

Value-led participatory design approach for improving public health clinic services

Chai-Huei Sher^{a,b*} and Tung-Jung Sung^a

^aDepartment of Design, National Taiwan University of Science and Technology, Taipei, Taiwan; ^bTaiwan Design Research Institute, Taipei, Taiwan

Correspondence

Chia-Huei Sher, Taiwan Design Research Institute, Taipei, Taiwan

Notes on contributors

Chia-Huei Sher is a PhD candidate in the Department of Design at the National Taiwan University of Science and Technology and also serves as the Director of Strategic Foresight Research & Development Section at the Taiwan Design Research Institute. Her research primarily centers around public service design.

Tung-Jung Sung is a distinguished professor in the Department of Design at the National Taiwan University of Science and Technology. His research interests encompass service design, social innovation, circular design, and intelligent product design.

Note: This is the Author Accepted Manuscript (AAM). Author affiliations and biographical information reflect the authors' positions at the time of acceptance. Please refer to the published Version of Record for the definitive citation.

Value-led participatory design approach for improving public health clinic services

This study aimed to explore the feasibility of employing a value-led participatory design approach to foster value co-creation in public health clinic (PHC) services. Through mixed-methods data collection at a PHC in New Taipei City, we found that improvements in functional, emotional, and life-changing value elements led to increased service satisfaction. The study highlights the importance of continuous evaluation and adaptation of services based on stakeholder feedback and evolving community needs, emphasizing the dynamic nature of healthcare service improvement.

Keywords: value-led participatory design; service-dominant logic; public service logic; public service design; value co-creation

Introduction

Governments worldwide are facing increasingly complex and unpredictable environmental challenges, necessitating innovative approaches to transform the public sector (Bradwell & Marr, 2017). Value co-creation encourages service users to collaborate in creating value, enhancing public services by incorporating users' perspectives. While some studies (Osborne et al., 2016; Trischler & Charles, 2018) have supported the integration of design expertise to improve public services and promote value co-creation and user participation, few have focused on applying design methods to address public health promotion issues (Bason, 2017; Sønderskov & Rønning, 2021; Trischler & Scott, 2016). The practical considerations of how values are created and integrated into public participation and government services remain ambiguous, hindering the application of design methods to address public issues. The use of design methods to promote healthcare utilization is a promising approach (Oertzen et al., 2022). While studies investigating design methods in public health are increasing, there is still a lack of comprehensive descriptions of the complete design method cycle or actionable strategies for its implementation in health promotion and disease prevention efforts, particularly in earlier literature such as Bazzano et al. (2017). With more researchers

integrating various design strategies, such as human-centered design and community-based participatory research, into the development of public health solutions (Chen et al., 2020), the methods utilized should progressively become easier to replicate and implement, improving communication efficiency. To bridge these gaps in the literature, this study aims to (1) clarify the role of public service design (PSD) in the value co-creation of public health services and (2) evaluate the effectiveness of value-led participatory design (V-LPD) (Iversen et al., 2012) for improving such services.

Literature review

Public service design (PSD)

The concept of Public Service Design (PSD) embodies a strategic melding of “public service” and “service design”, aiming to revamp how governmental policies, mechanisms, and services are conceived and delivered. Public services operate within a multifaceted stakeholder ecosystem, characterized by the interplay and co-creation of value among human resources, organizations, technology, and processes (Radnor et al., 2014). This complex ecosystem underpins the essential services provided by governments to their citizens.

Amidst growing interest in leveraging design-oriented approaches within public administration, there is a pressing need to evolve and refine design methodologies. These advancements are crucial for bolstering the scientific rigor and societal pertinence of design-led initiatives in the public sector (Hermus et al., 2020). This need arises from a broader public expectation for enhanced services, prompting government agencies to explore the potential of service design as a catalyst for innovation (Lewis et al., 2020).

Many policy innovation labs are striving to incorporate participatory and co-design methods into policy formulation, focusing on creating user-centered services (McGann et al.,

2018). Whicher and Crick (2019) introduced fundamental concepts for effectively conducting co-design, including clear language and processes, well-defined project selection criteria, evaluation, promotion, and support from decision-makers.

Service design is increasingly utilized to enhance the quality and efficiency of public services (McGann et al., 2021). It represents an ongoing exploratory process that underpins the generation or allocation of social resources and the establishment of fresh value-based interactions among participants (Kimbell, 2011). For service providers, service design can assist in planning efficient, effective, and exceptional services, as well as in generating specific design principles (Mager & Sung, 2011). In healthcare, the iterative and collaborative approaches of service design can improve users' experience and satisfaction with healthcare services; for example, it can enhance patients' experience and staff satisfaction (Banbury et al., 2021). Therefore, service design can identify the problems, conditions, and solutions of complex service systems, leading to effective services (Trischler & Charles, 2018).

The new public management approach can result in inadequate public participation and diminished quality control, integration, and collaboration (Osborne, 2006). According to van Buuren et al. (2020), adopting value co-creation based on service design thinking can thus benefit the public service sector. Osborne (2018) proposed the concept of public service logic, which promotes value co-creation in public services by designing a participatory process to facilitate the development of new services (Sønderskov & Rønning, 2021). Service design can promote the development of public services by focusing on the public interest (OECD, 2017). For example, it can engage with service users and promote collaboration to enhance public services. A fresh perspective and openness to new methods are crucial for making this shift happen.

As the key players in service design, designers must be aware of and explore the differences between the private and public sectors. This requires considering the interests of multiple stakeholders and balancing their occasionally conflicting needs, values, and expectations. Designers must also navigate the public sector's complex regulatory and bureaucratic environment to ensure that their designs are feasible and implementable. Thus, PSD is challenged to develop more effective frameworks and methodologies for impactful application in the broad realm of public services.

Value co-creation

Value is a crucial concept that explains behavior and attitude (Rokeach, 1973). Establishing a value proposition can help service design focus on clear but manageable goals (Lusch & Vargo, 2006; Sanders & Stappers, 2008). Service-dominant logic, introduced by Vargo and Lusch (2008), emphasizes the value co-creation process between service providers and users. According to Ballantyne et al. (2011), value propositions help stakeholders understand their roles and norms when interacting during participation. In the dynamic realm of human cognition, values often undergo reassessment and refinement (Bardi & Goodwin, 2011), a trait mirrored in the service domain, where collaboration between providers and recipients fosters joint value creation (Grönroos, 2019). Therefore, values serve as the cornerstone of service design and facilitate effective value co-creation between service providers and users.

As value co-creation encourages the use of public resources and capabilities to capture knowledge and improve public service quality (Mureddu & Osimo, 2020), it promotes innovation in private enterprises and the public sector (Alves, 2013). Joint value co-creation by service providers and users in the public sector may enable them to become resource integrators and create the service experiences they need (Trischler & Scott, 2016). Here, balancing, regulating, and enhancing the public interest is more essential than exploring

new product development with a profit-making motive, as in the private sector (Moore, 1995; Osborne, 2018).

Although the public sector's value generation remains unclear in the public domain (O'Flynn, 2021), clarifying the values that it seeks to develop and considering the differences between public and private values are necessary to improve public services through value co-creation. Leite and Hodgkinson (2021), for instance, explored the possibility of realizing value co-creation in public services. Previous studies (Li et al., 2016; Poirier & Devraj, 2019) have explored ways to improve services in business and healthcare contexts through value co-creation, notably by incorporating Maslow's classical hierarchy of needs (physiological, safety, social, esteem, and self-actualization) (Maslow, 1954). Almquist et al. (2018) modified Maslow's hierarchy by adding four elements: social impact, life-changing, emotional, and functional. They then proposed 30 value elements based on this framework, providing a solid foundation and clear boundaries for discussing values (Table 1).

Table 1. The Value hierarchy and elements

Value hierarchy	Value elements	Amount
Social impact	<i>Self-transcendence</i>	1
Life-changing	<i>Heritage items, Motivational inspiration, Nostalgic emotions, Providing hope, Self-actualization, Sense of belonging</i>	6
Emotional	<i>Attracting attention, Design aesthetics, Earning money, Healing and consolation, Health promotion, Laughter and entertainment, Providing channels, Reducing anxiety, Self-reward, Symbolic meaning</i>	10
Functional	<i>Avoiding trouble, Cost reduction, Good quality, Information provision, Integration ability, Interpersonal connection, Multiple choices, Organizational skill, Reducing burdens, Reducing risk, Sensory experience, Simple and easy, Time-saving</i>	13

Although value co-creation can help create services that better meet the demands of the public by engaging with users and understanding their needs, it faces various challenges

in practice, such as power imbalances and limited resources. Therefore, further research and exploration are necessary to fully realize the benefits of value co-creation in PSD.

Participatory design

Participation aims to gain a deeper understanding of people's lives and behaviors by gathering detailed information on events and engaging with individuals on specific issues, thereby acquiring tacit knowledge (Kemmis et al., 2014). Some processes, referred to as co-creation or co-design, have a similar purpose—to "participate" in the development of products or services (Sanders & Stappers, 2008).

Rather than relying solely on expert judgment, participatory design focuses more on people's expectations and values, and the political context provides constructiveness, by thinking about future opportunities through critique and empathy (Smith et al., 2017). While these design approaches embrace stakeholder engagement, they frequently suffer from a lack of structure, highlighting the necessity for explicit methods that can assess whether the expected benefits have been achieved. Additionally, there is a pressing need to account for the costs and risks associated with participatory design to ensure a comprehensive evaluation of its efficacy and impact (Huybrechts et al., 2017; Steen et al., 2011). In the realm of policy-making, there is a focus on designing processes that facilitate effective participation and harness the advantages of design in enhancing public engagement (Saguin & Cashore, 2022).

Byrne and Sahay (2007) applied participatory design in community healthcare projects and advocated that stakeholder participation promotes organizational capacity development. Some design-related studies (Oertzen et al., 2022; Xiao et al., 2023) have used participatory design for public projects and developed related strategies to support the integration of participatory design projects.

Visually highlighting value during the participatory design process can help researchers and users discuss values consistently and encourage users to discover them. Le Dantec and Do (2009) emphasized that establishing a clear basis for discussion through defined values can help designers make trade-offs among solutions. Iversen et al. (2012) explained the importance of values in the participatory design process and discussed how values are co-created and developed. Iversen and Leong (2012) noted that although values are subjective, participants can discuss them to create goals without feeling uncomfortable about the topic. V-LPD can thus serve as a design strategy to allow stakeholders to find meaningful development directions by discussing values (Van Mechelen et al., 2017). This method can enhance the participatory design process in public service development, leading to robust solutions that are practical and effective.

Methods

This study employs participatory action research (PAR) and mixed-methods approaches to observe changes in the value perceptions of public sector employees and citizens. Using a mixed-methods design can provide a comprehensive understanding of stakeholders' needs and opinions (Coghlan & Brannick, 2005; Fetter et al., 2013; Tashakkori & Creswell, 2007). The target of this study was a PHC in New Taipei City, Taiwan, where we initiated a project to identify service gaps (referred to as the "PAR project" hereafter). The PAR project was initiated during a kick-off meeting announced by the Health Bureau Commissioner to optimize the PHC's services. The remit of the PAR project included two primary healthcare centers, one located in a city and the other in a rural area.

This study is based on four types of V-LPD (Iversen et al., 2012): emergence of value, where stakeholders discuss specific issues and find new value; development of value, where the participation mode and stakeholders determine interaction roles; grounding of

value, where new value from the context of stakeholders arises, involving a thorough understanding of users and their needs; and realization of value, where stakeholders confirm their willingness to exercise new value propositions or practices, involving testing and implementing new ideas. It can thus identify the effectiveness of the action in each stage by tracking changes in values and describing the participation of participants (as shown in Table 2).

Table 2. Research process developed from V-LPD

V-LPD Type	Key activities	Participants
<i>Emergence of value</i>	Through qualitative interviews, recording key stakeholders' descriptions and potential service values	Health bureau, PHC's stakeholders
<i>Development of value</i>	Utilizing value elements to screen and prioritize the most critical value propositions and goals	Design team
<i>Grounding of value</i>	Based on the defined values and priorities, optimizing PHC services using quantitative surveys, to track community respondents' thoughts pre/post-improvement	Community members
<i>Realization of value</i>	Conducting a workshop for all stakeholders to explore how to optimize actions to improve PHC services in the future continuously	Health bureau, PHC's stakeholders, Design team

The PAR involved 30 stakeholders, including some who were selected by the Health Bureau Commissioner, as well as PHC stakeholders, the design team, and citizens. We interviewed 13 key participants actively engaged in the research process, comprising two policy executives, two medical policy consultants, six PHC stakeholders, two service designers, and one spatial consultant from the design team (Table 3). The 17 participants, including consultants, nutritionists, rehabilitation therapists, procurement, and administrative staff involved in policy discussions, were hesitant to partake in in-depth interviews due to a

lack of confidence but agreed to contribute through workshops.

Meanwhile, this study collected data on perceived value and service satisfaction from PHC users through pre- and post-test questionnaires. A hierarchical regression model was then employed to examine the differences among services.

Findings

Emergence of values

Drawing from Saad-Sulonen et al. (2018), the current methodology integrates a longitudinal view within the participatory design framework. This approach recognizes the significance of recorded experiences and future projections in shaping service outcomes. Through interviews with 13 service planning stakeholders, each lasting 15 to 60 minutes, as detailed in Table 3, we gathered insights spanning temporal horizons. These insights revealed how participants' reflections on the past and their anticipations for the future informed their current contributions and decision-making processes within the service planning arena.

Table 3. Three groups of interviewees.

Group	Participant	Purpose	Code
Health Bureau	(1) Policy executive	Propose policy planning and development	P1
	(2) Policy executive	Improve health policy benefits	P2
	(3) Medical policy consultant	Provide medical management suggestions	P3
	(4) Medical policy consultant	Provide nursing management suggestions	P4
PHC stakeholders	(5) PHC's chief physician (urban)	Integrate urban health promotion services	A1
	(6) Nursing supervisor (urban)	Improve management efficiency in promoting parent-child health check-ups	A2
	(7) Community representative (urban)	Improve management benefits for childhood vaccination rates	A3
	(8) PHC's chief physician (rural)	Develop rural health promotion services	A4
	(9) Nursing supervisor (rural)	Improve management efficiency in community health promotion	A5
	(10) Community representative (rural)	Provide service recommendations for traditional tribal communities	A6
Design team	(11) Service designer	Facilitate the design process	D1
	(12) Service designer	Facilitate the design process	D2
	(13) Spatial consultant	Propose interior design improvements	D3

Four themes were identified from the 13 interviews conducted to understand the participants' thoughts and perspectives (Table 4). Theme 1 revealed participants' expectations of and concerns about the designer's involvement, reinforcing the importance of feasibility and effectiveness. Theme 2 highlighted the participants' clear descriptions of current problems and their desire to enhance service value and information delivery to overcome existing stereotypes. These findings suggest a gap between the value proposition of the PHC and the value perceived by the public. Theme 3 involved the views of service providers and recipients, with managers finding service development challenging, and residents discussing their experiences and intuitive issues, needs, and welfare measures. Theme 4 related to the future, with participants expecting new services and meanings, rather

than more health promotion products.

Table 4. Excerpts from the 13 interviews with the participants.

Theme	Quote
Theme 1: Expectations for the PAR project	• ‘The concept of design like service...to accept new attempts, new experiences, and new ideas.’ (P1) • ‘I have tried to design the action plan with service design to improve the screening rate, but in the end, the long-term benefits of the design cannot be understood... It is very hard to start a new service project health institute.’ (P3) • ‘Public health needs to be successful through continuous efforts and initiatives, and any change cannot be immediately implemented as everyone expects.’ (A5)
Theme 2: Past communication experience	• ‘The favourability of the people can make service transmission more efficient.’ (P1) • ‘Because of professional relationships, we often have no way to communicate and focus on the people.’ (P2) • ‘The scarcity and surplus of regional medical resources will affect the value of the public for health clinics.’ (A1)
Theme 3: Past service experience	• ‘People have too many stereotypes about hygiene, are unaware of the services provided by the hygiene department, and therefore cannot effectively use them.’ (A2) • ‘Our village conducts classes in the health clinic. If you can provide meals in class, everyone will come.’ (A3) • ‘I have finished the number plates and waited for 3 hours. Many people have been waiting for a long time.’ (A6)
Theme 4: The future	• ‘As everyone’s life changes... but what kind of service innovation to be provided in the future is an important issue when health demands are unchanged.’ (A1) • ‘In the future, the service is no longer centred on the health clinic; it would be directly brought to the resident’s home or community.’ (A4)

Development of values

In the initial pilot interviews, discussions among participants regarding service improvement initiatives were challenging to focus on. However, by drawing on the method proposed by Rowley et al. (2012), we found that the use of a specially designed card game proved

effective in capturing the attention of interviewees and enhancing the value of semi-structured interviews.

We visually represented the 30 value elements outlined by Almquist et al. (2018) by printing them onto physical cards, thereby materializing them, and asking the participants to consider the values depicted on the cards while discussing their past experiences and future expectations. We then asked them to select the three values most crucial to health clinics and used these as keywords to describe their value propositions. The participants also selected values relevant to their future expectations, which had not yet been realized, and described their perspectives and the reasons behind their choices during the selection process.

Table 5 presents participants' descriptions of the value elements identified. Members with medical backgrounds began to actively imagine the possibilities brought about by design, focusing on addressing users' needs and considering workplace improvements. All participants eventually chose 16 value elements as the targets for improvement. The process of manifesting values through the value elements enabled them to move beyond being overly concerned with "problem points" or operational bottlenecks.

Table 5. Participants' descriptions of the value elements.

Value element	Description
Functional	1. <i>Integration</i> : Integrating information and channels to meet the needs of different people. (P3)
	2. <i>Variety</i> : Provide corresponding service channels and resources for people to choose a suitable way to use the service. (P3)
	3. <i>Quality</i> : We need to demand more from ourselves to achieve the sustainability of the health clinic. (A5)
	4. <i>Cost reduction</i> : Saving money and effort and eliminating the hassle of reducing the cost of using services. (P3)
	5. <i>Information</i> : Providing timely and important information. (P3)
	6. <i>Time savings</i> : Compared with medical centres, the PHC employs simpler processes. Adjusting service levels save time. (P4)
	7. <i>Simplification</i> : Through process improvements, the process is now relatively simple for people. (A2)
Emotional	8. <i>Health promotion</i> : The most important value of the PHC and the ultimate goal of the service provided. (P3)
	9. <i>Providing access</i> : They may obtain health education information through value exchange in health promotion. (D1)
	10. <i>Design and aesthetics</i> : The brand must be packaged, making it easier for people to remember. (A4)
	11. <i>Reducing anxiety</i> : Can provide solutions to reduce anxiety for patients and caregivers. (A2)
	12. <i>Fun and entertainment</i> : We need to find ways for people to come into contact with services through means beyond professional services. (P4)
	13. <i>Attractiveness</i> : People are influenced by the value of the service and actively want to participate and use the service. (P4)
	14. <i>Therapeutic value</i> : To establish services that symbolize preventive medicine and to become a trusted brand among the public. (A5)
Life-changing	15. <i>Affiliation/belonging</i> : Content is provided not through paid or self-acquired services but through interpersonal relationships. (D2)
	16. <i>Motivation</i> : Providing motivation for people to promote their health. (P3)

After establishing the values in the previous stage, we planned corresponding service improvement programs and obtained approval from the Health Bureau. After nearly a year of spatial adjustments and location transitions to accommodate new services, we simplified the

counter design for the waiting and consultation areas and improved the wall display of service processes (combining the sub-elements of integration and quality under the functional element), as shown in Figure 1. Moreover, we enhanced variety (functional element), health promotion (emotional element), and affiliation/belonging (life-changing element) by providing spaces for infant care and nutrition education, as depicted in Figure 2. These changes focus on improving service programs and facilities by clarifying values.



Figure 1. Original registration and consultation area (left) and the service counter with the added sub-elements of integration and quality (right).



Figure 2. Service that enhances the sub-elements of affiliation/belonging (left) and variety and health promotion (right).

Grounding of values

To test whether the value propositions were actually implemented in the proposed services, we conducted surveys before and after the service improvements. We assessed the

effectiveness of the service improvements using between-group testing to reduce the possibility of respondents being biased by their prior experiences with the service or intervention being tested. The pre-improvement data were collected from January to February 2020, with 74 questionnaires collected. The post-improvement data were collected in January 2021, one year after the service had been officially adjusted and one month after the new service was launched. Utilizing the support of PHC staff, we designated a specific area within the PHC facilities for questionnaires, strategically recruiting participants during operational hours to facilitate feedback from those willing to contribute, thus avoiding additional burdens at the grassroots level. Our sampling strategy, deliberately aligned with the actual service hours and enhanced by insights from PHC staff, aimed to capture an accurate representation of the PHC user demographic across locations. By conducting the survey amidst the most inclusive vaccine administration period, targeting the broadest possible age range, we employed purposive sampling to deepen our comprehension of diverse healthcare needs, providing insights for decision-making in PAR. A total of 66 questionnaires were gathered from individuals distinct from those surveyed in the two stages, resulting in a total of 140 respondents.

The questionnaire content was approved in advance by the Health Bureau and subsequently reviewed. It was deemed to have no adverse impact on the physical or mental well-being of respondents by three PHC directors. All participants provided verbal consent and indicated their agreement by checking the consent box in the digital questionnaire, demonstrating their understanding of the research purpose. We kept the questionnaire simple to prevent any disruption to public service work. We asked the respondents to rate their agreement with statements on the 16 value elements from the previous stage on a five-point Likert scale from 1 (strong agreement) to 5 (strong disagreement), representing their service satisfaction score. The questionnaire data were collected by on-site interviewers and subjected to quality control

measures to ensure that the responses were complete and accurate. Respondents' characteristics, descriptive statistics of pre and post-improvement data, composition of satisfaction factors, and questionnaire items are attached in the Appendix.

To comprehend the influence of various levels of values, we employed hierarchical regression analysis (HRA) (Bryk and Raudenbush, 1992) to investigate the impact of Maslow's theory's hierarchical levels of values on service satisfaction. This analysis particularly focuses on the pre- and post-improvement periods. All 16 value element items demonstrated high reliability, passing the Cronbach's α test with a score of 0.946 (>0.7). Validity was further confirmed using Pearson correlation coefficients. To address potential confounding factors such as gender and age ($p>0.05$), we calculated the variance inflation factors and found them to range from 1.016 to 4.222 (<10), addressing any concerns about multicollinearity. In the HRA, we formulated four models with service satisfaction as the dependent variable (Table 6):

- (1) Model 1 identified a significant difference between the pre-improvement and post-improvement periods at the headline level ($\beta=0.588$, $t=8.531$, $p<0.001$).
- (2) Model 2, which included the function value element, indicated significant positive relationships between the pre-improvement and post-improvement periods for five of the functional sub-elements ($\beta=0.195$, $t=3.768$, $p<0.001$): reducing usage costs, high service quality, perceived service diversity, service efficiency, and service integration. However, access to effective information and ease of use showed no significant relationships.
- (3) Model 3, which additionally included the emotional value element, continued to demonstrate a slight difference between the pre-improvement and post-improvement periods ($\beta=0.108$, $t=1.817$, $p<0.05$). The sub-elements fun and entertainment, therapeutic and trustworthy, and design and aesthetics exhibited positive changes

between these periods, whereas the other emotional sub-elements did not exhibit significant relationships.

- (4) Model 4, which added the life-changing value element, also showed that the change between the pre-improvement and post-improvement periods was minimal ($\beta=0.096$, $t=2.088$, $p<0.05$). Only affiliation/belonging was found to demonstrate a significant positive relationship, while health motivation did not.

Overall, the regression model had an explanatory power of 87.1% ($\Delta R^2=0.871$), indicating that it reflected the impact of the value elements and sub-elements on the pre-improvement and post-improvement periods. These steps primarily reveal the feasibility of scrutinizing and testing the value elements, while also identifying the value elements that are significantly correlated with service satisfaction. By translating value elements into measurable indicators, public service improvements can be implemented more effectively.

Table 6. HRA analysis of service satisfaction by the value elements and sub-elements.

Item	Model 1		Model 2		Model 3		Model 4	
	β	t	β	t	β	t	β	t
Pre/post-improvement	0.588	8.531***	0.195	3.786***	0.108	1.817*	0.096	2.088*
<i>Level 1: Functional</i>								
Reducing usage costs			0.216	4.344***	0.071	2.332*	0.088	1.967
High service quality			0.193	3.557**	0.040	0.774	0.036	0.713
Perceived service diversity			0.189	3.516**	0.075	1.243	0.066	1.074
Service efficiency			0.157	2.635**	0.087	1.688	0.057	1.075
Service integration			0.133	2.305*	0.056	1.001	0.041	0.749
Access to effective information			0.094	1.831	0.062	1.240	0.072	1.467
Easy to use			0.070	0.197	0.019	0.366	0.030	0.713
<i>Level 2: Emotional</i>								
Fun and entertainment					0.203	3.987***	0.170	3.297**
Therapeutic and trustworthy					0.231	3.808***	0.192	3.445**
Design and aesthetics					0.153	2.072*	0.152	2.101*
Health promotion assistance					0.071	1.495	0.082	1.755
Service attractiveness					0.106	1.402	0.099	1.309
Provide access to health					-0.059	-0.885	-0.060	-0.920
Anxiety reduction					0.021	0.390	0.020	0.382
<i>Level 3: Life-changing</i>								
Sense of belonging							0.089	2.042*
Motivation to health							0.055	1.291
R ²	0.345		0.824		0.881		0.887	
ΔR^2	0.341		0.813		0.866		0.871	
ΔF	72.784***		50.799***		8.417***		3.262*	

Realization of values

After engaging with the articulated value elements and witnessing the growth in service satisfaction from the previous phase, participants were inspired to envision further enhancements to the service. Therefore, we conducted a workshop with 13 participants and 17 stakeholders (a total of 30 people), including healthcare professionals, designers, and experts (Figure 3). The workshop focused on the challenges in public health and the development of strategies following V-LPD. The participants summarized six strategies: (1)

improving service design, (2) enhancing healthcare accessibility, (3) improving information dissemination, (4) enhancing technology application, (5) improving community integration, and (6) promoting public health awareness. We helped the participants identify the services and strategies to be developed to strengthen health promotion from the perspective of the value propositions. Finally, we reported our results to the Health Bureau Commissioner. After receiving approval from the city council, all the primary healthcare centers in the jurisdiction followed the service planning guidelines established during the PAR project.

At this stage, we reaffirmed the impact of values on participants' attitudes, reviewing previously selected value cards and introducing new cards to discuss future prospects. This led healthcare-focused participants to shift their focus toward user-centered thinking, fostering effectiveness in cross-disciplinary communication, problem-solving, and exploring alternative solutions. Ultimately, these participants provided feedback on participatory design and discussed prospects for innovation in public health services in the future.

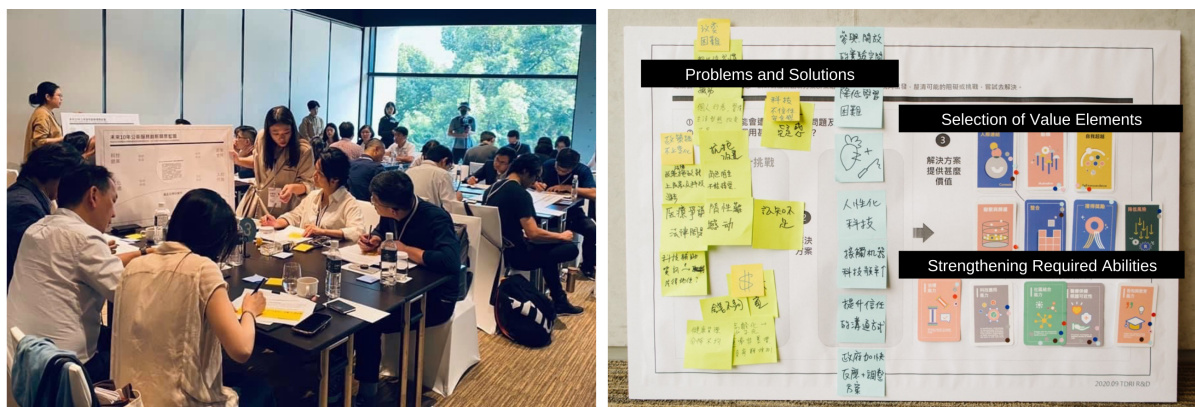


Figure 3. V-LPD strategy workshop (left) and strategy canvas (right).

Discussion

Although PAR provides additional professionals and resources to facilitate project implementation, the challenge of ensuring sustainable public services after the project ends must be addressed. This study recognizes the crucial role of public service evaluations in

fostering value creation, as underscored by Osborne et al. (2022), and tackles the inherent challenge of value variability. Employing the V-LPD approach, this research aims to align stakeholder values with the objectives of service optimization, navigating the complexities of public sector management and communication, as delineated by Komatsu et al. (2021).

Altering organizational culture and building capabilities are essential to address this issue. As such, managers must develop clear value propositions and create effective guidelines related to service to bridge communication gaps.

This study delineates the journey of value realization, substantiating the practicality and strategic merit of participatory design within the V-LPD framework. In the realization of values phase, stakeholders moved from diverse experiences to focusing on systematically discussing long-term strategies. This progression reflects the anticipatory aspect of participatory design advocated by Saad-Sulonen et al. (2018) and the integrated approach to value propositions as discussed by Smith et al. (2017).

At the same time, this study underscores the importance of prioritizing values and formulating a clear value proposition to ensure sustainable public services. Designers must recognize their crucial role as agents of change and innovation in the public sector and ensure that services are carefully adjusted. For example, one of the PHC's chief physicians (A1, as shown in Table 3) explained that they had begun playing ambient music in the waiting area since the PAR project, highlighting healthcare professionals' acknowledgment of the collaborative experience and the continuation of design methods. To achieve the ideal public services, practitioners should further develop methods and processes for encouraging public participation (Radnor et al., 2014).

Values reflect people's evaluations of and opinions on various phenomena. The hierarchical structure of values can influence behavior, as it prioritizes basic survival and safety needs over higher-order needs such as self-actualization and achievement. Engaging

stakeholders through value propositions helps them find meaningful developmental directions (Ballantyne et al., 2011; Smith et al., 2017; Van Mechelen et al., 2017). Initiating PSD requires empirical data and indicators to support goal-oriented service improvements.

This study suggests that the V-LPD process can help designers and participants comprehend and communicate the value of services while clarifying the public sector's value proposition. However, ensuring sustainable operations requires value transformation, which involves revising basic service processes, facilities, environments, methods, and tools for delivering health information.

When discussions on PSD reach a stalemate, this study proposes three strategies for moving forward in each stage. The first is to inspire: Start by identifying critical values among stakeholders. Engage policy planners, healthcare professionals, and citizens to identify essential community values and insights. Observations in natural service settings can help understand the forms and methods related to these values. Summarize vital value elements and detailed information on primary issues and obstacles for precise service planning. The second is to optimize: Actively discuss and analyze core values with a decision-making group of service stakeholders. Evaluate the involvement of residents and stakeholders through mixed research and workshops. This ensures the successful implementation of new services. The third is to practice: Despite agreement on improving value outcomes, challenges will persist when introducing new services. To achieve collaborative expected value, thorough evaluation and verification are necessary. Use data presentation methods to demonstrate design action plan contributions, such as enhanced satisfaction and improved service processes.

Conclusions

This study highlights the potential of a value-led approach for improving internal

communication in the public sector. Our findings bolster existing research on the benefits of value propositions in participatory design and their potential to augment services (Iversen et al., 2012; Iversen & Leong, 2012). Researching participatory design poses challenges due to inherent complexities. Acknowledging limitations is vital to prevent disruptions to public health. Regulatory, time, and resource constraints undeniably impact our study's scope. The PAR project, being under public sector regulation, likely steered the discussions of all participants toward feasible strategies within the regulatory framework rather than pursuing outcomes that might challenge existing rules.

Even so, the findings demonstrated that a value-led approach optimizes service improvement and communication despite limited resources and scale constraints. Governments should prioritize building citizens' trust by providing citizen-centric services, increasing transparency, engaging citizens in service co-production, and making evidence-based decisions, as suggested by Walker (2023) and Rodgers et al. (2020). Therefore, public managers should prioritize the design process and resources of public services to meet the diverse needs of the population.

Furthermore, the findings emphasize the importance of incorporating V-LPD and service design methods into public services, prioritizing public needs over technology and speed. Public services should focus on public comfort, mindset, and motivation to increase usage rates and public trust in the government. Nonetheless, forthcoming research should strategically address the challenges surrounding the establishment of a robust value co-creation mechanism and the systematic collection of public opinions. Consequently, it becomes imperative for service designers to craft research instruments that embody adaptability, feasibility, and effectiveness, ensuring their resonance within dynamic and evolving contexts.

Finally, this study highlights the significance of the intersection between service design and public health as a critical and promising area of research. Interdisciplinary collaboration has the potential to overcome traditional professional barriers and foster innovation in public health promotion services. Service design, with its ability to provide visualized information and facilitate understanding of users' needs and communication methods, plays a vital role in this context.

Impact

The project's service design component received the 2021 iF and Good Design awards, providing the New Taipei City Health Bureau with a successful case to guide service transformation. Subsequently, the New Taipei City Government utilized standardized design guidelines and systematically improved all of its 29 Primary Healthcare Centers (PHCs) within the constraints of the annual budget. This initiative has served as a model for other local government authorities in Taiwan, including those in Chiayi City, Changhua County, and Taitung County, actively planning improvements to healthcare facilities under their jurisdiction. Most importantly, these actions have heightened the awareness of public healthcare services among city policymakers and citizens.

Acknowledgments

We would like to express our sincere gratitude to all the individuals and organizations who supported this study. We extend our heartfelt thanks to the members of the local Health Bureau, healthcare professionals at the PHCs, and the residents who participated in the questionnaire survey. We also want to thank the service designers, project managers, and interns from TDRI who participated in the study and provided valuable insights.

Funding

This study was supported by the Bureau of Industry, Ministry of Economic Affairs (Taiwan) under grant number PM11006-0090, and by the Ministry of Science and Technology (Taiwan) under research project grant number MOST109-2410-H011-005-MY3.

Disclosure statement

There are no potential conflicts of interest present in this study.

References

- Almquist, E., Cleghorn, J., & Sherer, L. (2018). The B2B elements of value: How to measure and deliver what business customers want. *Harvard Business Review*, 96(2), 72-81.
<https://hbr.org/2018/03/the-b2b-elements-of-value>
- Alves, H. (2013). Co-creation and innovation in public services. *The Service Industries Journal*, 33(7-8), 671-682. <https://doi.org/10.1080/02642069.2013.740468>
- Ballantyne, D., Frow, P., Varey, R. J., & Payne, A. (2011). Value propositions as communication practice: Taking a wider view. *Industrial Marketing Management*, 40(2), 202-210. <https://doi.org/10.1016/j.indmarman.2010.06.032>
- Banbury, A., Pedell, S., Parkinson, L., & Byrne, L. (2021). Using the Double Diamond model to co-design a dementia caregivers telehealth peer support program. *Journal of Telemedicine and Telecare*, 27(10), 667-673.
<https://doi.org/10.1177/1357633X211048980>
- Bason, C. (2017). *Leading Public Design: Discovering Human-Centred Governance*. Bristol: Policy Press.

- Bazzano, A. N., Martin, J., Hicks, E., Faughnan, M., & Murphy, L. (2017). Human-centred design in global health: A scoping review of applications and contexts. *PLoS One*, 12(11), e0186744. <https://doi.org/10.1371/journal.pone.0186744>
- Bradwell, P., & Marr, S. (2017). Making the most of collaboration an international survey of public service co-design. *Annual Review of Policy Design*, 5(1), 1-27. <https://ojs.unbc.ca/index.php/design/article/view/1661>
- Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical Linear Models: Applications and Data Analysis Methods*. New York: SAGE Publications.
- Byrne, E., & Sahay, S. (2007). Participatory design for social development: A South African case study on community-based health information systems. *Information Technology for Development*, 13(1), 71–94. <https://doi.org/10.1002/itdj.20052>
- Chen, E., Leos, C., Kowitt, S. D., & Moracco, K. E. (2020). Enhancing community-based participatory research through human-centered design strategies. *Health Promotion Practice*, 21(1), 37-48. <https://doi.org/10.1177/1524839919850557>
- Coghlan, D., & Brannick, T. (2005). *Doing Action Research in Your Own Organization*. London: SAGE Publications.
- OECD. (2017). *Systems Approaches to Public Sector Challenges: Working with Change*. Paris: OECD Publishing. <https://doi.org/10.1787/9789264279865-en>
- Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs—principles and practices. *Health Services Research*, 48(6pt2), 2134-2156. <https://doi.org/10.1111/1475-6773.12117>
- Grönroos, C. (2019). Reforming public services: does service logic have anything to offer?. *Public Management Review*, 21(5), 775-788. <https://doi.org/10.1080/14719037.2018.1529879>

- Hermus, M., van Buuren, A., & Bekkers, V. (2020). Applying design in public administration: a literature review to explore the state of the art. *Policy & Politics*, 48(1), 21-48. <https://doi.org/10.1332/030557319X15579230420126>
- Huybrechts, L., Benesch, H., & Geib, J. (2017). Institutioning: Participatory design, co-design and the public realm. *CoDesign*, 13(3), 148-159. <https://doi.org/10.1080/15710882.2017.1355006>
- Iversen, O. S., & Leong, T. W. (2012, October). Values-led participatory design: mediating the emergence of values. In *Proceedings of the 7th Nordic Conference on Human-Computer Interaction: Making Sense Through Design* (pp. 468-477). <https://doi.org/10.1145/2399016.2399087>
- Iversen, O. S., Halskov, K., & Leong, T. W. (2012). Values-led participatory design. *CoDesign*, 8(2-3), 87-103. <https://doi.org/10.1080/15710882.2012.672575>
- Kimbell, L. (2011). Designing for service as one way of designing services. *International Journal of Design*, 5(2), 41-52. <https://www.ijdesign.org/index.php/IJDesign/article/view/938/345>
- Komatsu, T., Salgado, M., Deserti, A., & Rizzo, F. (2021). Policy labs challenges in the public sector: the value of design for more responsive organizations. *Policy Design and Practice*, 4(2), 271-291. <https://doi.org/10.1080/25741292.2021.1917173>
- Kemmis, S., McTaggart, R., & Nixon, R. (2014). *The Action Research Planner: Doing Critical Participatory Action Research*. Singapore: Springer Science & Business Media.
- Le Dantec, C. A., & Do, E. Y. L. (2009). The mechanisms of value transfer in design meetings. *Design Studies*, 30(2), 119-137. <https://doi.org/10.1016/j.destud.2008.12.002>

- Leite, H., & Hodgkinson, I. R. (2021). Telemedicine co-design and value co-creation in public health care. *Australian Journal of Public Administration*, 80(2), 300-323.
<https://doi.org/10.1111/1467-8500.12473>
- Lewis, J. M., McGann, M., & Blomkamp, E. (2020). When design meets power: Design thinking, public sector innovation and the politics of policymaking. *Policy & Politics*, 48(1), 111-130. <https://doi.org/10.1332/030557319X15579230420081>
- Li, E. Y., Chang, L. S., & Chang, L. F. (2016, June). Exploring consumer value of cross-border online shopping: An application of means-end chain theory and Maslow's hierarchy of needs. *PACIS 2016 Proceedings* (p. 359).
<http://aisel.aisnet.org/pacis2016/359>
- Lusch, R. F., & Vargo, S. L. (2006). Service-dominant logic: Reactions, reflections and refinements. *Marketing Theory*, 6(3), 281-288.
<https://doi.org/10.1177/1470593106066781>
- Maslow, A. H. (1954). *Motivation and Personality*. Harper & Row.
- Mager, B., & Sung, T-J. (2011). Special issue editorial: Designing for services. *International Journal of Design*, 5(2), 1-3.
<https://ijdesign.org/index.php/IJDesign/article/view/994/341>
- McGann, M., Blomkamp, E., & Lewis, J. M. (2018). The rise of public sector innovation labs: experiments in design thinking for policy. *Policy Sciences*, 51(3), 249-267.
<https://doi.org/10.1007/s11077-018-9315-7>
- McGann, M., Wells, T., & Blomkamp, E. (2021). Innovation labs and co-production in public problem solving. *Public Management Review*, 23(2), 297-316.
<https://doi.org/10.1080/14719037.2019.1699946>

- Moore, M. H. (1995). *Creating Public Value: Strategic Management in Government*.
Cambridge, Massachusetts: Harvard University Press.
- Mureddu, F., & Osimo, D. (2020). Co-creation of public services: Why and How?. *European Review of Service Economics and Management/Revue Européenne d'Économie et Management des Services*, 9, 177-200.
- O'Flynn, J. (2021). Where to for public value? Taking stock and moving on. *International Journal of Public Administration*, 44(10), 867-877.
<https://doi.org/10.1080/01900692.2021.1884696>
- Oertzen, A-S., Vink, J., Odekerken-Schröder, G., Mager, B., & Azevedo, S. (2022). Navigating the tensions of integrating lived experience in participatory healthcare design. *The Design Journal*, 25(6), 997-1018.
<https://doi.org/10.1080/14606925.2022.2113223>
- Osborne, S. P. (2006). The new public governance?. *Public Management Review*, 8(3), 377-387. <https://doi.org/10.1080/14719030600853022>
- Osborne, S. P. (2018). From public service-dominant logic to public service logic: are public service organizations capable of co-production and value co-creation?. *Public Management Review*, 20(2), 225-231.
<https://doi.org/10.1080/14719037.2017.1350461>
- Osborne, S. P., Powell, M., Cui, T., & Strokosch, K. (2022). Value creation in the public service ecosystem: An integrative framework. *Public Administration Review*, 82(4), 634-645. <https://doi.org/10.1111/puar.13474>
- Osborne, S. P., Radnor, Z., & Strokosch, K. (2016). Co-production and the co-creation of value in public services: A suitable case for treatment?. *Public Management Review*, 18(5), 639-653. <https://doi.org/10.1080/14719037.2015.1111927>

- Poirier, T. I., & Devraj, R. (2019). Pharmacy in an improved health care delivery model using Maslow's hierarchy of needs. *American Journal of Pharmaceutical Education*, 83(8), Article 7627. <https://doi.org/10.5688/ajpe7627>
- Radnor, Z., Osborne, S. P., Kinder, T., & Mutton, J. (2014). Operationalizing co-production in public services delivery: The contribution of service blueprinting. *Public Management Review*, 16(3), 402-423. <https://doi.org/10.1080/14719037.2013.848923>
- Rowley, J., Jones, R., Vassiliou, M., & Hanna, S. (2012). Using card-based games to enhance the value of semi-structured interviews. *International Journal of Market Research*, 54(1), 93-110. <https://doi.org/10.2501/IJMR-54-1-093-110>
- Rodgers, P. A., Mazzearella, F., & Conerney, L. (2020). Interrogating the value of design research for change. *The Design Journal*, 23(4), 491-514. <https://doi.org/10.1080/14606925.2020.1758473>
- Rokeach, M. (1973). *The Nature of Human Values*. NY: Free Press.
- Saad-Sulonen, J., Eriksson, E., Halskov, K., Karasti, H., & Vines, J. (2018). Unfolding participation over time: temporal lenses in participatory design. *CoDesign*, 14(1), 4-16. <https://doi.org/10.1080/15710882.2018.1426773>
- Sanders, E. B. N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign*, 4(1), 5-18. <https://doi.org/10.1080/15710880701875068>
- Smith, R. C., Bossen, C., & Kanstrup, A. M. (2017). Participatory design in an era of participation. *CoDesign*, 13(2), 65-69. <https://doi.org/10.1080/15710882.2017.1310466>

- Sønderskov, M., & Rønning, R. (2021). Public service logic: An appropriate recipe for improving serviceness in the public sector?. *Administrative Sciences*, 11(3), 64.
<https://doi.org/10.3390/admsci11030064>
- Steen, M., Manschot, M., & de Koning, N. (2011). Benefits of co-design in service design projects. *International Journal of Design*, 5(2), 53-60.
<https://www.ijdesign.org/index.php/IJDesign/article/view/890/346>
- Saguin, K., & Cashore, B. (2022). Two logics of participation in policy design. *Policy Design and Practice*, 5(1), 1-11. <https://doi.org/10.1080/25741292.2022.2038978>
- Tashakkori, A., & Creswell, J. W. (2007). Editorial: The new era of mixed methods. *Journal of Mixed Methods Research*, 1(1), 3-7. <https://doi.org/10.1177/2345678906293042>
- Trischler, J., & Charles, M. (2018). The application of a service ecosystems lens to public policy analysis and design: Exploring the frontiers. *Journal of Public Policy & Marketing*, 38(1), 19-35. <https://doi.org/10.1177/0743915618818566>
- Trischler, J., & Scott, D. R. (2016). Designing public services: The usefulness of three service design methods for identifying user experiences. *Public Management Review*, 18(5), 718-739. <https://doi.org/10.1080/14719037.2015.1028017>
- van Buuren, A., Lewis, J. M., Guy Peters, B., & Voorberg, W. (2020). Improving public policy and administration: exploring the potential of design. *Policy & Politics*, 48(1), 3-19. <https://doi.org/10.1332/030557319X15579230420063>
- Van Mechelen, M., Derboven, J., Laenen, A., Willems, B., Geerts, D., & Vanden Abeele, V. (2017). The GLID method: Moving from design features to underlying values in co-design. *International Journal of Human-Computer Studies*, 97, 116-128.
<https://doi.org/10.1016/j.ijhcs.2016.09.005>
- Vargo, S. L., & Lusch, R. F. (2008).

Service-dominant logic: continuing the evolution. *Journal of the Academy of Marketing Science*, 36, 1-10. <https://doi.org/10.1007/s11747-007-0069-6>

Walker, S. (2023). Design is... Lost. *The Design Journal*, 26(1), 4-6.
<https://doi.org/10.1080/14606925.2022.2154962>

Whicher, A., & Crick, T. (2019). Co-design, evaluation and the Northern Ireland innovation lab. *Public Money & Management*, 39(4), 290-299.
<https://doi.org/10.1080/09540962.2019.1592920>

Xiao, J. X., Luo, M. J., & Li, W. (2023). From the fuzzy front end to the back end: A participatory action research approach to co-design promoting sustainable behaviour. *The Design Journal*, 26(1), 32-51.
<https://doi.org/10.1080/14606925.2022.2113262>