

Springer Series in Design and Innovation 15

Alessandro Deserti
Marion Real
Felicitas Schmittinger *Editors*

Co-creation for Responsible Research and Innovation

Experimenting with Design Methods
and Tools

OPEN ACCESS



Springer

Springer Series in Design and Innovation

Volume 15

Editor-in-Chief

Francesca Tosi, University of Florence, Florence, Italy


Series Editors

Claudio Germak, Politecnico di Torino, Turin, Italy

Francesco Zurlo, Politecnico di Milano, Milan, Italy

Zhi Jinyi, Southwest Jiaotong University, Chengdu, China

Marilaine Pozzatti Amadori, Universidade Federal de Santa Maria,
Santa Maria, Rio Grande do Sul, Brazil

Maurizio Caon , University of Applied Sciences and Arts, Fribourg, Switzerland

Springer Series in Design and Innovation (SSDI) publishes books on innovation and the latest developments in the fields of Product Design, Interior Design and Communication Design, with particular emphasis on technological and formal innovation, and on the application of digital technologies and new materials. The series explores all aspects of design, e.g. Human-Centered Design/User Experience, Service Design, and Design Thinking, which provide transversal and innovative approaches oriented on the involvement of people throughout the design development process. In addition, it covers emerging areas of research that may represent essential opportunities for economic and social development.

In fields ranging from the humanities to engineering and architecture, design is increasingly being recognized as a key means of bringing ideas to the market by transforming them into user-friendly and appealing products or services. Moreover, it provides a variety of methodologies, tools and techniques that can be used at different stages of the innovation process to enhance the value of new products and services.

The series' scope includes monographs, professional books, advanced textbooks, selected contributions from specialized conferences and workshops, and outstanding Ph.D. theses.

Keywords: Product and System Innovation; Product design; Interior design; Communication Design; Human-Centered Design/User Experience; Service Design; Design Thinking; Digital Innovation; Innovation of Materials.

How to submit proposals

Proposals must include: title, keywords, presentation (max 10,000 characters), table of contents, chapter abstracts, editors'/authors' CV.

In case of proceedings, chairmen/editors are requested to submit the link to conference website (incl. relevant information such as committee members, topics, key dates, keynote speakers, information about the reviewing process, etc.), and approx. number of papers.

Proposals must be sent to: series editor Prof. Francesca Tosi (francesca.tosi@unifi.it) and/or publishing editor Mr. Pierpaolo Riva (pierpaolo.riva@springer.com).

More information about this series at <http://www.springer.com/series/16270>


Alessandro Deserti · Marion Real ·
Felicitas Schmittinger
Editors

Co-creation for Responsible Research and Innovation

Experimenting with Design Methods
and Tools

 Springer

Editors

Alessandro Deserti 
Department of Design
Politecnico di Milano
Milan, Italy

Marion Real 
Fab Lab Barcelona
Barcelona, Spain

Felicitas Schmittinger 
Department of Design
Politecnico di Milano
Milan, Italy



ISSN 2661-8184

ISSN 2661-8192 (electronic)

Springer Series in Design and Innovation

ISBN 978-3-030-78732-5

ISBN 978-3-030-78733-2 (eBook)

<https://doi.org/10.1007/978-3-030-78733-2>

© The Editor(s) (if applicable) and The Author(s) 2022. This book is an open access publication.

Open Access This book is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this book are included in the book's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the book's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

The relationship between science, technology and society is being rethought towards logics of permeability and dialogue, rendering the needs, desires and expectations of the latter as important drivers for innovation. A paradigmatic shift concerning the role of citizens in science, research and innovation is witnessed, as well as in Science, Technology and Innovation (STI) policymaking. In particular, the discourse on public engagement and Responsible Research and Innovation (RRI) powerfully became a matter of spread interest, showing the need of models that lead to an effective integration of co-design and bottom-up co-creation initiatives for encouraging/stimulating scientific and technological advancement as the result of a synergic, inclusive cooperation among actors that usually work autonomously. To address the topic, 17 cross-sector partners from all over Europe started the three-year EU-funded project SISCODE (Society in Innovation and Science through CO-DEsign). Inter-connecting an analysis of the theoretical background and existing cases with real-life experimentations (RLEs), the investigation sets up a reflective and learning framework to explore the transformations in initiatives and policies emerging from the interaction between citizens and stakeholders.

The book presents a critical analysis of the co-design processes activated in 10 co-creation laboratories addressing societal challenges across Europe. Each laboratory as a case study of a RLE is described through its journey, starting from the purpose on the ground of the experimentation and the challenge addressed. Specific attention is then drawn on the role of policies and policymaker engagement. Finally, the experimentation is enquired in terms of its output, transformations triggered within the organisation and the overall ecosystem, and its outcomes, opening the reasoning towards the lessons learnt and reflections that the entire co-creation journey brought.

Milan, Italy
Barcelona, Spain
Milan, Italy

Alessandro Deserti
Marion Real
Felicitas Schmittinger

Contents

Between Science, Technology and Society	1
Alessandro Deserti and Francesca Rizzo	
A Framework for Experimenting Co-creation in Real-Life Contexts	11
Marion Real and Felicitas Schmittinger	
Framing Real-Life Experimentations as Case Studies	25
Stefano Crabu, Ilaria Mariani, and Felicitas Schmittinger	
FabLab Barcelona—Co-design With Food Surplus: Better Redistributing, Upcycling and Composting	37
Marion Real, Anastasia Pistofidou, and Milena Juarez Calvo	
Polifactory. Transforming Playful Movement into Sound: Co-create a Smart System for Children with Cerebral Palsy	47
Carla Sadini, Laura Cipriani, Mirko Gelsomini, Stefano Maffei, and Massimo Bianchini	
Maker—Plastic In, Plastic Out: Circular Economy and Local Production	57
Asger Nørregård-Rasmussen, Malte Hertz-Jansen, and Felicitas Schmittinger	
KTP—Collectively Improving Air Quality in Krakow: A New Air Quality Plan for the Małopolska Region	67
Agnieszka Włodarczyk-Gębik, Aleksandra Gabriel, Maria Dubis, and Monika Machowska	
PA4ALL—Innovative Learning Methods for Education in Agriculture: An ICT Based Learning Programme for High Schools	79
Isidora Stojacic	

ThessAHALL—A Life-Long Learning Programme for the Social Inclusion of “Early-Stage” Older Adult Researchers 89
Despoina Mantziari, Evdokimos Konstantinidis, Despoina Petsani, Nikolaos Kyriakidis, Vassiliki Zilidou, Efstathios Sidiropoulos, Maria Nikolaidou, Aikaterini-Marina Katsouli, and Panagiotis Bamidis

Ciência Viva—Promoting Marine Activities Around Lisbon: Self-Constructed Boats 99
Gonçalo Praça

Cube Design Museum—Empathic Co-design for Societal Impact 109
Anja Köppchen

Science Gallery Dublin—Open Mind: Improving Mental Health of Young People 119
Grace D’Arcy and Ilaria Mariani

TRACES—In 2030, Artificial Intelligences Will Visit Museums? 129
Matteo Merzagora, Aude Ghilbert, and Axel Meunier

Assessing Co-creation in Relation to Context for RRI Operationalisation 139
Francesca Rizzo and Alessandro Deserti

Science Gallery Dublin—Open Mind: Improving Mental Health of Young People



Grace D'Arcy and Ilaria Mariani

To face the challenge of improving mental health and well-being with young people, *Science Gallery Dublin* initiates a high-school programme for mentorship among students. Involving academics, NGO's, psychologists, parents, teachers, college and high-school students, 'Open Mind' intends to use hobbies and individual attitudes for favouring empowerment and the overall atmosphere of the school, also leading to a long-term increased well-being and fewer mental health issues. This chapter describes how this programme empowers the young people to understand the importance of hobbies for their mental health, while using co-creation techniques for them to be innovative in facilitating the clubs.

1 Introduction

1.1 The Organisation

Science Gallery Dublin (SGD) is a space for public engagement, part of Trinity College Dublin and of a worldwide network of Science Galleries, a network of leading universities devoted to ignite creativity and discovery at the crossroad of science and art. To reach this aim, *SGD* organises multidisciplinary and engaging exhibitions between the fields art and science dealing with relevant issues for young adults. For their realisation, artists, makers and researchers collaborate in the development of

G. D'Arcy (✉)
Science Gallery Dublin, Dublin, Ireland
e-mail: grace.darcy@dublin.sciencegallery.com

I. Mariani
Department of Design, Politecnico Di Milano, Milan, Italy
e-mail: ilaria.l.mariani@polimi.it

© The Author(s) 2022
A. Deserti et al. (eds.), *Co-creation for Responsible Research and Innovation*,
Springer Series in Design and Innovation 15,
https://doi.org/10.1007/978-3-030-78733-2_12

these exhibitions engaging 15–25 year olds, thus creating a space of learning, discussion and imagination with the aim to develop capacities such as critical thinking, cooperation, creativity and communication skills. *SGD* frequently applies participatory methodologies to the development of its exhibitions and programmes constantly seeking to improve engagement and co-creation practices in a long-term process.

1.2 *The Co-Creation Journey*

Perceiving co-creation as a means for collaboration it is applied to involve, engage and learn from and together with stakeholders. As such, co-creation is a critically important approach in tackling issues. Specifically, it enabled *SGD* to reach out and connect with young people to jointly develop a solution for a specific issue relevant for them during *SISCODE*—young people and their mental health.

Within the frame of ‘mental health and management of well-being’ a group of 31 young people, teachers, parents and professionals in the field of mental health has been set up initiated through an open call to be involved throughout the project. The experimentation engaged a team of *SGD* members, and three groups of young people aged from 15–23, as well as a variety of professionals from the field of mental health and well-being. The activities started introducing the overall approach of *SISCODE*, its tools and methodologies to the group. For the purpose a set of Design Thinking activities and workshops were organised, allowing participants to get aligned before starting to redefine the problem and generate ideas collaboratively. Among the variety of ideas developed in the early phases, education and school was a recurring core element when speaking about well-being management of young people since school represents one of the main aspects of their life and at the same time is often a cause or driver of stress and worries. This became the issue at stake, to tackle through a co-creation approach that largely encourages bottom-up solutions.

Over the course of 18 months the group ideated, developed, prototyped, and tested a concept for an educational model for well-being management and understanding of mental health issues in second-level schools. The scope of this module is to transfer the importance of mental health to students, while connecting it to the importance of their hobbies and interests. All contents have been collaboratively developed with students and experts ranging from interactive activities to the choice of topics to be addressed in the learning module.

As part of the prototyping activities, the educational model has been iteratively tested as a pilot in four Irish schools to be then refined and improved for future application. Apart from the module, the project also led to a different application of co-creation practices and a general shift of approach in *SGD*.

2 Ecosystem, Context and Challenge Addressed

2.1 External Context and Ecosystem

During SISCODE, *SGD* experimented with co-creation to tackle the topic of mental health and its issues, establishing a direct link between the empowerment of people and improved mental health. The issue of mental health and well-being has been chosen as one of the most pressing issues in Ireland in recent times ranking third out of 36 European countries investigated [4]. The Irish government published a vision towards significant improvements in physical and mental health that considers the needs and responsibilities of citizens leading to mental health being valued and supported across all societal levels [2].

The specific focus on young people can be traced back both to the main target audience of *SGD*, 15–25 year olds, and to studies tracing mental health difficulties back to late teen- and adolescent age [3]. Mental health can also be associated with a lack of positive factors and traits such as self-esteem, absence of optimism and positive coping mechanisms, together with a general lack of consideration of the direct involvement of affected individuals and groups. Empowerment as one of the core goals of the WHO's envisioning of the development of health promotion has been stated as "People should be empowered to promote their own health, interact effectively with health services and be active partners in managing disease" [7]. Within this frame, the Irish government is addressing the issue of mental health management in young people with a strategy set out to give children and young adults a voice in co-developing policies and services that affect their well-being [1].

2.2 Organisational Background

Science Gallery Dublin is part of Ireland's internationally top-ranked university Trinity College Dublin. This inherently provides a rich variety of contacts and communication channels to reach out to researchers and professionals in combination with the relationships *SGD* established during activities and exhibitions with their target of 15–25 year olds prior to the initiation of the project. Furthermore, also the topic of mental health has already been addressed by *SGD* in the past leading to a pool of contacts, relationships and experiences to be exploited during the co-creation journey.

Apart from the multidisciplinary team within the organisation which includes scientists, artists and designers, all the *SGD* exhibitions tend to gather and to various extents engage a wide variety of external stakeholders. Engineers, designers, artists and scientists relevant to the particular topic of the exhibition are involved aiming at the constant expansion and enrichment of their network and leading to the establishment of public engagement practices together with capacities for the coordination of highly complex projects. In light of that, *SGD* has already experimented and applied

co-creation, even though it lacked structure and formalisation in its implementation. It has manifested mainly in the collaboration with the Leonardo group, a part of the advisory board composed by young people from across Ireland with the scope of informing the activities and directions of *SGD* through constant exchange, collaboration on initiatives and the integration of their own events in the context of the Science Gallery.

2.3 Challenge

The broad challenge of 'mental health and well-being' was chosen as one of the core themes of interest for the Science Gallery, as well as a pressing societal issue across Ireland. It has then narrowed down by conducting an extensive desk research in combination with interviews and focus groups involving stakeholders and users with various backgrounds and interests on the topic. It became evident that it is in need of being further addressed in the context of schools. As a consequence, the refined challenge around 'Co-creating mental health resources with young people to use in a school setting' has been addressed taking two different main aspects into consideration. On one hand, the challenge of supporting the students directly in developing an understanding of mental health and feeding capacities for managing their own well-being was tackled while on the other hand the policy background was addressed ideating new strategies for the inclusion of young people in the co-design of resources and policies.

3 The Co-creation Journey

The co-creation journey resulted in two main developments: an educational module was created and experimented in four Irish schools as a tangible resource of well-being management; triggered and sustained by the SISCODE methodology, the process ignited changes within *SGD* as an organisation. The evolution of both aspects throughout the four phases is described in the following.

3.1 Analysis of the Context

The initial investigation consisted in a literature review and additional desk research on the current policy landscape in Ireland. This was followed by field research involving stakeholders in interviews and focus groups, while more than sixty young people as end users have been engaged directly in hands-on workshops. The results were a clear definition of the current situation, its specific challenges, and its context

in the shape of representation of data and qualitative insights, together with proto-personas of the relevant stakeholders and users identified. The elaboration of the results were then presented and discussed with those who partook in the activities. The close collaboration with the involved groups throughout the research and the presentation of results led to the establishment of relationships since the early phases, raising interest in the initiative and the overall topic.

3.2 Reframing of the Problem

The challenges have been narrowed down and reframed conducting a series of structured workshops with stakeholders and users where design thinking tools and methodologies as personas or priority mapping were applied. The participants were split in groups to foster open discussions and constructive exchange of views leading to collectively identify the specific problem to be addressed as the focus on education on the topic of mental health and well-being within the formal setting of schools. In relation to the age of the target group, one particular year in the Irish educational system has been identified as a transition year particularly suitable for the activity, being situated between two cycles of education. Moreover the focus has been identified as the improvement and fostering of self-directed and independent learning [5].

3.3 Envisioning of Alternatives

The workshops generated a plethora of different ideas among a group of users and stakeholders. Then the single ideas have then been clustered and presented to experts to be collaboratively evaluated with a SWOT analysis. The activity led to grouping and combining ideas, resulting in the final concept of developing an extracurricular mental health programme to be implemented in schools in the shape of clubs promoting hobbies to foster well-being.

3.4 Development and Prototyping

The final concept is ‘OPEN MIND’, a 9-week educational module developed for teachers to be implemented in schools for supporting young people in understanding and improving their well-being management through personal interests and hobbies. The entire programme revolves around four key topics: (i) empathy and inclusion skills, (ii) mental health literacy, (iii) well-being management tools, and (iv) teamwork and co-creation skills. Central is the activity of co-creating hobby clubs in schools where older students act as mentors of younger people to empower them

in managing their well-being and encourage their interests and personal relations. The solution was developed focusing on one hand on the development of the content transmitted in-class through videos, on the other hand designing a roadmap for the overall prototyping of a 9-week programme of learning activities, hands-on lessons and reflective discussions carried out in four selected schools. Having identified creativity and consistency in engagement as two fundamental drivers for the improvement of mental health, students were asked to keep a diary in addition to the activities carried out in school both to provide an additional reflective tool to the students and monitor the activity itself.

In terms of monitoring and assessment, focus groups and feedback sessions were organised through the course and after the conclusion of both iterations of the programme to capture feedback and insights on the overall experience as well as on its specific elements and activities. The analysis of the results gathered was utilised to improve the programme in the following phases of the prototyping.

Between the two loops of prototyping conducted, the barriers for implementation, like the additional burden of work for teachers or the long-term sustainability in terms of training emerged. The barriers spotted have been thoroughly discussed with stakeholders leading to a transformation of the activity towards a mainly extracurricular one with few specific in-class sessions. The content of the sessions itself has been refined based on the feedback of the students, who were further involved in co-developing more engaging and appealing contents, able to better respond to their needs, expectations, and desires.

3.5 The Role of Policies and Policymaker Engagement

Policymakers have been engaged and involved throughout the entire journey, from more general, exploratory interviews in the early stages to concrete engagement of specific figures with the advanced prototype, carrying out consultation meetings and discussing concrete plans to implement OPEN MIND nationwide in schools. The positive feedback and wide interest from the policymakers' side has been reinforced by the COVID-19 pandemic that brought mental health issues and well-being management back into the focus of the government. As a result, the OPEN MIND programme has been transformed into an online resource to be distributed to a large network of schools connected to *SGD*.

4 Experimentation: Output, Transformations, Outcomes

OPEN MIND is a programme that supports students with tools and methods for developing their personal interests and hobbies. Beyond the specific aim of improving mental health and well-being management, it encourages the culture of positive well-being, resilience, student participation in decision making. Resulting in activities of

co-creation of the school environment, young people played a key role in developing an innovative solution prototyped for their own context and well-being. Acknowledging the complexity of maintaining and supporting the programme and its tasks through time, specific efforts have been made to make the programme sustainable and able to operate in the long run without the direct and constant inclusion of the *SGD* team. To provide guidance and support, a guide, training materials, and specific tools have been developed. The aim is making teachers able to implement the programme independently. Such training resources will be available on the official portal of the Department of Education. In parallel it has already started the development of an exploitation strategy.

In terms of transformations triggered and outcomes, the pilot was beneficial for the *SGD* team in different ways. Firstly, it provided an occasion to experiment in-field a different approach, that of co-creation and its practices. The overall process, in conjunction with the specific topic addressed brought new knowledge and expertise concerning the direct engagement and involvement of youth voices. The impact was significant, ranging from the reinforcement of existing skills to the introduction of new ones. Indeed, the overall experimentation largely benefitted from relying on the SISCODE methods and tools.

Secondly, the knowledge and know-how gained quickly became the object of an important process of embedding this knowledge into the organisation to be applied beyond the project in other initiatives (scaling out) regarding transdisciplinary education and multi-stakeholder engagement. Applied in-presence, but also adapted for online use, due to the COVID-19 emergency which imposed a switch to in-distance activities, especially the toolkit emerged as a valuable resource for multi-stakeholder engagement. Going beyond its application within the domain of SISCODE, the toolkit has been central to supporting Open Science Hub, a Horizon 2020 project aimed at engaging schools and local stakeholders in research and innovation, the project brings science, technology, engineering, art and mathematics (STEAM) education to the communities for sustainable development. Aimed at inspiring, empowering and engaging citizens in STEAM learning and research opportunities, the project is grounded in collaborating with the local community and other stakeholders. During the COVID-19 pandemic the *SGD* team adapted the SISCODE toolkit for online use to support Open Science Hub partners in structuring their co-creation journeys with their local communities. Further online adaptations of the toolkit also occurred in the Horizon 2020 project Fostering Integration and Transformation for FOOD 2030 (FIT4FOOD 2030) that points at creating sustainable food network systems.

Finally, the SISCODE methodology and the toolkit contributed to building co-creation practices within the network of Science Galleries over time. As a matter of fact, apart from being scaled-out to other projects within the *SGD* institution, the toolkit has also been the object of a significant scaling up, being disseminated and used across the Science Gallery Network worldwide. Additionally, *Science Gallery Dublin* ran online training sessions on ‘Creating Co-creation Sessions’ for staff and youth advisors across the Network.

In general, the expertise gained during the SISCODE project strongly positions *SGD* nationally as a facilitator of multi-stakeholder engagement.

5 Lessons Learnt and Reflections

The experience conducted led *SGD* to reflect on the outcomes of the project regarding its ability to tackle a youth-centred issue from various points of view. Stressing the capacity building inside the organisation, the project triggered pivotal reflections concerning the mediation among stakeholders. An important lesson learnt regards facilitating balancing voices within a group and encouraging relationships to obtain conversations and discussions where all stakeholders and users meet on eye-level. Another attention point is related to the role of the mediator, as gatekeeper and facilitator for the co-creation process not only among single stakeholders, but with other organisations, like schools in this case. On the side of policies the confrontation with formal educational institutes has confirmed their lack of flexibility and agility as a potential barrier to the introduction and implementation of co-creation practices highlighting the potential of informal organisations related to education like museums or cultural organisations [6].

References

1. Department of Children and Youth Affairs (2015) National strategy on children and young people's participation in decision-making, 2015–2020
2. Department of Health (2013) A framework for improved health and wellbeing 2013–2025
3. Dooley BA, Fitzgerald A (2012) My world survey: National study of youth mental health in Ireland. Headstrong and UCD School of Psychology
4. Organisation for Economic Co-operation and Development, & European Union (2016) Health at a glance: state of health in the EU cycle. Europe 2016. OECD Publishing
5. Perkins R, Cosgrove J, Moran G, Shiel G (2012) PISA 2009: results for Ireland and changes since 2000. Educational Research Centre, Dublin
6. Sunderland Bowe JA (2016) The Creative Museum—analysis of selected best practices from Europe. Heritec Education Consulting
7. World Health Organisation (2010) User empowerment in mental health: a statement by the WHO Regional Office for Europe—empowerment is not a destination, but a journey

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

