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Creative Toolkits for TIPS⋆

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Abstract. We present a survey of toolkits employed in research workshop approaches within TIPS (Trust, Identity, Privacy and Security) domains. Our survey was developed within wider design research to develop prototypes that support people in evaluating whether to trust that an online actor's identity is not recently faked, and that a service they are registering personal information with is legitimate; and a subsequent project involving a tool that invites people to reflect on the cumulative risks of sharing apparently harmless personal information online. The radically multidisciplinary nature of both these TIPS projects has determined that we create a research space to promote exchange to, as design researchers, better understand the 'opaque' immediate and longer term implications of our proposed services and invite cross-disciplinary discussion towards interdisciplinary understandings. This paper is intended as an at-a-glance resource, or indeed toolkit, for researchers from a range of disciplinary backgrounds working on TIPS research to inform on various different material engagements, with research stakeholders, through creative workshop approaches. Our survey focused on the literature from Design (especially Participatory Design and Codesign), Human Computer Interaction (HCI) and cybersecurity. It comprises 27 papers or toolkit examples organised across: review papers; example toolkits; case studies reporting relevant toolkit use; applied toolkits for learning/knowledge exchange; research toolkits focused on demonstrating a methodological-conceptual approach (some problematising emergent or near-future technologies); and two papers that straddled the latter two categories, focusing on future practical application. We begin with an overview of our rationale and method before presenting each group of texts in a table alongside a summary discussion. We go on to discuss the various material components, affordances and terminology of the toolkits along with core concerns often left out of the reporting of research; before going on to recognise toolkits not so much as things that diagnose and fix things, but as a loose collection of readily available material and wider resources, used in particular participatory approaches, which together help account for techno-relational differences and contingencies in TIPS-related fields.

Keywords: Toolkits · Creative Workshops · TIPS · Interdisciplinarity · Participatory Design.

1   Introduction

Our motivation was to synthesise the rapidly growing body of research that usefully demonstrates creative workshop approaches – broadly, if not always explicitly presented as involving toolkits – across collaborative (multidisciplinary), cross-sectoral (involving stakeholders) trust, identity, privacy and security research. The TIPS acronym has been taken up as a neologism in UK research following two respectively named funding calls in 2015 and 2017. These invited:

> co-created, novel, interdisciplinary projects that solve real problems in aspects of trust, identity, privacy and security (TIPS) in the digital economy in a responsible way. We also want to engender a sustained and collaborative approach so that these projects engage with the wider relevant sectors and disciplines ... [31]

We have been involved in projects enabled through both rounds, primarily due to their foregrounding of cocreating research with stakeholders and their synergy to research design involving participatory or codesign approaches. They provided a unique opportunity to design, prototype and trial creative methodological approaches across sustained multidisciplinary research involving also designing, prototyping and trialing a technology service. Our survey has uncovered earlier including foundational work (also generated from a EPSRC call in 2008 and a 2012 EPSRC sandpit). We position this paper as having particular relevance for early career researchers and those new to large multidisciplinary collaborative research that involving participatory and generative workshop approaches involving stakeholders in the broad area(s) of TIPS.

2   Survey of Papers

The term toolkit may suggest an off-the-shelf solution to enabling TIPS related learning/data generation. We think the term is over and often uncritically used while nonetheless being a convenient catch-all reference to a wide spectrum of practically applied and cocreative (socio)material approaches or principles. We unpick and identify these in the following sections.

2.1   Method

The authors discussed a number of potentially relevant papers informed by their earlier work [28]. The first author conducted a broad search for papers published since 2011 focusing on, but not limited to HCI, Computer Supported Cooperative Work (CSCW) and Designing Interactive Systms (DIS) in the ACM Digital Library using keyword search term 'toolkit', extended variously through companion terms: 'toolbox', 'tools', 'techniques', 'physical modelling', 'physicalisation' etc to widen the scope of the search. We then filtered the results to focus our inclusion criteria on 'workshop' activities, and then in turn to focus on TIPS

domains: 'trust', 'identity', 'privacy' and 'security'. The first author then conducted similar 6-word keyword searches to the SOUPS archives (again from 2011 to 2020). Crucially, we also identified relevant texts referenced in our corpus and also used some creative licence in our final selection, to include two papers that we consider of particular methodological interest due to demonstrations of and reporting on a PD approach with an individual [26] and an apparently silly approach to critically engaging with concerns around current and near-future technologies [5]. Our final survey comprises 25 papers and two exemplar practical toolkit manuals (while not reported upon within workshop use they are intended as such). We categorised the selected texts accordingly: Review papers; Toolkits; Case Study Papers; Applied Research Toolkits; Conceptual/Methodological Research Toolkits and finally; Conceptual Future Application Toolkits. We acknowledge that other creative toolkit papers of relevance to TIPS may exist. However, we claim that our sample serves as a representative, useful and readily applicable review of demonstrated approaches with relevance across this already broad and rapidly growing field of research.

2.2   Review Papers

We selected six toolkit review papers (Table 1) that straddle the range of disciplinary fields relevant to our multidisciplinary research across HCI/CSCW, PD and cybersecurity research and practice. Two are firmly HCI: toolkits within HCI [24] and IoT in HCI [4]. The combined scope of these reviews demonstrates the substantive nature of toolkit related research in HCI, primarily in enabling and influencing foci, design and deployment of technologies and interactions. Ledo *et al.* [24] synthesised 68 toolkit papers to propose strategies for a toolkit evaluation and classification system, and offering insights into the toolkits' relative value, potential for bias and various trade-offs. This is technically focused work, following earlier interface design concept toolkits for designer-developer teams – updated as more "generative platforms ...provid(ing) easy access to complex algorithms, enable fast prototyping of software and hardware interfaces, or enable creative exploration of design spaces." (p.2) Berger *at al.* [4] focused on more creative narrative approaches involving IoT toolkits, synthesising work reporting on cocreated design scenarios, fictions and stories. These authors found that some approaches enable immediately functioning scenario development while others involve more speculative notions. Pragmatically they recommend questioning and adapting toolkit materials to support creation of under-explored design stories. The HCI literature is important in demonstrating different forms of engagement with the users of TIPS research; [29] and [42] advocate the field's relevance for considering and improving system use for the intended user.

From CSCW we included a review of practical public-facing toolkits [17] due to its critical review of 41 available online to promote cybersecurity; defined as "online collections of tools, tutorials, and tips aimed to help individuals or groups improve their security online." (p.2) Two overlapping categories of security toolkit are identified; the first address those for general use amongst nonspe-

Table 1. Review Papers.

Reference	Field/Toolkit	Toolkit Review
Ledo *et al.*, 2018 [24]	HCI overview and discussion of evaluation methods for HCI toolkits	Analysis of 68 HCI toolkits proposing they comprise 4 categories: novel examples; replicated examples; case studies and exploration of a design space
Berger *et al.*, 2019 [4]	IoT evaluation and analysis of 3 IoT toolkits for co-designing design stories	IoT Un-Kit experience comprises hybrid and analogue methods; proposes framework to compare/assess design stories generated
Fox *et al.*, 2018 [17]	Cybersecurity; reviews 41 public facing security-related toolkits to help achieve online security	Focuses on articulating "differential vulnerabilities" to promote understanding on security as socio-culturally situated and group specific
Brandt *et al.*, 2012 [8]	PD review of toolboxes for co-creation in multiple domains	Widely recognised approach using probes, models, games, workbooks, scenarios and mapping techniques – demonstrates availability of tools/techniques and opportunity for various combinations, adaptation and extensions
Sanders *et al.*, 2010 [35]	PD framework for organising the proliferation of PD tools, techniques and methods	Framework provides tools and techniques for engaging non-designers; suggests three dimensions of form, purpose and context for designing new PD methods
Sanders *et al.*, 2014 [36]	Co-Design overview of cultural probes, toolkits and prototypes in design research/practice	Offers perspectives across: approach (probes, generative toolkits, design prototypes); mindset (designing for/with people); temporal aspects (design for now, near/speculative futures) and variations in intent (to provoke, engage or serve)

cific populations, such as Electronic Frontier's Surveillance Self-Defense toolkit [1]. The second group support people with a conflict or distrust of institutions (governments, device manufacturers, service providers), for example produced by grassroots, activist or other organisations to support members' particular online security practices and to address the unique threats and harms directed at those who are on political and social peripheries. The evaluation revealed many comprised bolt-on functionality to meet specific needs of certain groups, due to the inadequacy of mainstream tools. Institutional tools (e.g. provided by manufacturers, governments) aimed to promote neutral socio-political stances and in so doing so failed to meet many groups' needs, meanwhile also stigmatising them as "(in)secure users"(p.1). The authors build on Dourish's and Anderson's

2006 [13] work that called for better contextual understanding around safety, security and privacy as not primarily technological, but rather, socio-politically "entangled" (p319).

The other three review papers concern PD, and are included to represent foundational PD literature as a resource for TIPS. PD considers the sociopolitical contexts of technological development and deployment, with its roots in Scandinavian cooperative design — an approach engaging all stakeholders (e.g. employees, customers, often trade union officials) in technological system design to ensure that all perspectives are considered and needs met. PD provides a methodological foundation for toolkits within TIPS alongside practical guidance especially when approaching enhancement of usability outcomes (by improving the functional design and evaluation of user facing security technologies). But PD also concerns sociopolitical contexts of intended toolkit – or technology outcome – use. Interestingly, whilst HCI borrows heavily (if to varying levels of credit) from PD, PD is criticised from amongst its own community for its "ambivalence" [8] in failing to promote wider take up and use of its own tools and techniques, elsewhere. This is particularly telling in areas such as TIPS with dichotomous and often competing aims and objectives (compare with [9]).

2.3 Toolkits

Table 2. Example Toolkits.

Toolkit Name	Overview	Application
YouShapeSecurity Coles-Kemp *et al.* [33]	Three manuals outlining toolkit principles, materials and processes	Security practitioners; designers and managers of technical security approaches in organisations
Participatory Methods Toolkit Slocum [37]	Manual includes 10 in-depth fiches and overviews 38 participatory methods and techniques	For starting up/ managing participatory projects in organisations

From the vast number of practical toolkits available for general use we selected two for inclusion in our sample. We considered these as exemplars, worthy of mention due to being specifically on-topic and/or comprehensive; they are also critically framed – both coming from academic teams. They are: a manual of toolkits to support the design of digital security [33] and a toolkit of participatory methods (aimed more at practitioners) [37]. YouShapeSecurity [33] emphasises in a detailed series of user manuals the importance of collaboration. The techniques of "creative engagement" (p.4) enable people within organisations to discuss their individual situations, security focus and protection practices and to

develop shared understandings of their wider security landscape. The approach assists the generation and exchange of learning around the hazards and risks of day-to-day information security. This represents a "radical departure [from] affirming the principles of technological security through compliant practice" [12] (p.10) and a platform that enables participating communities, and indeed those who do not engage in security programmes, to enter a dialogue of security concerns [33].

2.4   Case Study Papers

Table 3. Case Study Papers That Include Toolkits.

Ref. – TIPS	Toolkit Overview	Toolkit Findings
Dunphy *et al.* 2014 [15] – Privacy – Security	Focuses on under-represented groups: 80 somethings; an international women's centre and an under-resourced community	Introduces notion of experience-centered privacy and security; advocates engaging users in sharing experiences of privacy and security; demonstrates a range of mixed creative methods
Jensen*et al.* 2020 [20] – Security	Geographically, socially and culturally diverse communities of: seafarers; Geenland residents and North East unemployed; uses a wide range of creative methods and information gathering	Ethnographic/conversational approach to solicit plurality of voices/experiences (around liminality and social isolation linked to security and technological innovation)

Further, we selected two papers that report on a number of different case studies – some of which are more relevant to TIPS than others, but which valuably synthesise, analyse and contribute critical insights into methodological approaches, with particular [15] or broad [37] relevance to TIPS.

2.5   Applied Research Toolkits

The remaining papers in our survey report on a focused study involving one or series of related workshops/participatory activities involving to different extents design, demonstration and evaluation of a toolkit approaches in a particular TIPS problem space. We further clustered this large group between reported research that was explicitly applied to exchanging knowledge, encouraging critical reflection on personal or groups practices towards supporting safety amongst particular participating groups; these papers are discussed in this section; and

Table 4. Applied Research Toolkits.

Ref. – TIPS	Applied Toolkit/Workshop	Guidance/Application
Coles-Kemp *et al.* 2012 [11] – Privacy	Support privacy and consent decision-making and promotes methodology in future oriented privacy and online awareness; focuses on hard to reach groups excluded from privacy design	Offers a range of domain specific participatory methods guides
Coles-Kemp *et al.* 2020 [12] – Security	Security design for security practitioners and healthcare service providers	User guides comparing top down and bottom up perspectives with related discussion aiming to share understanding from alternative security perspectives
Heath *et al.* 2019 [19] – Trust – Security	Security focused offering guidance for smart technology adoption amongst community/ resident groups	Suggests actions towards enabling a successful community-focused outcome
Bowyer *et al.* 2018 [7] – Trust – Privacy – Security	For system designers and policy makers on range of privacy, security and social justice issues relating to family-oriented data; involving cross-generational families	Offers principles on rights, control and visibility over civic data handling and involvement of families in decision-making

others that are primarily methodological and conceptual (despite some claiming practical application/impact). A further two papers fall somewhere in between, in that they clearly offer future applicability to addressing a particular area of concern; these groups of papers are discussed in turn in the sub-sections further below.

The applied toolkit texts focuses on sharing principles, guidelines and frameworks, grounded in empirical work that demonstrates particular creative approaches used in specific user contexts. Coles-Kemp and Ashenden are leaders in devising novel creative approaches to engaging stakeholders in debates and knowledge exchange about online security, including to humanise what otherwise is often highly technical, while also emphasising finding practical ways to vitally enable different voices and points of view. This marked a paradigm shift towards human centredness for privacy and security research. Early VOME (Visualisation and Other Methods of Expression) work over a 4-year period applied and demonstrated its "community-centric engagement" approach, which informed contribution towards a multi-disciplinary methodological framework. The spe-

cific papers included here consider designed interventions to promote privacy awareness both on and off-line [11].

2.6   Conceptual/Methodological Research Toolkit

The conceptual and methodological texts demonstrate, trial, evaluate and critique various multi- and interdisciplinary research design or methodology. In total these comprise 11 papers, by some measure our largest category within the review. Some of the research reported is intended to challenge and provoke current, emerging and near-future technological systems and our attitudes and understandings as both designers and uses of these systems. Blythe *et al.*, used an imaginary design workbook [6] approach with industry partner Mozilla and a social work professional to promote workshop participants' critical envisioning around (post) privacy and surveillance potential of home-hub technologies "that record the minutia of our lives". The experimental design workshop process was used to demonstrate one approach to addressing HCI's need to not only "engage with political, ethical and legal issues" while questioning whether designers actually currently do or not. Blythe and colleagues also adopt "silly" design fiction workshop making approaches [5] to demonstrate and unsettle our position in relation to technological solutionism – the critique of trends towards delegating human agency and morality to technology – as posited by Evgeny Morozov [32]. The resulting "unuseless, partial or silly objects" [5] (p.4977) as illustrated in the paper problematising the surveillance by stealth potential of urban data capture. Blythe is one of a number of UK researchers extending Design Fiction - associated with Critical Design and typically accredited to Bruce Sterling in 2005 where he is said to have said it is similar to science fiction (see [38]) to envision plausible near-futures to provoke a sense of discomfort through recognition of our role as designers in co-constituting unwelcome technological outcomes.

Several of the papers also clearly demonstrate a particular methodological approach within or came out of TIPS related research with particular users groups; 80-somethings and trusted banking leading to a "questionable concepts" approach [41]; investigating older people learning about the potential of digital technologies using props and performance over several sessions [27]; creative making workshops with LGBTQ young people and community police to surface attitudes from both groups to aspects of hate crime and hate crime reporting, to inform on designing for particular groups and needs; workshop outcomes were then adapted as design materials for a public intervention [18]; a generative workshop approach, "Blockit", to support understanding of blockchain and cryptocurrency [22]; socio-material aspects of workshop materials and their interpretation and use (or non-use) by particular groups in building trust, both amongst researchers and workshop participants and between participants and (in this specific case) local officials [10]; didactic approaches to understanding "opaque technologies" [30]; and an illustrated guide approach to supporting people undergoing life transitions [16]. Some of these involve different user groups while others, as with [5] [40] involve conference or university workshops to explore

Table 5. Conceptual/Methodological Research Toolkits.

Ref. – TIPS	Toolkit and Workshop Overview	Approach
Blythe *et al.* 2016 [5]	Demonstrates participatory critical design fiction approach informed by Magic Machines [2]; with interdisciplinary research team and older community	Critical design and unuseless designs towards an anti-solutionist methodology
Blythe *et al.* 2016 [6] – Privacy – Security	Constructive criticism through practical provocations approach to data post-privacy, with HCI specialists (Mozilla) and a social work professional	Exploration and creative design with/in post-privacy space
Clarke *et al.* 2019 [10] – Trust	Critically investigates sociomaterial trust in design workshop methods to investigate trust-related perspectives towards particular people or institutions; with a low-resource community organisation	Articulates significance of material use not just as a workshop topic but in building or unsettling trusted relations between researchers and participants; broadly based beyond digital contexts
Gatehouse *et al.* 2018 [18] – Trust – Security	Creative HCI design approach to enable and communicate trust/mistrust and LGBTQ identities in the context of hate crime reporting with young people and community police	Informed by Magic Machine approach [2] to challenge conceptualisations of LGBTQ young people's vulnerability by designers, and to lesser extent, criminal justice workers
Khairuddin *et al.* 2019 [22] – Trust	HCI tool to engage participants in designing trust protocol in blockchain with experienced bitcoin users	A toolkit for visually materialising and discussing non-visual blockchain phenomenon relating to transactions and trust.
Light *et al.* 2011 [26] – Identity	HCI approach to investigating user vulnerability focusing on one older person's experiences	Improvisation performance experiment to investigate personal transformation through experiential learning through participation.
Maxwell *et al.* 2015 [30] – Trust	Design-HCI approach to informing blockchain enabled platform service design using peer-to-peer validation with students, designers, tech start up reps. and bitcoin users	A 'tangible interactive workshop' invited participants to enact trusted transactions as though on a Blockchain, with Lego

Table 5. Conceptual/Methodological Research Toolkits Continued...

Ref. – TIPS	Toolkit & Workshop Overview	Approach
Sturdee *et al.* 2016 [39] – Identity	HCI approach to exploring value of creating fictional research worlds involving conference Workshop participants	Design fiction, imagined future interactions and online identity
Vines *et al.* 2012 [41] – Trust	PD workshops soliciting older olds' experiences of banking	Concept cards, design sketches and brief outlines of concepts to solicit ideation around new financial services with/for the older old
Durrant *et al.* 2018 [16] – Identity	Investigates how UK citizens at 3 life-transitions create and manage their online identities with young adults; new parents and recent retirees	Ethnography/experience-centred design to "inform policy-making and service innovation for enhancing digital literacy in online self-representation" (p.122)
Mathiasen *et al.* 2011 [29] – Security	Participatory and experience-driven design using prompted exploration workshops/acting out security techniques with professional typesetters and senior citizens	Explores space between security experience and expectation and participants' changing strategies different security situations.

and/or demonstrate an approach for take up and use by others. Mathiasen *et al.* is worth noting in that [29] explores the spaces between participants' security experiences and their expectations of a new working system for typesetters.

2.7   Conceptual Future Application Toolkit

This final group of two papers highlights the potential future application of using creative generative workshop approaches in knowledge exchange activities involving InfoSec practitioners [25] and cybersecurity practitioners and policy makers [3]. These papers fell between our constructed conceptual and applied categories, yet are clearly motivated to offer a workshop methodology with clearly explicated relevance to TIPS practitioners such as to understand the operational context of different professional roles and related stakeholders such as policy makers.

Table 6. Table of Conceptual-Future Application Toolkits.

Ref. – TIPS	Toolkit and Workshop Overview	Approach
Ashenden *et al.* 2013 [3] – Privacy – Security	Toolkit and approach to expand the boundary of the currently held mental models of risk and security; with cyber security practitioners and policy makers	Critical design - creating speculative scenarios suggested as a research technique for imagining future cyber security risk
Lewis *et al.* 2014 [25] – Security	Toolkit for InfoSec practitioners to better understand other user communities and their security practices; with InfoSec practitioners	Suggested as an approach for security training and awareness programmes to understand operational contexts of differing professional roles, for planning exercises around professional roles needed for particular security tasks

3   Discussion

Socio-technical design is increasingly concerned with critically considering the impacts on society, citizens and non-human actors of current or near-future technologies and is pertinent to our work as design researchers. While current and emerging technologies have enormous societal potential, including through enhanced online privacy and security, their design involves many operational challenges, including through their immaterial illegibility; often challenging the understanding of technologists that help create them [28]; but certainly those of the multiplicity of stakeholders who commission, promote, benefit or otherwise from uptake and use. Concerns include the increasing 'reach' of data generating technologies as they encroach across every aspect of our everyday lives [28] [34] [14] [21].

So with these multiple intersecting concerns and contexts; what makes a good toolkit? Our review papers comprise the following materials, devices and props as described by their authors. But crucially, these are used in particular research approaches in different ways, with different groups; we go on to explore these further below.

3.1   Materials

Digital Recording Tools to Capture Information
Audio-recorder [20]; video capture [3] [39] [11] [15].

Analogue Capture/Sorting of Comments
Instant/ disposable camera [8] [20]; corkboard [7]; diary books [8]; writable pa-

per tags [7]; sticky notes [5] [3] [22] [33] [20] [12]; postcards [10] [8] [20]; stickers [30] [7]; ink stamp [22]; pens, markers [5].

Construction/Drawing Materials For Assemblage and Annotation
Card and Cardboard [18] [41] [5] [8];paper [30] [22] [29]; wide use of LEGO bricks [22] [30] [12] [19] [35]; cocktail sticks [18]; masking tape [18]; modelling clay [22]; paper plates [5]; plastic cups [5]; string [18]; paper sorting poles [7]; pipe cleaners [5];foam [35] and; envelopes for covering or grouping together [22].

To Promote Play
Paper dolls [8]; plastic guns [18].

Ready to Hand Household or Leisure/Crafting Materials
Balloons [18]; sandcastle flags [18]; fly squatter [18]; keys [22]; lights [22]; maps [20]; clothing [10] [26] padlock [22] tokens [22]; transparent containers [22].

The survey covers a vast number of creative participatory workshop approaches – designed for a specific purpose and group(s) of participants. We have categorised these below broadly across five thematic groups: storytelling and reflective annotation; visual and 3D modelling; improvisation, performance and role play; games and cards and; finally landscaping, problem setting and mapping focused on their method of soliciting information. We caution however that there are cross overs and overlaps between these approaches; Lego bricks are readily assembled into visual and physically interpretative models that in turn invite articulation and dialogue. Story boarding [11] lends itself – beyond soliciting immaterial ideas, understandings or experiences of its creator – to visual construction of a narrative – which in turn can be shared, interpreted and discussed. Often the narrative arc afforded by provision of particular individual or combinations that invited or scaffolded storytelling. Landscaping, problem setting and mapping was used in the texts to explore the problem space and also, notably, to promote participants' ideation and envisioning, often beyond the researchers' intentions and the inherent limitations and /or expectations.

3.2   Material Approaches

Storytelling and Reflective Annotation
Annotation/notes [43] [5] [22] [11]; costume annotation [9]; day in the life exercises [7]; diaries/diary-study [7]; storytelling [17] [27] – timelines [28]; washing line scale [20]; creating story sheet/ storyboarding [11] [22] [21] [35]; fictional narrative[7]; narrative scenario [27]; persona cards [27]; newspaper story [9]; picture book [18]; speculative scenarios [12]; personal narratives [22]; fantasy persona [28]; current experience comic strip (CECS) [25] digital storytelling [22]; envisioning exercise [9]; privacy awareness interventions [10]; think-out-loud technology evaluations [10].

Visual and 3D Modelling
Community art [10]; magic machines [4]; magic tool [7]; imaginary design workbooks [5]; participatory video [10] design artifact [5] [28]; low-fidelity model [7]; high-fidelity prototype [43]; velcro modelling [7] [37]; future design artifact [37]; rich picture [12] [21]; video artifact [12]; technological artifact [31]; physical modelling [24] [32] [21] [35] [11]; participatory prototyping [7]; inspiration token [43] [17]; prototype [43] [38] [31]; mock-up [7] [37]; conceptual prototype [7] [37]; digital portrait [17].

Improvisation, Performance and Role Play
roleplay [9]; participatory theatre [10]; participatory envisioning and enactment [37]; improvised scenarios [7]; performance-derived improvisation methods [28]; props [4] [12] [28] [37].

Games and Cards
card trading game [10]; concept cards [43]; board game [9]; show and tell family workshops [10]; questionable concept cards [43] [17]; resource cards [32]; family design game [6]; prompt [32]; prompted exploration [31]; enactment game with technological artifacts (acting-out security) [31].

Landscaping, Problem Setting and Mapping
collage [7] [10] [17] [35] [37] [43] [11]; brainstorming [31] [11]; creative security engagements [35] [17]; probe [28]; Digital probe [10] Cultural probe [7] [10] [37] [38] [31] [22] [17]; exploratory interview [27]; information gathering kit [22]; boundary object [6]; cake assemblage [9]; tea party [43]; holistic mapping exercise [9]; participatory mapping [22]; mapping [37]; cognitive mapping [7].

3.3   Summary and Conclusion

It is apparent from the survey that this multiplicity of different and largely inexpensive and readily available materials have different physical affordances. LEGO bricks readily afford their assemblage. Similarly pieces of clothing invite role play, expression and the trying on of possible future identifies or roles. We suggest, informed by Le Guin [23], that these various toolkits are not about their physical properties but about their collective and generative potential in concert with workshop researchers, participants and particular approaches. Le Guin argues that technology should not be discussed and understood in terms of its techno-heroism, as she puts it:

> We've all heard all about the sticks and spears and swords, the things to bash and poke and hit with, the long, hard things, but we have not heard about the thing to put things in, the container for the thing contained. [23] (p.151)

Tools and technologies have historically invited narratives based on weaponry, that poke and prod and potentially maim. Le Guin goes on to suggest technology is better and more accurately conceptualised as a container into which often

mundane necessities are collected; the humdrum but essential function of many technologies remain largely absent from technology's dominant *heroic* narrative. Our survey relatedly comprises a toolkit of toolkits; we are not prescribing its contents but demonstrating a range of associated materials and approaches to addressing a number of user centred challenges that arise within multidisciplinary TIPS research. Crucially, we have selected papers that include the quite technically focused [24] while also offering a richness of demonstrated creative design methodologies.

We research in interesting times when the perception of technological complexity raises many salient societal questions. Le Guin highlights it is not about promoting compliance amongst citizens and users of technologies, but also taking better care to understanding different groups' characteristics, abilities, needs and values. Containers, or toolkits, within this mindset could be more fully exploited. We consider them at their best as a pre-production or pre-engagement resource that facilitates exploration and negotiation of trust, identity, privacy and security within the research process itself, not merely its final object(ive), enabling multiple different realms of social, relational contingencies and dependencies. These toolkits comprise a pragmatic design resource or approach for current and continuing TIPS researchers to not so much aim for others' compliance but through which to engage critically, offering a vantage point from which to consider the unstable, unseen, and differently-abled experience-centred factors; all much needed in TIPS research.

Survey spreadsheet with additional detail available at
http://www.dropbox.com/s/0ms58snpsx7ppxh/T4T.xlsx?dl=0

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