Chapter 62
On How to Add SALT: 'PLAYGORA'—A Real-World Case Study and Experimentation (Out of the Lab)

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Abstract This contribution presents a real-world case study and experimentation based on the Serendipity, Ambiguity, Laterality and Tangibility (SALT) conceptual architecture. We present early-stage design engineering processes (DEP) coupled with assisted human–machine creativity and directed towards research Out of the Lab in which we engaged public participation during a nine-day public international design event in The Netherlands. The 'Playgora' study and experiment(s) were executed and conducted (i.e. early-stage research) with hybrid design tools (HDTs) and environments (HDTEs) support systems imbued with SALT.

62.1 Introduction

62.1.1 An Early-Phase SALT Case Study

This case study is based on physical reality and tries to give tangible proof of the SALT hypothesis in a real-world setting named 'Playgora' (PLG). We present early-stage design engineering processes (DEP) coupled with assisted human–machine creativity and directed towards research Out of the Lab[1] [1], in which we engaged public participation during a nine-day public international design event in The Netherlands that brought together the work of 2,600 designers for an audience of 335,000 visitors.

The study and experiment(s) were executed and conducted with hybrid design tools (HDTs) and environments (HDTEs) including support systems for data acquisition and repository. All the interaction and generated data were acquired and mined with various observation and capture technologies and stored real time on

[1] Scientific activity is not 'about nature,' it is a fierce fight to construct reality. The '*Out of the Lab*' is the workplace and the set of productive forces, which make construction possible.

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a data repository for analysis and evaluation. A feedback loop[2] (real time) was made available to participants synthesized from user generated content and data.

62.2 PLG and SALT in Public Space

62.2.1 What is PLG?

PLG is a metaphorical assemblage on the words 'play' as, for example, identified and addressed in Homo Ludens [2] and the Greek word 'agora', a public (i.e. playgoers) open space used for assemblies and markets [3]. PLG guides the development and functioning of cyber-physical systems, networks and its users to the realization of potential through emergent creative behaviour, intent and meta-cognitive knowledge. We point to Voltaire's [4] observation that the demonstrative force of a public show is entirely entangled with the constitution and character of its public and realize that it is a surprisingly heterogeneous undertaking.

Design could be the 'happy medium' to link people, society and technology to improve, sustain and reframe the status-quo of contemporary mono-culture thinking, progression and doing, through meaningful communication, participation and experiential story-telling, interaction and creation of narratives (see Fig. 62.1).

Testing devices, systems and machines play a fundamental role (e.g. social media) in the formation of enlightened social practice and democratization of 'knowledge' (i.e. truths, ideologies and philosophy) as a means by which esoteric or natural 'knowledge' might be diffused pervasively through innumerate spheres and social contexts [5].

62.2.2 Environment and Setup

The PLG design environment entails innovative interactive software solutions and design tools to create meaningful communication, experiences, personal involvement and social inclusion within various contexts and/or domains. People cannot feel data; however, by tangibly taking advantage of touch (a simple emotional phenomenon), add ambiguity in visual stimuli, we aim to stimulate the lateral thinking capacity and capability in people (i.e. users) possibly leading to serendipitous events and novel and/or alternatives in 'design' outcome (See Fig. 62.2).

The placement, location and layout of the various interactive areas were in such that the HDT's (i.e. 2 Tablets + 1 Smartphone) were mounted dead centre on the tabletop. The digital content monitor (DCM) showed a scrollable digital content with

[2]We characterize this process as a simple feedback loop of virtual content based on users' physical, tangible and behavioral dynamics.

Fig. 62.1 Orthogonal projection of HDTs in public arena, showing test and experiment environment with various inactive tools and screens

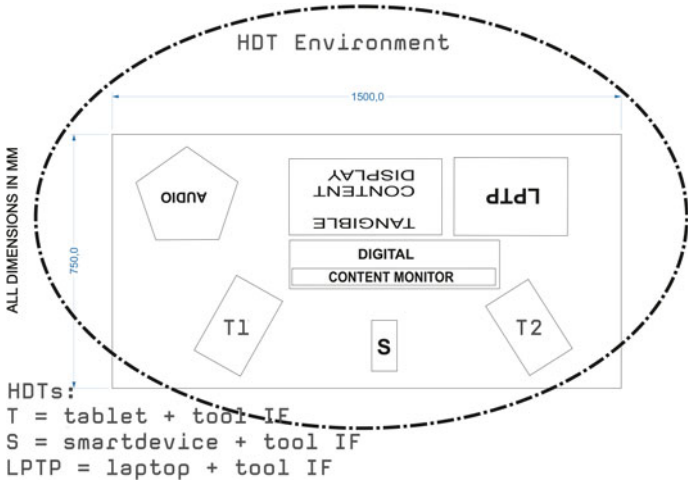

Fig. 62.2 Diagram set-up PLG HDT environment and tools

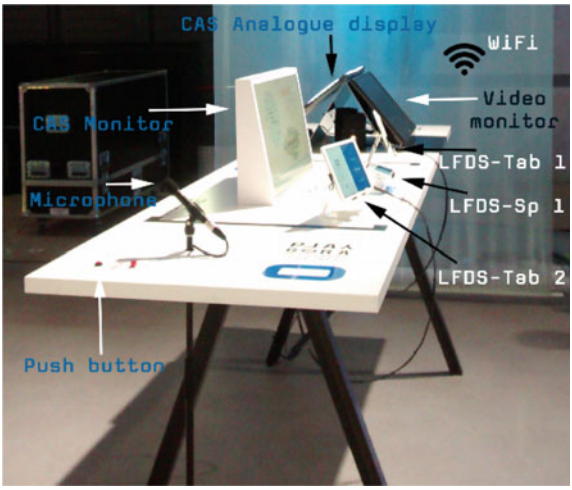

Fig. 62.3 Typical set-up PLG with HDT devices, systems and machines

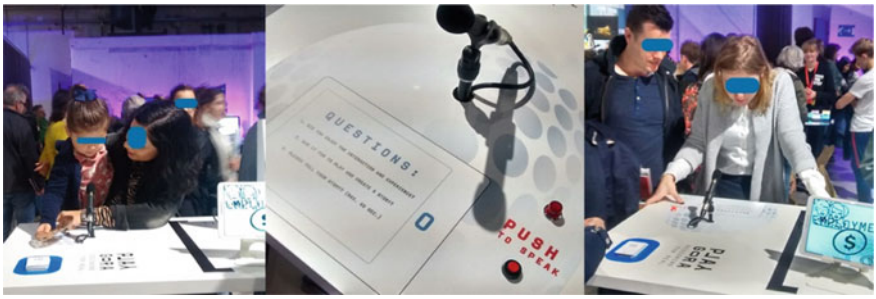

Fig. 62.4 PLG audio set-up (speakers' corner) and audience engaged in (inter)action (left/right)

generic simple and archetypical icons/themes that were selected based on the chosen 'context' (see Fig. 62.3).

A led lightbox with wide variety black-and-white depictions in archetypical icons and signs was located directly opposite of the DCM to visualize and attract users to engage in generative design activity. On the left corner of the set-up, the audio area including a high-definition microphone, push-to-speak button and red indicator light was facilitated. The audio stream was captured 24/7 by means of a strategically placed high-definition microphone. Three questions[3] were framed and placed next to the microphone to trigger story-telling, enquire verbal 'stutter' and exclamation from the participants/users (see Fig. 62.4).

In addition, we mounted an IP-Camera at 4.5 m above the PLGR set-up pointing directly downward to monitor and observe all the traffic of visitors and interactions

[3]Three questions were: (1) Did you enjoy the interaction and experience? (2) Was it fun to play and create a story? (3) Please tell your story (max. 60 s).

of the participants. We collected and acquired a total of 14 GB in video data (.mp4) and 2 GB in audio data (.wav) during the event.

Matters of concern, societal issues and challenges exist only if the concerned groups create them as such by making them visible, tangible, audible and perceptible in the public sphere [5]. People (e.g. users) should congruously and relentlessly made aware to immerse themselves in explorative iterative creative processes by use and means of intelligent interactive hybrid design tools and environments (iHDTs; iHDTEs).

62.2.3 Approach, Context and Tasks in PLG

The approach we take in this project is to test and experiment with a large number of users in public space. In fact, we take our research Out of the Lab environment and try to connect our framework and approach to the general public (rest of society), in this paper named users. It was stated that '…the social world cannot exist on one side and the scientific world on the other because the scientific realm is merely the end result of many other operations that are in the social realm' [5].

For instance, take the case of climate action and change, the depletion of resources, the transitional and renewable sources of energy, addressing issues in access and lack of potable drinking water or the continual increase of inequality and unemployment.

Formatting of (global) economic agency, concerted activism and achieving sustainability goals (i.e. local, national and global) coupled with these societal concerns, induced and instigated by the asymmetries and unbalances of competencies by supply and demand, need and greed and haves or have nots.

Making 'things' public through highlighting and to demonstrate the existence, organize (e.g. public) investigations on possible solutions, test and facilitate experiments designed to (re)qualify, for example, policies, laws and governance; products, systems and services; and (re)analyse and (re)evaluate their performance which helps to reduce the socio-cognitive handicaps that cripple people and society.

Visitors create their own present and near-future scripts in conjunction with the PLG set-up and hybrid design tools (HDT). Individualized and cooperative design combined with hybrid design tools has the capacity to act as the missing link between humans, society and technology (STS). The blended design environments (spaces) entail innovative interactive software solutions and design tools to create meaningful communication, experiences, personal involvement and social inclusion within various contexts and/or domains (see Fig. 62.5).

The design task to be executed voluntarily by heterogeneous users was to create user generated content by expression through narrative of experiences (e.g. associative reasoning), audiovisual representations (e.g. designing, engineering) based on a prescribed context, externalization of opinion and address meaning. The objective of the task was to nudge the user's think, feel and react on the specified context: '*On*

Fig. 62.5 Top view audience in PLG blended design environment

Societal and Cultural Issues and Challenges', spur design interaction to create visualizations of their individual perspective or story based on a selected *theme* within the specified *context.*

62.2.4 The Challenge Ahead

The challenge now is to rethink and readapt completely the processes according to the available technologies, proposing new design models, conceptual blending strategies, iterative-layered processes and/or architectures that can leverage the digital continuity in both physical (PPD), virtual (VPD) and hybrid product[4] development (HPD). Whatever meaning or intention one may have, in essence and in general, people 'shape and design' their own lives and 'form' their own perspectives on life.

Individualized design combined with collaborative dynamic activity (e.g. discussion, narration and negotiation) in conjunction with hybrid design tools has the capacity to act as the missing link between humans, society and technology (STS), thereby addressing the fundamental core issues (e.g. regional, national and international) and global challenges at hand.

62.3 Out of the Lab, Making Things Public and Context

62.3.1 Observing SALT Through Public Engagement and Externalization

Externalization through representation, by making use of diagrammatic representations, or mental diagrams in the mind's eye, which provide it with powerful inference processes [6], coupled with aid of computational and/or artificial systems therefore

[4]Product could be artefacts, systems and/or services.

seems a logical and obvious step to assist human action, communication and interaction. Although the HDTs input–output interaction modalities and virtualization system, by the standards of formal logic, are a jerry-built structure, we depict as 'loosely fitted'.

But it gets us through the intuitive externalization process amazingly effective and addresses slow and fast thinking efficiently. Users rely on quite powerful but somewhat unreliable inference operators, so-called heuristic processes, to discover new conclusions [6]. The thought process (i.e. to think like a mountain) here is considered as a holistic view on where one stands in the entire ecosystem.

To think like a mountain [7] means that to have a complete appreciation for the profound interconnectedness of the elements in the ecosystems. Later, in the process, users subject them to careful scrutiny, using more microscopic and reliable inference rules to test the doubtful steps. In the common practice of reasoning, discovery and verification are intermingled, we may alternate between them during the whole course of our thinking [6]. The elegance of the HDTs is the immediacy and integrated activity to facilitate and allow users readily available access and congeniality with the HDT environment [8].

62.3.2 HDTs Thinking Machines as Creative Inventing Tools

HDTs are machines for thinking and inventing [9]; by interaction and intentional stance, the user is enabled through the interface and workspace (blended space) to immerse and engage in creative and design processes. The twist and/or mix between analogue interplay and digital feedback loops require very little knowledge of the system or various interaction modalities. The object of the HDT inventing machine is to facilitate a low threshold, whereby the interactive instrumentation and tool layout initially have no preset limits, constraints or boundaries for the prospective user.

To start an iterative design process, the user can either use hand-drawn sketches, images, 2D and 3D objects, snippets and any other type of content or material. The aim is to create designs or instances with the aid of a high-definition video camera and capture instances with keystrokes. The keystrokes are input (i.e. captures) for the system as separate and individual instances over time, whereby the system simultaneously generates virtual output in a blended fashion. The blended stacks consist of multiple layers of instances generated by the user(s) over the duration of process time.

Blended space is filled with numerous images (i.e. stacks), and multiple instances can be unstacked and repurposed for other stacks through simple tack, copy and paste instructions on screen. The user interface (IF) has a very simple, clean and transparent intuitive configuration to facilitate easy progress and interaction during the design process. Over the last decade, we tested and experimented many configurations, variety in embodiments and version adaptations of the HDTs with thousands of users, either laymen novice and/or experts. The primitive arrangement of the HDTs and first impression simplicity of the HDT system interface and interaction modalities

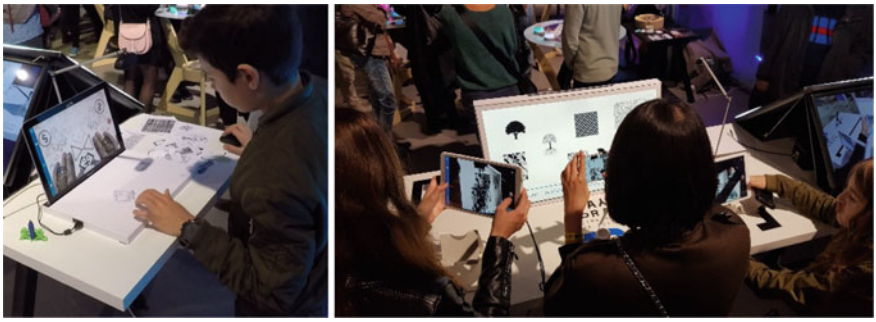

Fig. 62.6 Users' interaction, engagement and experience with devices, systems and machines

Fig. 62.7 Participatory design and collaboration of multiple users and interested audience

gives users' confidence, supports motivation and brings forth direct results in virtual outcome, enjoyment and surprise (see Figs. 62.6 and 62.7).

The HDTs support our hypothesis that computational tools could intuit, enhance and assist users in their sense-making, design and creative endeavours whilst making sure that user could rely on their individual explicit and tacit knowledge, human capabilities, personal capacities and idiosyncratic stance.

62.4 Data and Content Generation

We measured all the interactive progressions and actions in the limit over time. The keystrokes were tracked and harvested from our *imagedb_server*. In Table 62.1, we show the results of user interactions (UIs) of all the devices, measured and acquired from the system and machine databases. We differentiate between visible and invisible 'captures', this means that the visible interactions became part of the real-time feedback loop, whereas the invisible 'captures' were tagged not saved and made recurrent by the system.

Table 62.1 Statistical result content captures of total event duration

Total amount captures HDT devices from Public IA						Percentage visible captures: 74.4%—9 days					
Day Nr.:	Total/Day:	Visible:	Invisible:	Tl:	Visible Tl:	T2:	Visible T2:	S:	Visible S:	LPTP:	Visible LPTP:
1	185	163	22							–	
2	213	190	23								
3	32	19	13	–						–	
4	48	30	18								
5	43	34	9	–						–	
6	76	46	30							–	
7	56	29	27	-						–	
S	280	212	68							–	
9	147	81	66							–	
TOTALS	1080	804	276	262	188	183	148	365	254	270	214
MAC Address											
Tl:						19eb8b0a00aba3cc					
T2:						56386c29479975c					
S:						6c255abM1af2d5t >					
LPTP:						webclient l					

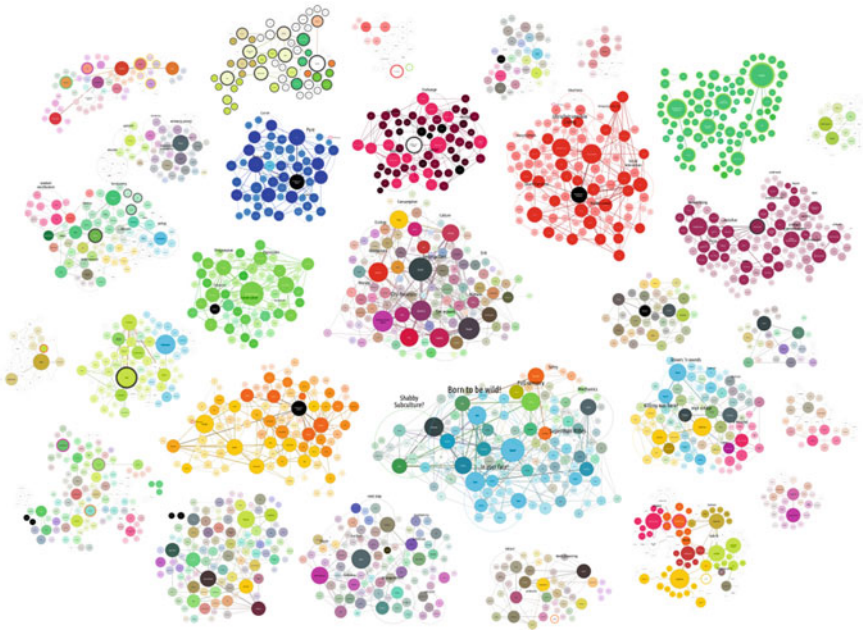

Fig. 62.8 Associative network visualization from interactive and iterative generative datasets

In addition, we collected data from the audience (i.e. users, participants) during generative and iterative design sessions over the duration of nine days. These associative reasoning and narrative tracings were captured and visualized with one of the tools and instantly connected and derived from discussion, enquiries and story-telling between the facilitator(s) and the audience or active participants (see Fig. 62.8). Participative technological evaluation (PTE) is very useful to elaborate, investigate and improve devices, systems and machines, whilst allow for more sustained and articulated forms of citizens expression. This emerges at a locus of particularly great complexity, through the interface of science and society. However, this taking into account of the impact of technological innovations (e.g. interactive technological evaluation) on society or on concerns of democracy is not new [10]. At the end of the PLG process (event), we returned to our institute's laboratory, where discussion and evaluation started on how to analyse, synthesize and present the data; based on the results, the specific audience (heterogeneity), the context of the event and the decisions the datasets might entail the available time during the testing and other relevant resources.

62.5 Evaluation

PLG was both an accident and success. People are in general very curious or at least driven with some curiosity and show interest in the overall layout and scope of the PLG setup. We observed that eighty percent of the audience do not engage themselves, participated immediately or become active in their actions or immersed in activity. Only after some nudging, giving attention and/or reach out people were willing to pick up the devices and asking: 'What to do next'? 'How does it work'? or 'Why is this relevant'?

Relations and associations between *context(s)* framed from presupposed societal issues and challenges (*content*) were often considered 'not really relevant' or 'of interest' at the start. However, after some enquiry and questions by the facilitator(s), about twenty percent of the users started to interact, connect and make representations. Some users were able to connect narrative based on a constraint challenge and create simple visuals with the tools. If asked if they had a concern or societal issue, in general, these were topical like, for example, 'plastic soup' or 'climate change'.

Younger audience (10–30 years) was faster and more spontaneous to pick up and play with the tools. A substantial number of these users were able to frame and visualize scenarios based on the design task. However, a larger number lacked attention or interest to get involved in the actual design task. One of the problems was, deduced from questions and responses, that the total event was overwhelming, and cognitive overload made most visitors to be overstimulated in their senses and concentration levels.

Older participants showed some anxiety initially to use the devices and system features. Most were afraid that 'something would happen'. Demonstration and some instructions helped to get these people interactive and worked collaboratively (i.e. friends, family and bystanders) to the creation and generating of content. Most people (audience) understood the tools and were able to formulate stories and make satisfactory visuals to go along with the storyline.

The audio area (speakers' corner) was the most spontaneously used tool of the PLG setup. Most users followed the sequence, first tool use and content creation afterwards reflection on tool interaction, experience and story-telling. However, we observed (and listened afterwards) many people to go up to the microphone and speak their minds, stutter randomly or answering the questions placed next to the microphone.

We ended up with a lot of data from the various resources and observed, received and witnessed many positive reactions and feedback from the audience. They found it novel, exciting, thought-provoking and often quite interesting to represent in multi-modalities based on context-aware societal issues and challenges.

The context of the event (*design*) and our PLG set-up created some friction in the publics' expectations, constraints in interests and trade-offs oscillating between '*fun and play*' [2] and '*serious and play*' [11].

62.6 Conclusion

To conclude, SALT as part of tools and systems to support and facilitate users in their interactions, communications and processes (e.g. design, creativity, engineering, sense-making, etc.) is argued to be beneficial for society, whilst enhance and foster democratization and helps in creating insight and understanding in (e.g. common, mutual) interests, hidden knowledge and tracing unknowns (i.e. unknown unknowns).

PLG was a prototype of an open-ended space; basically, it was a space on the edge of the unknown, perhaps even the frayed seam of societal fabric, however, a space for exploration, for probing experimental associations, meanwhile for investigating exploration in itself. It was a blended space, where the processes of knowledge (i.e. implicit/tacit to explicit) are examined and enquired into that allow the representation and visualization the production of knowledge in the entire multiplicity of its resources.

Thereby making visible, the mutually constitutive processes of translation through generative iterations that transform heterogeneous actors into seamless hybrids and hybridity networks. Automatically, a lot of bias and subjectivity occurs when tests and experiments take place as public evaluation in a synchronous or asynchronous manner in the presence of audience (i.e. users, participants) and in conjunction with various technological mediations, such as, interactive communication devices, information systems and machines.

Subjectivity is a process (not a 'thing'), which relies on two critical ingredients: the building of a *perspective (image making)* for the images in mind (*mental images*) and the accompaniment of the images of *feelings* [12]. Subjectivity is considered the first and indispensable component of consciousness. Every increment of design in the universe begins with a moment of serendipity, and the undersigned intersection of two trajectories yielding something that turns out, retrospectively, to be more than a mere collision [13]. You never can tell when SALT will strike, if given an opportunity.

Globally, collective, collaborative, networked users should be enabled to engage through democratization (e.g. communications, interactions and connections) and increasingly pose significant challenges (e.g. structures, analysis, behaviours and doctrines) that could lead to have strategic impact(s) (e.g. societal, industrial, resources, energy and environmental), experience global communal relations and pursue alternative agendas for effective change, affect and stance.

The SALT architecture and framework are discussed more in-depth in an additional article titled as: 'Why Add, SALT?' the case for tools to support Serendipity, Ambiguity, Laterality, and Tangibility (SALT). Unfortunately, this additional and supporting article was not accepted for this conference and/or proceedings.

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