.

In the final step, the projects were exhibited, and all the parties were gathered to discuss the outcomes of the projects. The prototypes (10 out of 45 projects) were selected and donated to TEGV Çiğli Education Park for the testing phase with the end-users (phase 4).

6.4.1.2. Participants' Profile

The YU INAR Department and TEGV took several roles in this case study. The lecturers of the furniture course were the moderators; students of the furniture course were the designers; TEGV children, families, workers, and volunteers were the end-users; TEGV management was the stakeholders; TEGV workers and YU INAR guests were the specialists; Fabrika Lab İzmir, YUTAM, and other furniture workshops were the facilities.

Moderators and designers were part of the whole PDP. End-users were part of all the phases but in particular periods. TEGV management was part of the project in the first and last phases. TEGV workers, YU INAR guests, and facilities were part of the project at specific times. Table 6 indicates the number of participants who have joined the first and final exhibitions. Family and children could contribute to the midterm because it was held in the TEGV facility. As the final jury was organized at Yaşar University Campus, they could not be part of it due to procedures related to contribution and transportation issues.

Table 6. Zoo Project - Number of Participants

ZOO PROJECT	Investigation	Initiation	Interaction	Workshop	Post-interaction	Findings	Post-evaluation
Moderator	7	7	7	7	7	7	7
Designer	0	90	90	90	90	90	0
User	0	0	188	0	0	6	Un-countable
Stakeholder	5	2	4	0	3	3	3
Specialist	3	3	3	2	3	7	0
Facility	2	1	1	2	1	1	1

Participants' numbers depended on several different issues. First, designers were university design students who were voluntarily choosing the Furniture Design Course. In that year, the number of contributions to the class was ninety. According to the number of the students, the number of the moderator was decided. Because the course is an applied course and the PDP was taking much effort, one moderator was assigned for each twelve-thirteen students/designers. In total, there were seven moderators. Users were not chosen or decided by moderators or designers, or stakeholders. TEGV Çiğli Education Park announced the project to all members of the TEGV. During the design proposal presentations at TEGV Çiğli Education Park, TEGV children interested in the project joined the exhibition voluntarily. The number of participants was not decided beforehand. Volunteers of TEGV helped the following the number of 188 participants. Because the selected furniture was donated to the TEGV Çiğli Education Park, the number of participants could not be calculated for the post-evaluation phase. There were different participants from stakeholders for each step of the PDP. Specialists were also varied in each step. Their contribution was significant in shaping the PDP in the investigation phase. During the PDP, they contributed to supporting the designers and users with the necessary information.

6.4.1.3.   *Methodology for "Zoo Project"*

In PD, awareness is created by designers and users through methods mainly designed to support a process of mutual learning and create a 'shared language' among designers and users. Methods such as interviews, questionnaires, observations, scenarios, prototypes, mock-ups, virtual models, collages, and mapping are applied to progress

design and make design decision-making processes accessible to non-designers. PD is characterized by generative, experiential, and action-based arrangements that stress play, cooperative learning, developing visions of the future, and designing by doing. In this project, different methods were used for the needs of each phase. The first phase used introductory seminars, face-to-face meetings, online meetings, workshops, questionnaires, interviews, and observations. The second phase used face-to-face meetings, observation, interviews, physical and virtual modeling, and workshops. The third phase used workshops, interviews, observations, physical and virtual modeling, and face-to-face meetings. The last phase used physical models, interviews, and observations. All methods will be explained in detail in this chapter.

This case study has one preparation phase, three design process phases, and one analyzing phase. Data collection was started with Phase 0 by the agreement process. In that phase, moderators and stakeholders were involved in clarifying the path of the design process by using brainstorming, discussion, face-to-face meetings, and online meeting methods. As a result, the duration of the project, involvement of TEGV members, roles of the individuals, location of the facility, and project schedule were decided. Phase 0 took four weeks to complete (Table 7).

Table 7. ZOO Project – Phase 0

PHASE 0: Agreement Process			
Date	Topic	Activity	Method
2 weeks	Agreement and Investigation Process	- Agreement process	- Face-to-face meetings - Online meetings - Brainstorming
2 weeks	Research and meetings	-Meeting with Children	- Semi-structured interview

Phase 1 constituted a pivotal period of concept development spanning four weeks, characterized by weekly meetings convened to facilitate collaborative discourse and progress tracking. Designers embarked upon this phase equipped with a general understanding of the project topic, albeit lacking comprehensive mastery of the intricacies of the design process and the organizational framework of TEGV.

The inaugural week of Phase 1 served as a foundational orientation period, during which moderators elucidated the overarching design process and delineated the

subsequent schedule. Subsequently, specialists from TEGV provided an insightful overview of the organization's mission, objectives, and operational modalities. This dual-pronged approach aimed to equip designers with a holistic understanding of both the design methodology and the contextual framework.

Following these informative presentations, a robust question and answer session ensued, fostering an interactive platform wherein designers engaged directly with stakeholders, specialists, and moderators. This exchange of ideas and insights not only elucidated ambiguities but also catalyzed a deeper appreciation for the multifaceted considerations inherent to the design endeavor.

In line with collaborative principles, designers were strategically grouped in pairs to embark upon exploratory research endeavors aimed at delineating and dissecting pertinent design challenges. This group-based approach, underscored by Table 8, fostered synergistic interactions, thereby harnessing the collective expertise and perspectives of diverse design cohorts in the pursuit of innovative solutions.

Through structured engagement and collaborative inquiry, Phase 1 laid the groundwork for subsequent phases, imbuing designers with a nuanced understanding of the project scope, methodology, and organizational dynamics. This concerted effort towards knowledge dissemination and collaborative problem-solving exemplifies the efficacy of participatory design approaches in fostering interdisciplinary dialogue and driving innovation within educational contexts (Table 8).

Table 8. ZOO Project – Phase 1

PHASE 1: Concept development			
Date	**Topic**	**Activity**	**Method**
07.02.19	Introduction to project	- Brief presentation, - Group formation.	- Seminar / Q&A - Research and Analysis
14.02.19	Story Board Presentation	- Brainstorming, Mind Mapping and Story Board, - Scenario and storyboard creation, - Problem identification, design language, and inspiration.	- Brain Storming - Workshop - Drawing
21.02.19	TEGV visit and Group Discussion	- Individual visits to TEGV Çiğli Education Park. - Context and problem analysis -Anatomic and behavioral analysis.	- Face-to-face meetings - Survey - Observation - Interviews
28.02.19	Project presentation	- Concept proposal presentations	- Seminar - Discussion - Drawing

At the starting of the second meeting, the first two hours, designers present their storyboards. Then the following one hour, the whole group of designers worked together for the brainstorming and mind-mapping sessions. Then, in the workshop, designers focused on problem identification, design language, and inspiration.

The third meeting was at TEGV İzmir Çiğli Education Center. Designers made a questionnaire to TEGV families, children, and volunteers. In addition to that, designers spend a minimum of two days observing the users to prepare a list of context and problem analysis. As of last, they made interviews with workers and specialists of TEGV.

The fourth meeting was between moderators, designers, specialists, and stakeholders. Designers proposed their conceptual approach to the project. At the end of the presentations, discussion sessions were held. This session was the last step of Phase 1. Phase 2 started with the furniture fair meeting that allowed the designers to interview unexpected users such as other types of furniture designers, stakeholders, visitors, and different age groups. With the collected data, designers focused on the broader scale of the problem in the children's furniture. The following two meetings were executed only with designers and moderators to create physical and virtual models for prototyping trials.

The workshop session (8th meeting) was held in the İzmir Çiğli TEGV Education Park. Because of the huge number of participation number, the organization of the workshop was crucial. First of all, the role of the moderators was decided. It was the main focus to create a safe space for all participants mostly children between 6-14 years old. The moderators were not the authority of the workshop, alternatively, their role was a neutral position that promoted and allowed the group to be actively involved in the workshop. The moderators should be intimate with the design process but did not need to hold all the responses. Other tasks of the moderator were to summon generative issues when the discussion occurs to quiet, maintain the agenda and purposes, along with keeping time. Importantly, the moderator should keep the energy up and participate actively.

There were 90 designers and they were grouped into two people. At one time, each designer group was meeting with four children. In addition to that, twelve TEGV workers/volunteers and two specialists were also joining different activity groups. In total, 12 TEGV workers/volunteers, 180 children, two specialists, seven moderators, and 90 designers contributed to the activity. Designers were responsible for icebreaker activities such as; introducing their partners, talking about the project, asking general questions about children's interests and etc. Designers should also share with children the ground rules of the design process such as; every voice is important, one person talks at a time, designers need to explain why and etc. During the exhibition, four different cameras were placed all around the exhibition area to take a picture for each 10 seconds (Figure 29).

Figure 29. Midterm Exhibition at İzmir Çiğli TEGV Education Park

At regular intervals of 5 minutes, the participants, comprising children, transitioned between designer groups, thereby fostering an environment of active engagement and burgeoning confidence. This structured movement regimen not only facilitated continuous interaction but also bolstered the participants' sense of agency and empowerment as they navigated through various design iterations.

The progression of activities within each designer group mirrored a deliberate pedagogical approach aimed at scaffolding the participants' understanding of design principles. Commencing with introductory warm-up tours, the sessions gradually transitioned towards more focused and project-centric discussions. This sequential evolution allowed for a nuanced exploration of design concepts, empowering the participants to delve deeper into the intricacies of each project.

Central to the participatory nature of the design process was the facilitation of hands-on experiences for the children. Within the designated design space, participants were encouraged to actively engage with furniture prototypes, experiment with various artistic mediums, and provide constructive feedback through written annotations. This multifaceted approach not only nurtured their creative expression but also instilled a sense of ownership and investment in the design outcomes.

The provision of a diverse range of materials, including paper, corrugated boards, and cutters, served to augment the participatory framework by allowing the participants to contribute their ideas and embellishments to the ongoing projects. Through collaborative efforts, the participants imbued the designs with a sense of collective creativity and innovation, thereby enriching the overall design discourse.

Concluding the interactive sessions were structured interviews conducted by the designers to gather insights and reflections from the participants. These qualitative exchanges served as a valuable mechanism for eliciting nuanced perspectives and uncovering latent design preferences, thereby informing subsequent iterations of the design process.

Armed with a comprehensive dataset comprising observational data, participant feedback, and design insights, the designers embarked on the iterative task of refining

and iterating upon their projects. Drawing upon the collaborative input of the participants, Phase 2 of the design journey culminated in a synthesis of ideas and a consolidation of design principles, underscoring the transformative potential of collaborative design methodologies within educational contexts (Table 9).

Table 9. ZOO Project – Phase 2

PHASE 2: Design development			
Date	Topic	Activity	Method
07.03.19	MODEKO	- Furniture fair visit	- Face-to-face meetings - Observation - Interviews
14.03.19	Group discussion	- Revision and development of the conceptual proposal. - Group working, project revision, scaled drawings, and draft model.	- Physical Modelling - Virtual Modelling - Presentation - Discussion
21.03.19	Group discussion	- Revision of the project proposal. - Group working, project revision, scaled drawings and draft model.	- Physical Modelling - Virtual Modelling - Seminar - Discussion
30.03.19	Midterm	- Design proposal presentations at TEGV Çiğli Education Park. - 1:1 scale prototype.	- Face-to-face meetings - Observation - Interviews - Workshop

Phase 3 was structured based on the production process conducted only by moderators, designers, and specialists. At first, a 3D printing workshop was organized at "İBB Meslek Fabrikası" - a public facility established by Izmir Municipality that has computer labs, a maker lab, and a seminar room - in two days of period. On the first day, seminars about children's furniture details and safety rules, computer-aided design, and computer-aided manufacturing were executed. After each seminar, there were brainstorming and question-answer sessions. As a result, each designer group was asked to find daily problems according to their own experiences, and the second day continued with design proposals and production details. There were presentations and 3D-printed objects. The primary purpose of this workshop was to introduce the designers to a new production technique and create an awareness of the connection between daily problems and children's furniture problems (Figure 30).

Figure 30. 3D printing and laser-cut workshop at İBB Meslek Fabrikası

After those meetings, the next two meetings were organized as designers' presentations and discussion sessions that allowed the designers to see other approaches to the problems. At the end of phase 3, there was a final exhibition with presentation boards, 1:2 scaled prototypes that explains the design process, and 1:1 prototype (Figure 31).

Figure 31. Final Exhibition at Yaşar University

In this exhibition, there were three TEGV workers/volunteers, six children, two specialists, five guest designers, seven moderators, and 90 designers. The purpose of the exhibition was to analyze the design process with final products and select the pieces of furniture that would be used in the İzmir Çiğli TEGV Education Park (Table 10).

Table 10. ZOO Project – Phase 3

PHASE 3: Prototyping			
Date	Topic	Activity	Method
04.04.19 - 05.04.19	3D printing Workshop	- Full-day workshop. - Introduction on the software. - Design development and 3D printing.	- Seminar / Q&A - Brainstorming - Workshop - Physical Modelling - Virtual Modelling
08.04.19	Group discussion	- Group working - Project revision	- Physical Modelling - Virtual Modelling - Presentation - Discussion
18.04.19	Group discussion	- Group working - Project revision	- Physical Modelling - Virtual Modelling - Presentation - Discussion
25.04.19	Project presentation	- Advanced project proposal - 1:2 scale prototype.	- Face-to-face meetings - Observation - Interviews
02.05.19	Group discussion	- Project revision - Production follow-up at 1:2 scale	- Physical Modelling - Virtual Modelling - Presentation - Discussion
09.05.19	Project Finalization	- Panel review - 1:2 scale model - Group working - Project revision - Advanced prototype - Scaled drawings	- Physical Modelling - Virtual Modelling - Presentation - Discussion - Pilot test - Jury
27.05.19	Final project Exhibition	- Exhibition at Yaşar University Campus. - Project board, model 1:2 scale, and 1:1 furniture prototype exhibition.	- Face-to-face meetings - Observation - Interviews - Pilot test

The furniture was placed at the İzmir Çiğli TEGV Education Park in the final phase. They kept there for eight months. During this period, TEGV workers followed the process through observation and interviews. The report with pictures was delivered to the moderators (Figure 32).

Figure 32. Testing Phase images from İzmir Çiğli TEGV Education Park

As the testing phase concluded, the comprehensive evaluation of the selected furniture pieces at İzmir Çiğli TEGV Education Park marked the culmination of the PDP. It reinforced the project's commitment to creating functional, impactful solutions for the educational community (Table 11).

Table 11. ZOO Project – Phase 4

Phase 4: Testing phase			
Date	Topic	Activity	Method
30.05.19 20.03.20	Observation	-Furniture prototypes were placed in TEGV Çiğli Education Park	- Observation - Pilot test - Interviews

6.4.1.4. Findings and Results

The Zoo Project's PDP was a dynamic, iterative journey that produced meaningful insights and concrete results. The project benefited from a wealth of viewpoints incorporated into the design process by involving many stakeholders, including the primary end-users, who were children.

The project's phases were iterative, providing a foundation for ongoing improvement. An evolving knowledge of user needs and preferences resulted from each design cycle, user feedback, and iteration. This iterative process demonstrated the value of flexibility in PDPs and guaranteed that the design could adjust to the changing needs of TEGV Çiğli Education Park.

The PDP ended with the final exhibition at TEGV Education Park and the following testing phase. This exceptional chance made it possible to thoroughly evaluate the actual effects of the designed furniture elements on end users. Direct observations, user interactions, and feedback mechanisms were used in the testing phase to assess the furniture prototypes' overall acceptability, functionality, and usability. The practical environment yielded priceless information, providing insights into how the designed elements were incorporated into the regular interactions and activities at TEGV Çiğli Education Park.

The ability of the participatory design approach to deeply engage and instill a sense of ownership in the TEGV community was one of its noteworthy results. A collaborative spirit emerged by including end users throughout the design process, from concept to final implementation. As end users, children became the recipients of products and participated actively in their design. Beyond the conventional designer-user relationship, this empowerment gave the TEGV community a sense of pride and ownership. The pervasive participatory design ethos in the educational setting profoundly impacted people's interactions with and perceptions of the designed elements.

The Zoo Project's conclusions emphasized how crucial it is to include end users in the design process from the beginning to the end. Because of this inclusivity, the finished products were guaranteed to be contextually relevant and functionally effective. The community's unique needs and goals were considered when designing the solutions, thanks primarily to the direct input of TEGV kids and stakeholders.

In summary, the academic goals of the Zoo Project were successfully attained through the implementation of a participatory design process. The project achieved academic success and left a lasting and palpable mark on social responsibility. The collaborative design approach showed how academia can impact real-world, socially relevant solutions in addition to theoretical domains. Through prioritizing participatory design, the Zoo Project demonstrated how cooperative endeavors can effectively tackle practical issues. In addition to providing valuable and contextually appropriate furniture, the project fostered a sense of belonging and shared accountability among all parties involved (Figure 33).
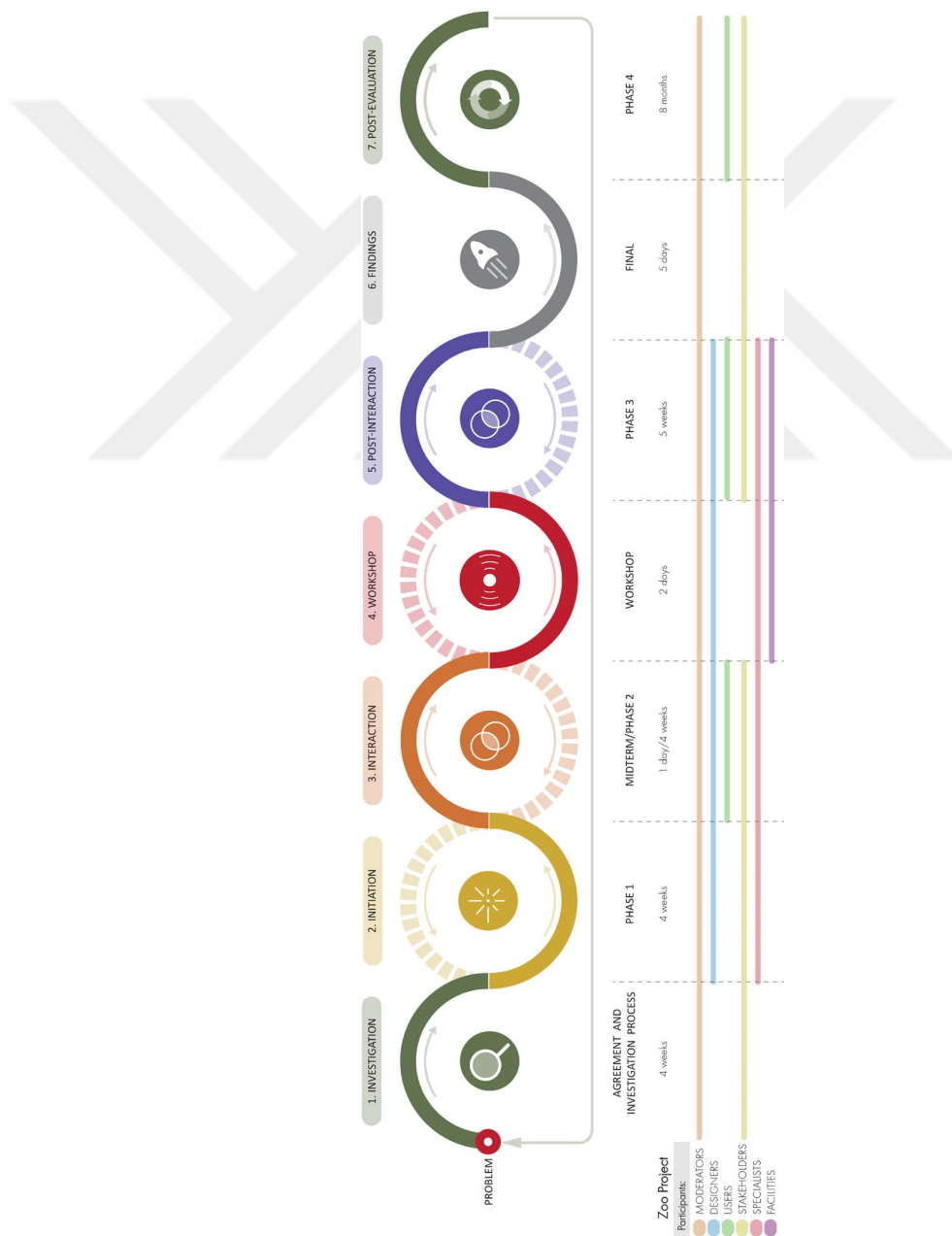
Figure 33. Proposed Method

6.4.2. *Phase 2 - Online Participatory Design Process - "Empathic Design"*

This project was carried out during the spring semester of the academic year 2019-2020 within the course INAR 3302 - Furniture Design, Department of Interior Architecture and Environmental Design at Yaşar University, Izmir – Turkiye.

INAR 3302 intended to contribute to social responsibility in favor of TEGV. The aim was to design and produce 1-to-1 scaled prototypes of furniture elements envisioned for children according to their interpretation of empathy and its meaning. At the end of the semester, final prototypes were supposed to be manufactured. For this reason, Caploonba Furniture firm was included in the project as a third party for mentoring and sponsoring the project and for industrial production. Therefore, the products would be distributed and sold in Caploonba Flagship Shops in Turkiye, and the income obtained through the sales operations would be donated to TEGV. Due to the Covid-19 pandemic, the production phase was postponed for a while.

6.4.2.1. *Brief*

The starting idea of the project was to create a bridge for children around Turkey by using a wide range of TEGV accessibility options. During the agreement and investigation process, there were several meetings among moderators, stakeholders, child development specialists, and marketing communication specialists. The concept of "empathy" was chosen for the project theme. The aim was to start the project with the dictionary meaning of "empathy" and continue with its interpretation by children. The students were asked to assimilate and reinterpret the definition of empathy given by the interviewed children of TEGV that were previously interviewed. The goal was to connect emotionally with users through the designed object. With this intention, students were required to finalize the design of the following furniture types:

- seating elements of different sizes and purposes,
- tables of different sizes and purposes,
- any furniture type suggested by the students.

All furniture elements were manufactured by using plywood as a mandatory primary material. The manufacturing process integrated digital fabrication techniques, such as CNC fabrication – Computer Numerical Control – and, optionally, 3D printing for

additional accessories. Each project was designed by working in a team of two students.

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. A variety of participants were involved in each phase of the project.

6.4.2.2. *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 publicized 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 organization and from students via email. This process was initiated after the project's initial delivery and comprehensive description were completed. Additionally, all specialists who participated in the study provided informed consent for the use of the collected data in further research. 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, categorizing data, and analyzing 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 centers in different regions of Turkey. The educational centers 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 indirectly affected by the operations and internal stakeholders 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, pediatricians, 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, pediatricians, 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 emphasized 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 analyzing and synthesizing 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, such as the moderators and designers, remained consistent across certain phases, 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 12).

Moderators and designers were part of the whole PDP. End-users were part of all the phases in particular periods. TEGV management was part of all the phases. TEGV workers and YU INAR guests were part of the project at specific times.

Table 12 indicates the number of participants that have joined the first online presentations and the final online presentation juries. Family and children could contribute both of the juries as these were held online and open to their participation. The direct contributions of the children were precious inputs.

Table 12. Empathy Participant Numbers

Empathy Project	Investigation	Initiation	Interaction	Workshop	Post-interaction	Findings	Post-evaluation
Moderator	5	5	5	5	5	5	5
Designer	0	59	59	59	59	59	59
User	56	0	92	0	0	88	Un-countable
Stakeholder	10	2	3	1	1	3	10
Specialist	7	4	14	2	2	18	18
Facility	3	1	0	0	0	0	3
Social media interactions (YouTube)	0	0	93	0	1574	270	749
Social media interaction (Instagram)	49	133	50	109	23	90	2165

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 34) was prominently showcased on Instagram and subsequently shared with TEGV for publication on their online platform through email and WhatsApp channels.

Figure 34. 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 utilized 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.

6.4.2.3. *Methodology for "Empathic Design"*

In this case study, phases are the same as the previous case study; one preparation phase, three design process phases, and one analyzing phase. Data collection was started with Phase 0 by the agreement process. In that phase, moderators and stakeholders were involved to clarify the path of the design process by using brainstorming, discussion, face-to-face meetings, and online meetings methods. As a result, the duration of the project, involvement of TEGV members, roles of the individuals, location of the facility, and schedule of the project were decided. Duration of the Phase 0 was eight weeks. In addition to the previous case study, in the startup

meetings, there were not only moderators and stakeholders but also specialists and TEGV volunteers/workers (Table 13).

Table 13. 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 concept of the project and design process were decided by all parties. The aim of the project evolved from designing for TEGV to design with TEGV. The main purpose of the project was to create a bond between TEGV children and all children in Turkey. To summarize, the project name and motto were decided as, "Empathic Design" and "Empathic design will do us good". The process aimed to find solutions for furniture by understanding the needs of children. Also, this method was more than designing the furniture itself, it was designing the process.

The case began with Phase 0 through the agreement process. The process took 8 weeks. Briefly, this contract was for the production of furniture to be designed for TEGV Learning Units within the scope of the INAR 3302 Furniture Design course given at the Faculty of Architecture, Interior Architecture and Environmental Design Department for the 2019-2020 Spring Semester. The donation of the prototypes to TEGV and the 2020-2020-2020 season of the furniture to be produced within the scope of the project subject to this Contract by Caploonba Company (Appendix 1). In that phase, moderators and stakeholders clarified the direction of the design process using brainstorming, discussion, face-to-face meetings, and online meetings.

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 centers 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.
The semester was structured in three main phases in which the design solutions were

developed.

With the help of the specialists (child development specialist and marketing communication specialist), a guide for an interview with TEGV children was prepared to help the TEGV workers and volunteers. The guide was structured into the following parts:

- Topic: To create a furniture design process that deals with the concepts of feel, influence, and experience.

- Aim: Functional furniture design.

- Lexical meaning: The guide started with the meaning of "Empathy" and continued with the benefits of developing empathy for the children.

- Preliminary studies: Since empathy is not a subject that can be taught, preliminary studies were carried out to decide on the right path. Two different question lists were planned according to whether the children recognized the concept of empathy or not.
  - In these studies, children who know the concept of empathy put themselves in someone else's shoes and express their feelings. It was seen that they defined them as exemplary and easily exemplified; but when asked what it looks like "I don't know; I can't think of anything." such answers were received. In this case; when children understand that they can answer freely, found to be easier. in some circumstances to embody the example; "I'm giving you a gift wrap, what do you think would come out if I said there is empathy in it?" It was seen that the question made them think more easily.
  - On the contrary, children who said they had not heard the concept of empathy before were encouraged to guess. In this sample, positive feedback enabled the child to respond more easily.
  - Execution sample: Hi "Child1", I want to talk to you a little bit about "Empathy". Have you heard the word empathy before?
    - Scenario 1

      Child1: No, I did not hear.
      Interviewer: So, what can empathy be? Can you guess? (The child can give answers such as fish, flowers, goods, etc. Please, ask the child

to describe her/his answers and encourage s/he to answer. Such as; "What color is a flower?" or "What kind of fish is it, can you describe it?".

- Scenario 2

Child 2: Yes, I heard.

Interviewer: So, what is Empathy? Can you explain to us? If Child Cannot Explain: It may be asked to give an example If he/she cannot sample, he/she may be asked to make an estimate. Such as; "Why is empathy important?", "What does empathy look like?", "If we put empathy in a box, what would it be?".

- Application samples:
  - Case 1: Eylül - 10 years old - İstanbul

  Interviewer: What is Empathy?
  Eylül: It's the connection we make with our friend about her/his feelings.
  Interviewer: What does Empathy look like?
  Eylül: Dog; because dogs get along well with people.

  - Case 2: Meriç - 10 years old - Ankara

  Interviewer: What is Empathy?
  Meriç: Empathy is understanding how someone is feeling.
  Interviewer: What good does it do us to understand this?
  Meriç: This allows us to have more friends
  Interviewer: What does Empathy look like?
  Meriç: It is like a tree or a flower.
  Interviewer: We put empathy in a box! What do you think comes out of the box?
  Meriç: A letter from a friend.

  - Case 3: Nehir - 7 years old - İzmir

Interviewer: What is Empathy?

Nehir: Understanding the other party's feelings.

Interviewer: What does Empathy look like?

Nehir: Friendship or writings.

- Case 4: Janset - 10 years old - İzmir

The child gave a clear explanation.

- Case 5: Masal Su - 11 years old - İzmir

Interviewer: What is Empathy?

Masal Su: Put oneself in someone else's shoes.

Interviewer: What does Empathy look like?

Masal Su: I would liken it to the sea because we pollute the sea. Into the sea, there are living things.

- Case 6: Çakıl- 9 years old - Antalya

Interviewer: What is Empathy?

Çakıl: For example, let's say there is a bereaved person to help him.

Interviewer: Why empathy is important?

Çakıl: Empathy shows that we are good people. We will be good people.

Interviewer: What does Empathy look like?

The child couldn't give an example.

Interviewer: We put empathy in a box! What do you think comes out of the box?

Çakıl: A sweater knitted by an old person.

- Case 7: Gizem - 5 years old - İzmir

Interviewer: What is Empathy?

The child couldn't answer.

Interviewer: What does Empathy look like?

The child couldn't give an example.

Interviewer: We put empathy in a box! What do you think comes out of the box?

Gizem: Booties.

- Case 8: Defne- 8 years old - İzmir

Interviewer: What is Empathy?

Defne: For example, if someone is angry with someone, he puts himself in their shoes, this way we can understand each other.

Interviewer: Why empathy is important?

Defne: It is important to understand our friend. That makes me happy.

Interviewer: What does Empathy look like?

The child couldn't give an example.

Interviewer: We put empathy in a box! What do you think comes out of the box?

The child couldn't answer.

o Aim: With these answers, it was planned to create the content of the course. Also, this allowed the designers to reach a huge amount of input.

This guide was shared with seven TEGV Centers. However, in the end, five centers could execute the process: Antalya Education Park, Giresun Education Unit, İstanbul Ferit Aysan Education Park, İzmir Çiğli Education Park, and Van Education Park. Because of the rights of the TEGV children, some of the records were only soundtracks. After the delivery of all records, a video was prepared for the announcement of the project with the help of the specialists (Figure 35).

Figure 35. A screen shot from TEGV initial video showing keywords emerged by TEGV children (Translations: "Çiçek" – Flower; "Bağlılık" – Commitment; "Kırmızı" – Red; "Simge" – Embodiment; "Diş" – Teeth; "Dede" – Grandfather; "Elma" – Apple; "Yırtık Elbise" – Torn Dress; "Arkadaş" – Friend)

The video has the video and sound records of the some of the TEGV children while they were answering the questions about "Empathy". All records were shared with all the parties of the design process.

In parallel with this process, necessary preparations were made for the goodwill agreement between the three parties; Yaşar University, TEGV, and Caploonba. Before the announcement of the project, Instagram and YouTube accounts were prepared by doing necessary graphic works.

The first publishing was done few days before than signature ceremony to announce the aim and program of the project. The agreement ceremony was executed in Yaşar University a few weeks later than the project had already started. All the Phase 0 preparations were done on online platforms without meeting except the Signature Ceremony (Figure 36).

Figure 36. Agreement Ceremony

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 14).

Table 14. 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 second meeting was at the TEGV Çiğli Education Park. Four different seminars were prepared by specialists and moderators. The first seminar was about TEGV. The second seminar/workshop was about "Kid behaviors and their relationship with their environment". After the presentation designers joined the workshop to understand group behavior and the child approach. The third seminar was about the rework about Empathic Design. The prepared video was shared with the designers. The volunteers

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from the other cities joined the seminar online that created a great opportunity for designers to ask direct questions to the executors of the interviews. The last seminar was about the Caploonba Firm. Knowing the company's production capacity and production methods was one of the important issues that would affect the design process (Figure 37).

Figure 37. Seminars and Workshops in TEGV Çiğli Education Park

Phase 1 continued with the seminars of the professionals in the sector for more than 60 years. These seminars helped stakeholders, designers, and end-users to understand the nature of the design process. In the following meeting, designers presented their initial ideas to get feedback from all parties. To sum up, brainstorming, discussion, drawings, interviews, observation, seminars, research, and analysis were used during Phase 1.

During the Conceptual Phase, the student approached the project by analyzing the answers to the interviews of the TEGV children regarding empathy. With this information and additional research developed by the students, a scenario and a storyboard were developed for each group of students. Each group identified the project goal and design inspiration.

The first two seminars were about TEGV and child behavior and their relationship with their environment. Then, designers joined the workshop to understand group behavior 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. At the end of this phase, the students presented their ideas to moderators. This phase was conducted in a face-to-face modality.

The second phase was dedicated to the design development of the furniture. The students came up with the initial design ideas and produced both drawings, digital models, and animations. 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 15).

Table 15. 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

Phase 2 started with the furniture fair that allows designers to meet with other designers, production firms, and end-users that are not directly related to the ongoing

project. Designers had four days to have observation, make interviews, and brainstorm (Figure 38).

Figure 38. Modeko İzmir Furniture Fair Exhibition

Following the fair, the designers came up with their virtual models and drawings first time. These meetings among designers and moderators were repeated three more times before their first design presentation to all parties. In the presentation, designers used digital drawings, models, and animation to communicate with the users effectively on an online platform. In addition to that, the project was invited to be presented at the design festival called, "I'm Design". In that festival, twelve TEGV volunteers, one TEGV worker, two moderators, and four designers represent all participants of the project. The colloquium created a chance to communicate with designers from other universities, academicians, and sectorial companies. This increased the awareness of the project in other cities (Figure 39). During Phase 2, brainstorming, digital modeling, discussion, drawing, interview, observation, jury, research, and analysis were used as methods.
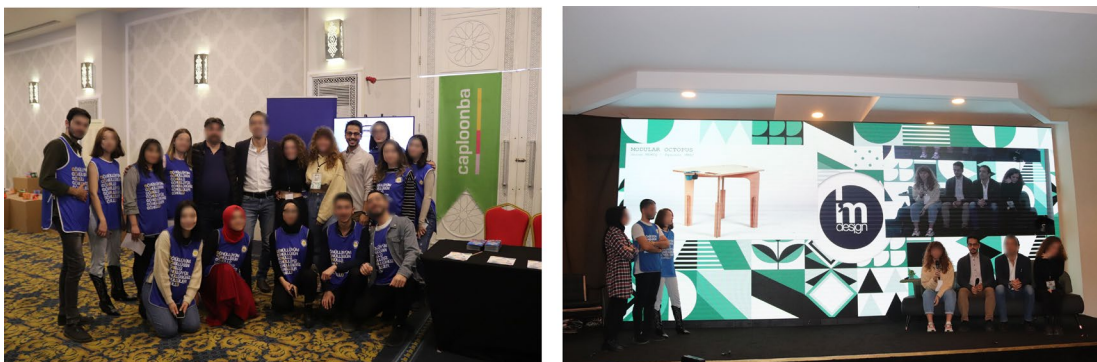
Figure 39. I'm Design Workshop and Seminar Contribution with TEGV Volunteers, Moderators, and Designers

In addition to these activities, another online workshop was organized 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 40).
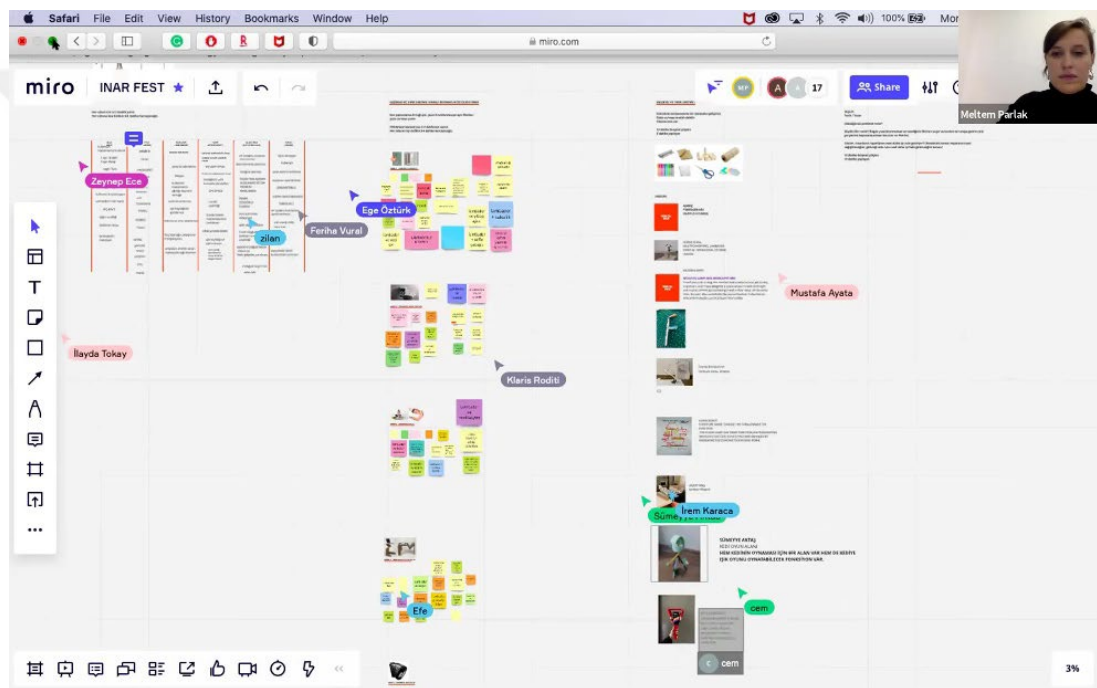
Figure 40. Online Workshop about Rethinking Environment

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 41).

Figure 41. Online Workshop about Rethinking Environment

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 digitalization of traditional methods (such as stickers, sketches, and modelling) was also established by using the online platform.

At the end of Phase 2, an online meeting was organized 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 42).

Figure 42. Phase 2 project presentations

The initial design concept for Project 1 was a multifunctional table designed for two kids to use in small spaces. It consisted of two tables that could be arranged in a linear shape or spread up to create an L shape, permitting both kids to use the table simultaneously. During the first phase, participants, especially the children involved, delivered feedback asking for additional components to improve the table's functionality. They recommended containing space underneath the table for use as a playground or tent-like area. This feedback guided the integration of detachable cushions positioned on the legs of the table, allowing them to be utilized as seating pillows or as part of a play area under the table.

Project Two is a small table designed for two children to spend time together and play. It features two cushions stored inside the table, with a removable top surface that can

be flipped to accommodate different activities. During the first phase, the project received positive feedback overall. However, there were significant criticisms regarding the design's limitation to accommodate only two users. Some children, particularly those with multiple siblings, expressed the need for the table to accommodate three or four people.

Project Three is a multifunctional bench designed to also serve as a table. While initially well-received, the design received criticism from participants who expressed a desire for more versatility in its usage, particularly to accommodate both children and adults. During the first phase, participants highlighted the limitations of the bench's size, which made it unsuitable for use by adults. Additionally, feedback indicated dissatisfaction with the bench's unattractive top surface and difficulty in carrying the object.

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 43).

Figure 43. Some of TEGV children's participation and their sketches showing interior elements such as stairs, shelves, and chairs

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. Phase 3 initiated a presentation session about revisions made according to the feedback. The following sessions included the moderators, designers, specialists, and facilities to finalize the design and prepare for advanced-level online presentations and productions (Table 16).

Table 16. 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

During the third phase, the students worked on the prototype of their project and advanced with their design based on the feedback gathered in the first exhibition meeting. The students continued to work on the communication techniques to create a language suitable for children. VR and AR were also used by the students to augment the perception of the digital object and to integrate it with mixed reality. With specialists in DIs, communication with children was established through images and animation to help the designers with their final preparations (Figure 44).
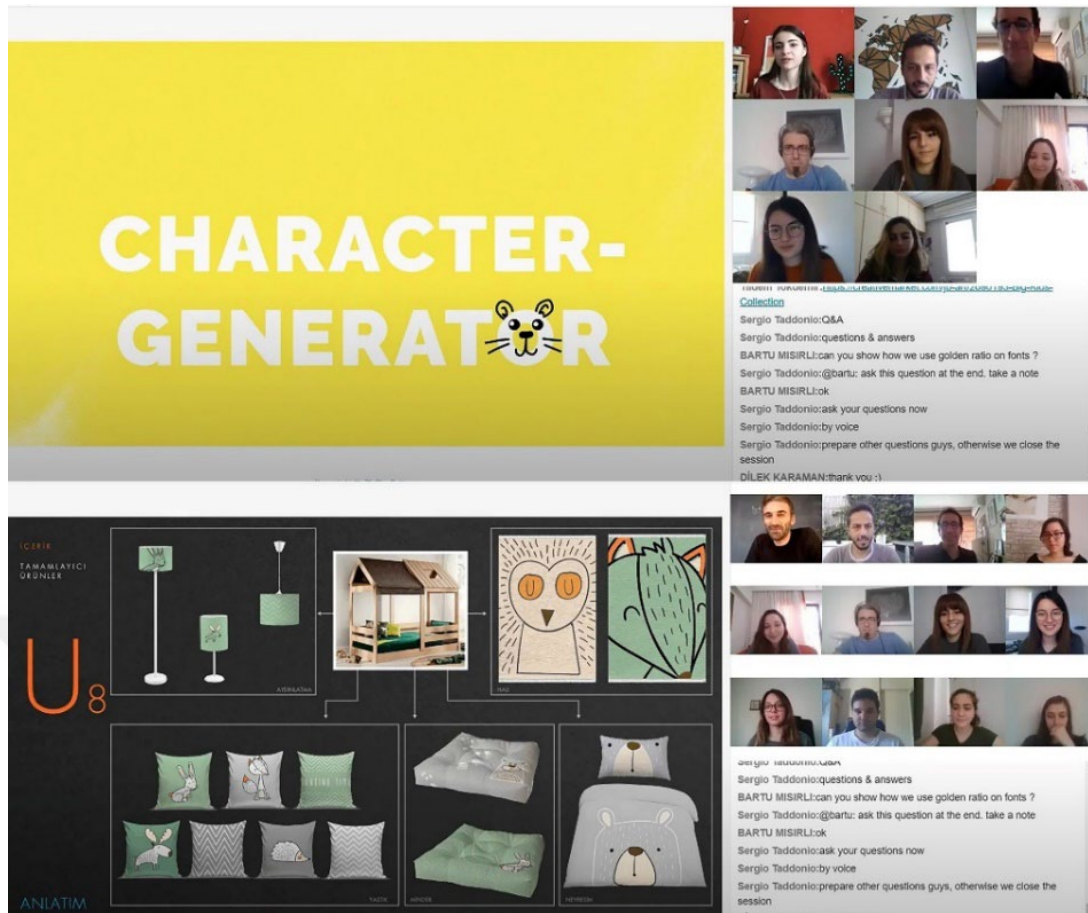
Figure 44. Communication with children through images and animation seminars

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 visualize 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 45).
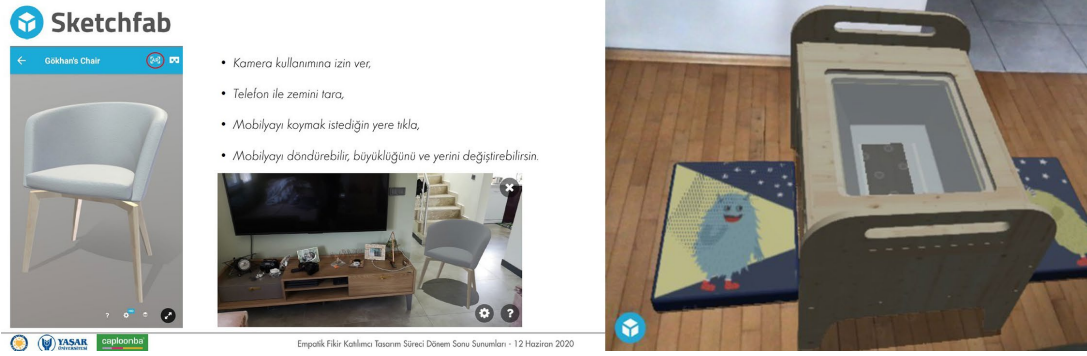
Figure 45. On The Left - Training for AR / On The Right – One of the participant's images with AR furniture

An in-depth analysis was conducted to scrutinize the iterative phases of the PDP applied to the three selected projects, focusing on the invaluable insights and critiques provided by the end-users, specifically children and their families. The first project meticulously examined user interactions, revealing prevalent feedback concerning pattern and color elements. The designers undertook a comprehensive redesign to address paramount safety considerations, mainly refining connection and corner details to align with heightened safety standards. The second project faced criticism centered around user limitations, encompassing concerns about the number of users and available top-board options. In response to this constructive feedback, the design team orchestrated enhancements, notably augmenting the cushions to accommodate larger family units, fostering a more inclusive and adaptable user experience.

Furthermore, the third project's evolution within the participatory design framework manifested through a thoughtful upgrade that embraced a transparent surface conducive to artistic expression. This innovative feature not only addressed aesthetic considerations but also opened up avenues for creative engagement. Parents, recognizing the potential for interactive storytelling, were empowered to utilize the transparent surface as a canvas for bedtime narratives. The introduction of this novel design element not only attested to the designers' receptiveness to user input but also showcased their commitment to fostering meaningful interactions within the familial context. This nuanced refinement not only enhanced the project's aesthetic appeal but also exemplified the depth of collaboration between designers and end-users, resulting in a more profound and enriched participatory design process (Figure 46).

Figure 46. Phase 3 project presentations

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 Project One, in the third phase, further feedback was received regarding the colors, functions, and patterns of the table and cushions. Children actively participated by sharing their imaginative ideas and drawing their desired patterns for the cushions. Additionally, expert feedback was considered to ensure the production quality, safety standards, and appropriate material connections of the design.

For the Second Project, additional feedback was collected to address the limitations identified in the first phase. Participants requested more variety in the activities available on the table's surface, as well as storage space for game pieces, pencils, and other small items. Specialists and experts also provided input on color combinations, table height, and safety concerns regarding the top surface's opening mechanism. To address the feedback received, several improvements were made to the design. Firstly, the table was modified to accommodate four cushions instead of two, allowing for a larger number of users. Additionally, an extra storage area was added to the design to store game pieces and other small items, enhancing the table's functionality. The surface of the table was redesigned to incorporate a series of games that could be easily added or removed, providing more variety and encouraging interaction. Safety concerns regarding the opening mechanism were addressed by using appropriate materials and ensuring proper weight distribution, making it safer for children to handle. Throughout the participatory design process, the initial concept evolved significantly based on the feedback received from participants. The addition of detachable cushions transformed the table into a versatile piece of furniture that not only served as a functional workspace but also provided a creative and interactive play environment for children. Furthermore, the incorporation of various colors and patterns enhanced the aesthetic appeal of the design, while considerations for production quality and safety ensured that the final product met industry standards.

For the Third Project, further feedback was collected regarding the materials used in the design. Participants also suggested incorporating features that would allow parents to engage with the bench, such as using it to tell stories to their children while they sleep. To address the feedback received, significant changes were made to the design. The bench was redesigned to feature a transparent top part, allowing users to draw on it. A light installed under the table enabled the images to be reflected onto the surface, enhancing its visual appeal and interactive capabilities. Additionally, participants' stories were prepared to be printed on transparent paper and reflected onto the ceiling, creating a unique storytelling experience for parents and children alike. These modifications transformed the bench into a versatile piece of furniture that could be used by children for sitting and playing, as well as by parents for storytelling and creative activities.

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 17).

Table 17. Empathic Design Project – Phase 4

Phase 4: Findings and Post-evaluation			
Date	Topic	Activity	Method
Eight days	Observation & Interviews	-Pieces of Furniture published	- Interview - Observation - Online Observation
Eight weeks	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 47).

Figure 47. Selected and produced projects

6.4.2.4. Findings and Results

This study explores how SM can be used to promote participatory design and build on the idea of co-design. It shows that these platforms can be used to democratize and enhance the practice of PDP (Srnicek 2016). This concept involves the use of various online platforms to promote collaborations between designers, stakeholders, and end-users. The study shows that these tensions can manifest when the activities related to these collaborations are happening within an online platform. The findings reveal how the interactions between designers and online platforms can re-shape the position of designers in non-emancipatory settings. The PD practice is also marked by the various SM logics and the reconfigured roles of participating in traditional design settings and perception of "platform vernaculars"(Gibbs et al. 2015, 257).

In their study, Van Dijck and Poell (2013) identified the popularity principle as the underlying concept of SM platforms. It refers to the relational activities that happen 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 number of time people spent using the platform. Since digital platforms have become more common, PD is becoming increasingly associated within several ways networked publics. As the PD practices become part of the inevitable collapse of SM platforms, they are often regarded as having a unique and diverse audience.

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 utilization 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 and 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 and Sandra, 2017).

To mitigate these challenges, support and training were proactively provided by our research team. However, it is essential to recognize 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 and Sandra, 2017). This approach aimed to provide a clear and precise understanding of the entire design before its finalization. Nevertheless, it is vital to recognize that with many participants involved in the PDP, effectively representing projects can be a daunting task. Ensuring that participants without design experience understand the digitalized data and scale is an ongoing challenge that calls for innovative solutions (Karen and 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 and Sandra, 2017).

In addition to these technological endeavors, 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 and Sandra, 2017).

By recognizing 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.

The comparative analysis of three projects aimed to explore their respective levels of participation, communication effectiveness, initial idea strength, evolution process, and overall effectiveness within a participatory design framework. Each project represents a unique approach to engaging participants in the design process, ranging from low to high levels of interaction. By examining these projects, we can gain insights into the importance of communication, the impact of initial idea clarity, and the effectiveness of the evolution process in creating successful design outcomes. Subsequently, each project will be evaluated based on these criteria to determine their relative strengths and weaknesses (Table 18).

Table 18. The comparative analysis of three projects

Projects	Project 1	Project 2	Project 3
Participation Level	Low interaction with participants.	Good communication and interaction with participants.	High level of participation and ownership.
Communication	Weak communication among designers and participants led to a lack of understanding of the problem.	Effective communication between designers and participants, allowing for feedback and improvement.	Strong communication facilitated a deep understanding of the project concept.
Initial Idea Strength	The initial idea was clear but lacked depth and flexibility.	The initial idea was strong but limited in its flexibility.	The initial idea was open-ended, allowing for more creativity.
Evolution Process	Limited evolution due to minimal feedback and communication issues.	While there was improvement, changes were somewhat limited due to the constraints of the design.	Extensive evolution due to the open-ended nature of the project, allowing for a wide range of contributions.
Overall Effectiveness	The project struggled to effectively engage participants and evolve the design, resulting in a less successful outcome.	The project successfully engaged participants and evolved the design, resulting in a functional and improved product.	The project effectively engaged participants, resulting in a highly evolved and innovative design that addressed a variety of needs.

Project Three stands out as the most successful in terms of participation, communication, idea strength, evolution process, and overall effectiveness. Its open-ended concept allowed for greater creativity and ownership from participants, leading to a more innovative and inclusive final product. Project Two also performed well, demonstrating effective communication and improvement despite some limitations in the initial design. However, Project One struggled due to low participation and communication issues, resulting in a less successful outcome.

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 19).

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 utilizing 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 19. 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 emphasizes 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 emphasizes the need to utilize DIs effectively to raise participant engagement.

These results underline how crucial it is to include DIs in the design phase to maximize participant participation. Designers can improve communication channels, address issues, and promote creativity by utilizing 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 analyzed in this study to understand better how these interactions impact project success, building on prior research (Aldous and 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 analyzing 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 links SM and OP interactions and project performance by strictly evaluating likes, comments, and direct messages (Table 20).

Table 20. Comparison of project final grades and SM and online platform interactions (The projects are sorted according to total interaction number)

Prj. No	Instagram	YouTube	Direct Message	Zoom Platform	Total Interaction	Grade
1	224	246	47	28	549	A-
2	167	229	17	16	429	B+
3	87	236	22	16	361	A-
4	106	190	33	30	359	A-
5	74	249	18	12	353	B
6	99	190	41	22	352	A-
7	50	183	23	32	288	B+
8	187	47	15	14	263	B
9	92	142	11	11	256	B+
10	86	130	14	14	244	B
11	150	53	5	22	230	B
12	128	73	11	10	222	B+
13	130	56	8	9	203	C
14	80	87	5	16	188	C+
15	127	31	11	16	185	C-
16	99	66	2	15	181	C+
17	72	51	14	14	151	C+
18	57	53	19	25	131	B-
19	78	33	4	16	131	C+
20	76	36	7	10	129	C
21	74	35	6	13	127	C+
22	44	54	11	17	125	C
23	49	38	17	28	122	B+
24	8	70	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 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, p. 257). 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.

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 optimization 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 (Figure 48).
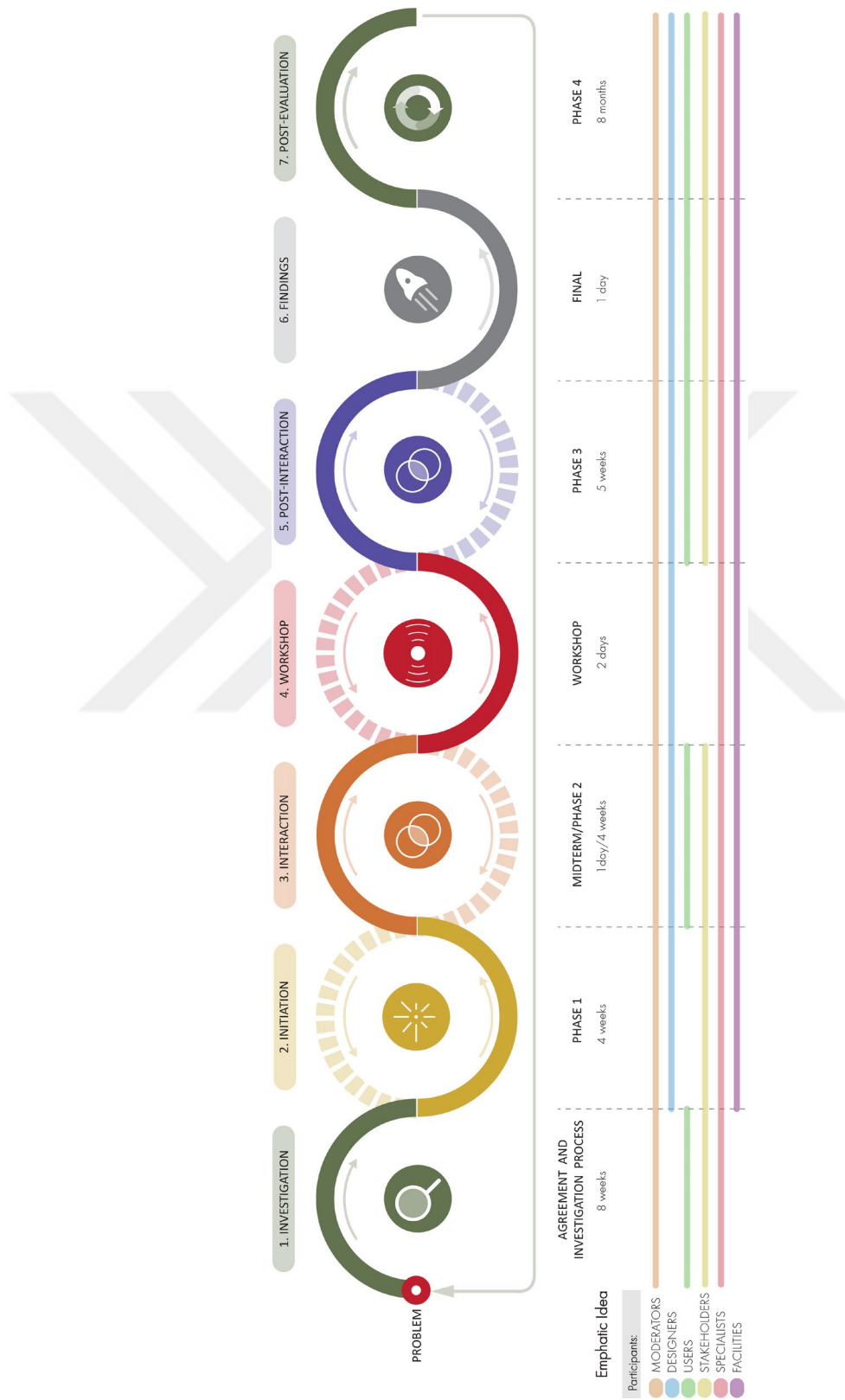

Figure 48. Proposed Method for the Online PDP

6.5. *Findings and Discussions*

Nowadays, designers frequently consider consensus a substitute for participatory democracy, emphasizing collaboration and fostering relationships. Sanoff (2000) distinguishes between the two, pointing out that while representative democracy guarantees a broader range of viewpoints, participatory democracy permits individual expression of opinion. A true participatory democracy is open to all, allowing individuals to actively participate as planners and designers while upholding the validity of their opinions. Arnstein (1971) illustrates how citizens move up the "Ladder of Participation," highlighting the change from complete disengagement to active participation.

Although they may not be at the top of the ladder, citizens serve as advocates in Davidoff's advocate model. Consultation is the mode of participation used here. The traditional method of shaping the client-professional relationship is through program design, which politicians and boards frequently reflect. However, now that citizen voices are becoming more and more influential, clients include everyone living in the town. The community participates in decisions about project design and construction, turning what was previously the domain of architects and planners into a collaborative endeavor.

While controversial, this assertion suggests diverse applications, such as examining information collection and application methods. Surowiecki (2005) challenges the belief that group decisions are inferior, emphasizing the importance of considering conditions influencing group thinking, particularly aggregation. Public hearings alone may not tap into the collective genius of a community; a well-designed system is essential for channeling collective knowledge.

Shifting focus, a study explores the impact of SM on design processes that aim for widespread participation. This involved diverse participants, including youth, children, families, student designers, and industry professionals. SM and OP were vital in fostering creativity and participation in a national-scale project with 250 participants and 3000 SM contributions. Challenges included scale, scheduling, time constraints, budget, data organization, and prototyping, addressed using SM, OP, and DI.

Active involvement of children in the design process fosters a sense of belonging and provides valuable feedback. The chosen case, TEGV, facilitated a nationwide PDP within an educational context. The Furniture Design course at Yaşar University engaged third-year design students, lecturers, specialists, and facilities.

Digitalization, especially amid the COVID-19 pandemic, enhanced communication and creativity. SM, OP, and DI facilitated collaboration, with online platforms aiding data collection and analysis. Van Dijck and Poell's (2013) popularity principle underlines SM platforms, measuring engagement by connections and time spent.

Despite the benefits, a nuanced understanding of digital participation is crucial. Danielsson et al. (2008), Hagen et al. (2007), and Foth and Axup (2006) caution against overlooking drawbacks. Slingerland et al. (2022) advocate thoroughly analyzing complications in nationwide projects. Insights from Mouter et al. (2021) on participatory value assessment and Ali et al. (2021) on distributed interaction design contribute to understanding online platforms' opportunities and drawbacks.

Contemporary digital platforms are increasingly integral to participatory design in a networked public. The study suggests new SM platforms can connect designers and users, fostering collaboration and inclusive participation. This multifaceted approach enhances inclusion and brings diverse voices from local and global communities together.

Adding to this narrative, the "Zoo Project" and "Empathic Design" serve as case studies designed for TEGV in a similar course setup at Yaşar University. These projects share similarities, such as designing furniture for TEGV and following a comparable course structure. However, they diverge significantly in their approach and scope.

The "Zoo Project" adopted a traditional face-to-face PDP locally. It involved hands-on collaboration with the community and stakeholders. In contrast, "Empathic Design" embraced a digital approach with online tools for a nationwide PDP. It navigated challenges posed by the COVID-19 pandemic and leveraged digital platforms for communication, prototyping, and data analysis.

While the "Zoo Project" traditionally engaged with the local community, "Empathic Design" capitalized on DI to facilitate a broader national participation. This shift from a local to a national scale and from traditional to digital tools highlights participatory design processes' adaptability and evolving nature. In summary, these case studies underscore the dynamic nature of participatory design, showcasing its adaptability to different contexts and technological advancements. The "Zoo Project" and "Empathic Design" offer valuable insights into the multifaceted approaches designers can employ to engage communities effectively in the design process, considering both local and national scales and leveraging both traditional and digital tools (Figure 49).
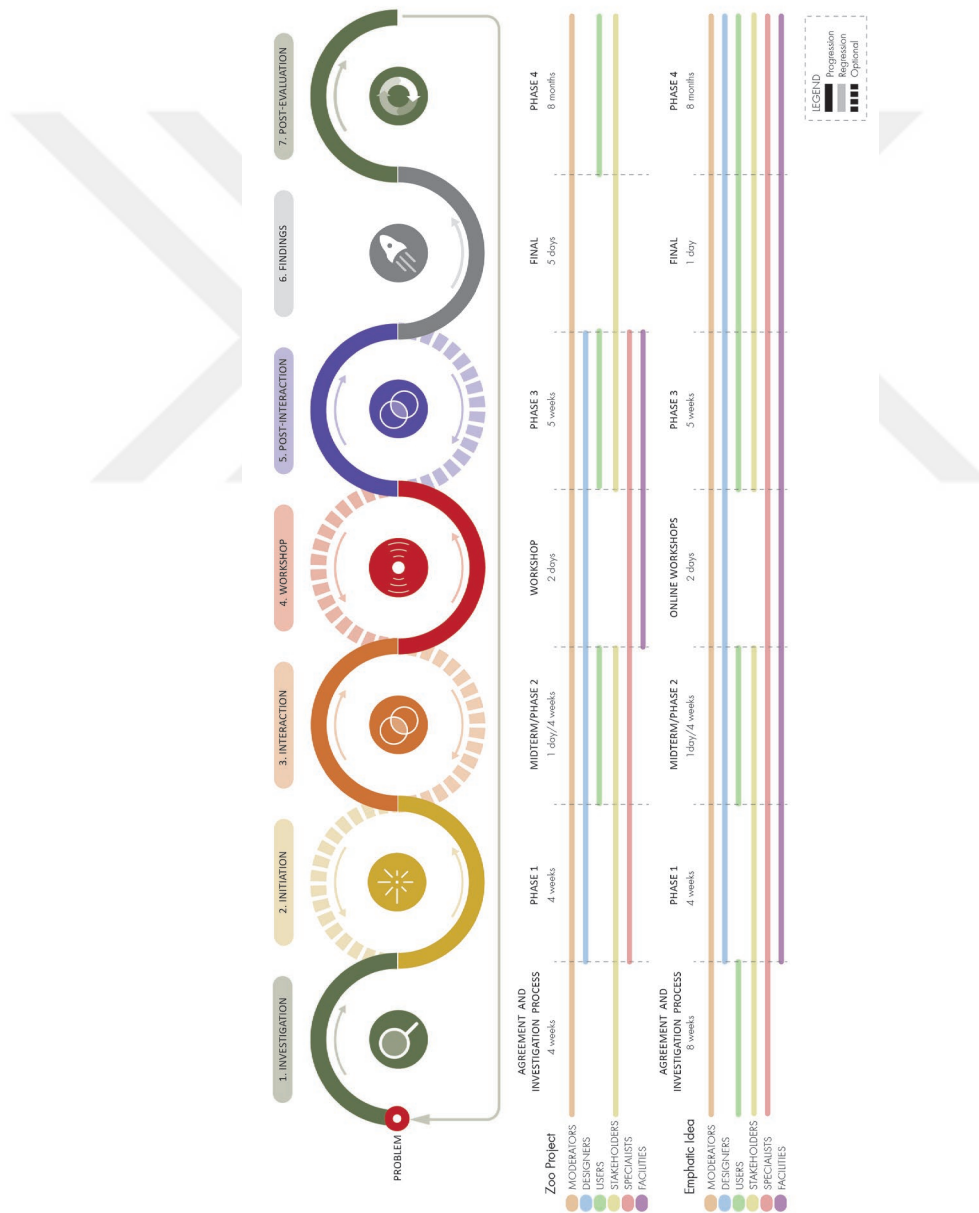

Figure 49. Participatory Design Process – Comparison of Zoo Project and Empathic Design

CHAPTER 7: CONCLUSION

According to Jansson (2008), participatory design is a pivotal stage and a significant journey in students' learning and development because it intersects procedural efficacy and transformative educational and developmental prowess. This research set out to explore the rich potential contained in participatory experiences while at the same time introducing novel technologies that cannot only enhance but also drastically alter the complex fabric of the participatory design field.

The study's proficient handling of the complex interactions between SM, OP, and DI indicated how broad the canvas of inquiry was. The aforementioned navigational skill was used in the broad context of a nationwide participatory interior design project. This challenging environment included large-scale and smaller-scale scheduling, budgeting, and prototyping challenges.

Like a well-orchestrated symphony, the research strategically addressed and overcame these multifaceted challenges, leveraging its methodologies to create a harmonious amalgamation of insights and innovations. As we traverse this intellectual landscape, the study's objectives stand as ambitious pillars—efforts not just to recognize but to unlock the latent potential residing within participatory experiences and simultaneously usher in technologies that stand as harbingers of transformative change.

Sanders (2002) emerges as a pivotal figure who highlights the importance of the user as not just a participant but also a key component of participatory design processes. Breaking from traditional models, which frequently consider user needs after the project has been developed, this research explores the complex aspects of participatory design and skillfully integrates transparent, emancipatory, and participatory techniques. Its compass extends into education in addition to pointing to successful design outcomes. Instead of being passive onlookers, participants in this odyssey actively participate and acquire genuine ownership over the projects in which they play a crucial role.

The joint projects with TEGV and YU INAR, namely the "Zoo Project" and "Empathic Design," were insightful in deciphering the complex dynamics present in PDPs. These programs shed light on the subtle interactions between traditional in-person and modern virtual methods, providing priceless insights into the intricate dance of approaches. An emphasis on developing relationships with others gave rise to a deep comprehension of the depth that can be attained by active participation. This emphasis on relationship-building proved especially relevant in interior design, where human interactions are highly valued. Nonetheless, the geographical limitations inherent in this conventional method highlighted the necessity for alternative approaches.

Conversely, the university's contribution of moderators and designers, YU INAR, was instrumental in creating the participatory environment. The "Empathic Design" project overcame geographical obstacles with skill, demonstrating how contemporary design methodologies are changing. However, it faced difficulties maintaining the interpersonal relationships and immediacy essential in the digital sphere. The challenges the "Empathic Design" project encountered demonstrate the dynamic nature of PDPs and act as a microcosm of the more significant changes in modern design practices. These challenges involve striking a careful balance between the virtual and the tangible.

"Zoo Project" and "Empathic Design" case studies add more nuance and complexity to this research. Both projects, carried out as part of a TEGV course at Yaşar University, had the same goal of designing furniture but differed significantly in scope and approaches. The "Zoo Project" promoted direct interaction with stakeholders and the surrounding community using a traditional, in-person participatory design approach. On the other hand, "Empathic Design" deliberately adopted a digital approach, utilizing online resources to lead a national cooperative design campaign. This tactical change demonstrated flexibility and grit as it skillfully handled the extraordinary difficulties brought on by the COVID-19 pandemic.

While the "Zoo Project" highlighted the inherent benefits of localized participation and community involvement, "Empathic Design" skillfully used digital innovation to enable a more extensive national engagement. This significant move from a regional to a national scope, along with the change from traditional to digital approaches, is

evidence of the adaptability and energy of participatory design processes. It presents a paradigm in which combining conventional and contemporary methods solves the problems caused by the dynamic nature of the design world and creates opportunities for novel, inclusive, and flexible techniques that reshape the parameters of participatory design.

The complex "Empathic Design" and "Zoo Project" case studies are powerful examples, eloquently demonstrating participatory design's flexible, dynamic quality. These stories weave a complex tapestry demonstrating the adaptability of participatory design approaches and their deft handling of various situations and rapidly changing technology environments.

Examining the details of these case studies reveals that the "Zoo Project" and "Empathic Design" are the best examples of the various approaches available to involve communities in the design process successfully. The "Zoo Project" captivates with its traditional, face-to-face participatory methodology, which cultivates strong relationships with stakeholders and local communities. On the other hand, "Empathic Design" takes a novel approach, adopting a digital paradigm that skillfully negotiates the difficulties presented by the rapidly changing technological environment and the limitations enforced by the COVID-19 pandemic.

These insights are compelling because they can be implemented at the local and national levels, providing a path forward that harmonizes the advantages of digital tools with traditional methodologies. These approaches highlight how adaptable participatory design is, extending beyond national borders and adjusting to the constantly changing landscape of technological breakthroughs. It attests to the immediate achievements of these distinct projects. It offers a model for upcoming undertakings, promoting a comprehensive, multifaceted method of participatory design that can be adjusted to various circumstances and settings.

The two-year case study execution process was multifaceted. It involved various methodological approaches, resulting in a rich tapestry of techniques that crossed traditional and cutting-edge domains. These were not isolated methodologies but essential elements carefully woven into the participatory design journey: animated

videos, AR/VR simulations, brainstorming sessions, digital modeling endeavors, lengthy discussions, intricate drawings, captivating exhibitions, immersive games, perceptive interviews, thorough questionnaires, meticulous jury evaluations, keen observations, meticulous pilot tests, in-depth research and analysis, informative seminars, strategic use of SM, carefully crafted surveys, rigorous usability testing, and interactive workshops.

Ultimately, the goal of this extensive toolkit of methods went beyond simple implementation to the focused search for a deep understanding of the complex dynamics of participatory processes with children as a particular focus. Examining the intricacy of the relationships and lines of communication between different stakeholders, including designers, moderators, users, and experts, became a priority. Each methodology functioned as a lens, presenting a distinct perspective into the complex realm of participatory design while revealing participants' varied roles and levels of participation. Furthermore, these in-depth case studies are expected to yield outcomes far beyond the immediate project goals. They have the power to expand the possibilities of participatory design processes into previously unexplored domains by redefining and creating new hybrid techniques. This proactive, future-focused approach seeks to advance the field's body of knowledge and usher in a time when cutting-edge and conventional methods will work together harmoniously to improve the effectiveness and inclusivity of participatory design.

The study's extensive results highlight the enormous and unrealized potential of SM and DI when used in participatory design projects. The ramifications of these discoveries extend throughout the interior design fields, providing experienced designers and scholars with many advantages in navigating the complex terrain of design procedures. Unlike the conventional face-to-face participatory design methods, these contemporary methods are flexible and adaptive, necessitating a sophisticated comprehension of the particular requirements presented by the ever-changing contemporary context.

A distinguishing feature that puts participatory design processes above and beyond traditional qualitative and quantitative approaches is the adoption of generative methods. These cutting-edge methods go beyond the conventional bounds of design

methodologies, allowing users to actively participate, make defensible choices, and offer insightful criticism that helps shape the direction of design proposals.

Using generative methods has significant implications because it can give users a true sense of agency, turning them from recipients of information into participants in the design process. This change in perspective aligns with the fundamentals of participatory design, which involves involving end users as co-creators and incorporating their preferences and insights into the evolving story of the design.

When researchers plan participatory design exercises, these fundamental ideas act as a compass, directing the smooth integration of techniques that give users agency while amplifying their voices in the design discourse. These ideas work well together to produce a robust framework that lays the foundation for a genuinely inclusive participatory design process. This method, based on combining generative and user-centric approaches, can effectively capture the various viewpoints and complex needs of the involved users, resulting in a design philosophy that is truly meaningful to the communities it serves.

The vast domain of SM reveals itself as a powerful enabler, offering many benefits in building relationships with a wide range of stakeholders. This adaptable platform allows communication with people familiar with the case and those living in hometowns with similar service areas. The study unearthed an intriguing phenomenon that demonstrated the natural connective power of social media: even though the case application took place in a different location, these participants were already deeply ingrained in TEGV.

An important finding is the natural development of SM contribution environments. In contrast to traditional methods, these environments evolved organically, molded by users' active and spontaneous contributions rather than following a predetermined structure painstakingly created by moderators. This dynamic transformation defied expectations, breaking down barriers and encouraging a cooperative spirit aligned with the values of a more democratic design environment. These SM contribution environments' participatory dynamics reflect the democratizing power of user-driven platforms. A spirit of inclusivity and shared ownership developed as participants

molded the story and the layout of the interaction area. This innovative method not only enhances the participatory design process but also demonstrates how social media can be a catalyst for creating democratic and cooperative environments for artistic pursuits.

Looking ahead reveals a world of fascinating opportunities: creating and implementing a specialized web application and platform precisely adapted to participatory design methodologies' subtleties. This imagined platform, closely connected to social media (SM) profiles, has two goals: increasing awareness and democratizing the field of participatory design. Such a platform's multifarious potential cuts across disciplinary boundaries and holds the promise of revolutionary applications in city planning, architecture, furniture design, landscape design, and public organizations.

In this perfect future, participatory design goes beyond its current function as a step in the process. It has become a vital and dynamic force that significantly shapes the course of many different fields. The intended web platform serves as a hub, quickly incorporating participatory processes into the structure of different artistic fields. A symphony of collaborative energies emerges as designers, participants, and stakeholders unite in this digital space, reshaping design endeavors and advancing inclusive practices.

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APPENDICES

Appendix A – Goodwill Agreement Among Yaşar University, TEGV, and Caploonba

The firm's roles were;

• Participation in all juries within the scope of the INAR 3302 Furniture Design course during the 2019-2020 Spring Semester.

• Participating in the workshop to be held at TEGV Çiğli Education Park on February 15, 2020.

• Participating in the mid-term jury.

• Opening its doors to Yaşar University for one day for the workshop to be held on 04.04.2020 according to the academic calendar of the university, making an educational presentation and providing material and labor support for the study.

• To produce 30 (+- 2) student projects to be published at the end of the 2019-2020 Spring Term until 01.06.2020 and deliver them to Yaşar University Interior Architecture and Environmental Design Department.

• Production of 100 of the 2 projects to be selected by all parties at the end of the 2019-2020 Spring Term and distribution to the stores in Turkey, donating all of the income to TEGV.

• In line with the company's request, in addition to the above 2 projects, 1 more project was selected from the ZOO Project carried out in 2018-2019, 100 units were produced and distributed to the stores in Turkey, and all of the income to be donated to TEGV.

• Organizing summer internships at Caploonba Factory in the 2019-2020 Summer Term for 4/6 students whose project mentioned in the above article is selected.

• Participation in MODEKO Furniture and Decoration Fair 2020 İzmir together with Yaşar University Interior Architecture and Environmental Design Department without introducing its products.

• Allowing the outputs of the project to be used in academic articles that can be written by mentors in the future.

• The University and the Foundation have the right to use the Company's corporate logo, limited to the duration of the Project.

The moderators' roles were:

• Controlling, monitoring, and archiving the SM accounts to be opened for academic research and data collection throughout the project.

• Organizing the semester meetings, seminars, presentations, workshops, online activities.

• Creating several communication channels between all the parties.

• Sharing all necessary knowledge with the designers, TEGV, and Caplooonba.

• Organizing the contribution of the I'M DESIGN 6 Symposium, which will take place in İnegöl between 1-7 March 2020.

TEGV's roles were:

• An educational workshop will be held at TEGV Çiğli Education Park on February 15, 2020, on the behavior of children and their relationship with the objects around them by the Child Development Specialist to be assigned by TEGV. On the same day, a presentation will be made by the TEGV Field Management Organization to inform about TEGV.

• TEGV Field Management Department will attend the year-end exhibition to be held on June 2, 2020, at Yaşar University and the ceremony where the furniture will be donated.

• If TEGV needs it, it will be able to produce similar furniture designed and produced in the 2019-2020 Spring Term and use it at different event points.

• TEGV, from the sale of mass-produced furniture, provides communication, advertising, press, sales, etc. in return for the donation mentioned in the Duties and Responsibilities of the Firm. will give the necessary permission under the terms of this Agreement for the use of the TEGV logo for these purposes.

• It is expected that the company will provide the necessary permissions on behalf of TEGV for the process video to be shot for advertising purposes. No development activities will be carried out without the written consent of the Foundation and/or the persons whose images or voices are recorded.

• TEGV is expected to attend MODEKO Furniture and Decoration Fair 2020 Izmir (4 - 8 March 2020) together with Yaşar University Interior Architecture and Environmental Design Department.

• It is expected that the I'M DESIGN 6 Symposium, which will take place in İnegöl between 1-7 March 2020, will be included in the presentation where the output and process of the 2019-2020 Spring Term joint work with Yaşar University

Department of Interior Architecture and Environmental Design will be explained.

• During the project, it is expected that the SM accounts to be opened for academic research and data collection will be allowed to be used and these accounts will be delivered to TEGV children by the education units.

• It is expected that the outputs from the project will be used in academic articles that can be written by mentors in the future.

Yaşar University's roles were:

• It is expected that the Moderators appointed for all experience sharing meetings to be held by the Company and TEGV during the 2019-2020 Spring Term will participate.

• The Firm and the Foundation have the right to use the University's corporate logo, limited to the duration of the Project.

Also, the project process and program were agreed on by all parties.

CURRICULUM VITAE

Gökhan Keskin received his bachelor's degree in interior architecture and environmental design from Izmir University of Economics, Faculty of Fine Arts and Design, Department of Interior Architecture and Environmental Design in 2014; his graduate degree in Design Studies from the Graduate School of Social Sciences in 2016. He wrote his master's degree thesis titled "Sports Area Design for People Affected by Cerebral Palsy". In 2013-2014 and 2015-2016, He had education as an Erasmus student in Escola Spuerior de Artes e Design in Matosinhos Portugal.

He participated La Trienale di Milano-Portugal Stand, EWUQ Port 2013-Izmir Expo 2020 Site Project, Chiba University Internship (designing a Cultural Center in Japan), multicultural workshops, Istanbul Biennial-Make A Difference, and La Trienale di Milano-Design After Design exhibitions.

ETHICAL BOARD APPROVAL

Sayın Prof. Dr. Deniz Hasırcı ve Gökhan Keskin,

"A Participatory Interior Design Method for a Learning Environment Through the Use of Social Media and Digital Technologies" başlıklı projenizin etik uygunluğu konusundaki başvurunuz sonuçlanmıştır.

Etik Kurulumuz 21.10.2021 tarihinde sizin başvurunuzun da içinde bulunduğu bir gündemle toplanmış ve Etik Kurul üyeleri projeleri incelemiştir.

Sonuçta 21.10.2021 tarihinde **"A Participatory Interior Design Method for a Learning Environment Through the Use of Social Media and Digital Technologies"** konulu projenizin etik açıdan uygun olduğuna oy birliğiyle karar verilmiştir.

Gereği için bilgilerinize sunarım.

Saygılarımla,

Prof. Dr. Murat Bengisu
Etik Kurul Başkanı